IODP Proposal Cover Sheet

Antarctic Cenozoic Paleoclimate

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Title	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
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Abstract

Along the George V and Adélie Land (GVAL) shelf of Antarctica, shallowly-buried strata contain a record of Antarctica's climate and ice history from the lush forests of the Eocene greenhouse to the dynamic ice sheet margins of the Neogene. Over these times, Antarctica and the Southern Ocean have played a central role in controlling sea level, deep-water formation, ocean circulation, and exchange of carbon dioxide with the atmosphere. Yet currently there are very few direct records of Antarctic climate and ice conditions from close to the continent. On the GVAL shelf, short piston cores and dredges have recovered Cretaceous and Eocene sediment at the seabed. In 2010, IODP Expedition 318 recovered earliest Oligocene and early Pliocene subglacial and proglacial diamicts, providing direct records of ice advances across the shelf at these times, and confirming that target sediments are accessible at shallow burial depths. However, challenging ice and drilling conditions from the JOIDES Resolution resulted in poor core recovery and abandoning sites before the stratigraphic targets were reached. Here we propose to use the MeBo sea bed drill for improved core recovery and easier access to the shelf. We propose to drill two stratigraphic transects of shallow (~80m) holes to investigate Antarctica's role in icehouse and greenhouse climates, and the transitions between the two.

To investigate Oligocene to Pliocene ice sheet dynamics, we target strata above and below regional erosional and downlap surfaces to date and characterize major episodes of ice sheet advance and retreat. These direct records of ice extent on the shelf can be set in the context of Southern Ocean records of temperature, ice-rafted debris (IRD) and latitudinal fluctuations of the opal belt, and hence we can relate ice behavior to paleoclimate conditions. The ice and climate history of the GVAL margin can provide warm-world scenarios to help understand ice sheet instability in analogous future warm climates.

In the Cretaceous and Eocene greenhouse target intervals: temperature and vegetation records will provide high-latitude constraints on pole-equator temperature gradients and their evolution; the proximity of the sites to the coastal lowlands will enable us to assess the hypothesized role of thawing permafrost in Eocene hyperthermal events; and late Eocene cooling and possible pre-cursor glaciations can also be documented by drilling.

This proposal addresses the IODP science plan's challenges "How does Earth's climate respond to increased CO2?" and "How do ice sheets and sea level respond to a warming climate?"

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Scientific Objectives

Paleoclimate and ice sheet dynamics objectives:
- The timing and environmental conditions leading to major ice advances over the shelf, and how this relates to records of IRD, sea level and oxygen isotopes. We aim to sample the Eocene/Oligocene ice advance (~34 Ma), Oligocene environmental conditions, the mid-Miocene climate transition (~14 Ma), and earliest Pliocene warmth and climate fluctuations (~5 Ma).
- Climate cooling in the late Eocene in advance of main glacial inception at the Eocene/Oligocene boundary: what were the paleoenvironmental conditions, was there cyclicity, and were there precursor glaciations?
- Antarcticaʼs climate during the early Eocene climatic optimum, including cyclicity, hyperthermals, temperatures and vegetation. This will extend the short time window obtained at distal Site U1356 (Expedition 318), at a site closer to Antarctica.

- Early Cretaceous greenhouse conditions (non-marine sediments): are they stable or cyclic, and how do conditions compare to the Eocene greenhouse?

Drilling will also address seismic-stratigraphic, glacial-isostatic, and tectonic objectives to:
- Date the major changes in shelf prograded wedge geometry and the major unconformities.
- Constrain the timing and character of rifting between the GVAL margin and Australia.
- Assess whether the predictions of glacial isostatic adjustment (GIA) models are recorded in the ice-proximal sediments (e.g., relative sea level rise adjacent to expanding ice sheets).

Non-standard measurements technology needed to achieve the proposed scientific objectives.

Drilling from a stable platform achieves much better recovery of glacial sediments than from a moving ship (e.g. ~98% recovery at AND-1B, drilled from the McMurdo ice shelf, compared to ~38% recovery of semi-lithified diamict at Antarctic shelf sites drilled from the JOIDES Resolution). Therefore we propose to use a sea floor drill rig (MARUMʼs MeBo) to provide a stable platform and improved core recovery. Additionally, the deploying vessel would be better able than the JOIDES Resolution to reach sites through moderate sea ice conditions.

Proposed Sites

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
GVAL-01A	-66.74533, 145.59042	506	80	0	80	Late Eocene cooling, precursor interglacials? Youngest available strata along WEGA-02-01. Primary site.
GVAL-02A	-66.78851, 145.50550	563	80	0	80	Late Eocene cooling, precursor interglacials? Can Antarctica sustain any ice sheets when the atmosphere is above 1000 ppm CO2? Nature of high amplitude reflector. Primary site.
GVAL-03A	-66.87160, 145.32064	713	80	0	80	Middle/Late Eocene climate conditions, nature of paleoenvironmental change represented by underlying high-amplitude reflector. Primary site.
GVAL-04A	-66.88356, 145.29604	765	80	0	80	Middle Eocene climate conditions, nature of paleoenvironmental change represented by overlying high-amplitude reflector. Primary Site.

GVAL-05A	-66.90627, 145.26001	844	80	0	80	Middle Eocene climate and environmental conditions, nature of paleoenvironmental change (close to Dredge 1). Primary Site.
GVAL-06A	-66.91162, 145.25153	881	80	0	80	Middle Eocene climate and environmental conditions, nature of paleoenvironmental change (close to Dredge 1). Primary Site.
GVAL-07A	-66.93843, 145.20008	956	80	0	80	Early/Middle Eocene climate and environmental conditions. Pre-unconformity A. Hyperthermals? Primary Site.
GVAL-08A	-66.95185, 145.16873	1069	80	0	80	Early/Middle Eocene climate and environmental conditions. Pre-unconformity A. Hyperthermals? Primary Site.
GVAL-09A	-66.98382, 145.10865	1193	80	0	80	Early Cretaceous temperature and vegetation on Antarctica. What were the Cretaceous greenhouse conditions like compared to Eocene warmth? Alternate Site.
GVAL-10A	-66.99644, 145.08846	1200	80	0	80	Early Cretaceous temperature and vegetation on Antarctica. What were the Cretaceous greenhouse conditions like compared to Eocene warmth? Alternate Site.
GVAL-11A	-66.10396, 143.27648	540	80	0	80	Early Pliocene ice advances and warm intervals. Age of WL-U8 unconformity. Alternate Site.
GVAL-12A	-66.13133, 143.19281	570	80	0	80	l. Miocene (?) environmental conditions leading to the formation of the WL-U8 unconformity and the observed change in the geometry of the sedimentary wedge. Alternate Site.
GVAL-13A	-66.19123, 143.04521	600	80	0	80	?mid-Miocene ice expansion (~14Ma) across downlap surface following the Mid-Miocene Climate Optimum Alternate Site.
GVAL-14A	-66.21104, 142.99714	607	80	0	80	Middle Miocene (climate optimum?) and environmental conditions leading to mid-Miocene ice expansion Alternate Site.
GVAL-15A	-66.33685, 142.77142	465	80	0	80	Oligocene environmental conditions. How did the Antarctic ice sheets respond the last time Earth's atmosphere was between 600-1000ppm CO2? Alternate Site.
GVAL-16A	-66.38363, 142.72241	540	80	0	80	Earliest Oligocene environmental conditions and glacial advance leading to a continental-wide ice sheet. Alternate Site.
GVAL-17A	-66.39432, 142.70773	532	80	0	80	E/O transition. Environmental changes across the WL-U3 unconformity (in combination with proposed site GVAL-16A) Alternate Site.
GVAL-18A	-66.40869, 142.68304	518	80	0	80	Late Eocene environmental conditions leading to establishment of

-	-	-	-	-	-	continental-wide ice sheet. Age of sediments underlying unconformity WL-U3 Alternate Site.
GVAL-19A	-66.46560, 142.57710	428	80	0	80	Late Eocene cooling, precursor interglacials? Alternate Site.
GVAL-20A	-66.51689, 142.48008	353	80	0	80	Middle Eocene climate and environmental conditions, Eocene cooling. Alternate Site.
GVAL-21A	-66.53017, 142.45635	428	80	0	80	Middle Eocene climate and environmental conditions, Eocene cooling. Alternate Site.
GVAL-22A	-65.59561, 138.56735	698	80	0	80	Early Pliocene ice advances and warm intervals. Age of downlap surface. Primary Site.
GVAL-23A	-65.61177, 138.55483	705	80	0	80	Early Pliocene ice advances and warm intervals. Age of downlap surface. Primary Site.
GVAL-24A	-65.65785, 138.51445	750	80	0	80	Early Pliocene ice advances and warm intervals. Age of WL-U8 unconformity. Primary Site.
GVAL-25A	-65.68413, 138.49526	758	80	0	80	l. Miocene (?) environmental conditions leading to the formation of the WL-U8 unconformity and the observed change in the geometry of the sedimentary wedge. Primary Site.
GVAL-26A	-65.83677, 138.38131	863	80	0	80	?mid-Miocene ice expansion (~14Ma) across downlap surface following the Mid-Miocene Climate Optimum. Age of downlap surface. Primary Site.
GVAL-27A	-65.86841, 138.35631	870	80	0	80	Environmental conditions leading to (?mid-Miocene) ice expansion. Primary Site.
GVAL-28A	-65.94511, 138.29178	900	80	0	80	Earliest Oligocene environmental conditions and glacial advance to a continental-wide ice sheet. Primary Site.
GVAL-29A	-65.96027, 138.28022	908	80	0	80	Late Eocene environmental conditions leading to establishment of continental-wide ice sheet. Age of sediments underlying unconformity WL-U3 Primary Site.
GVAL-30A	-67.73300, 146.85000	1407	80	0	80	Early Cretaceous (Aptian) temperature and vegetation on Antarctica. What were the Cretaceous greenhouse conditions like compared to Eocene warmth? Alternate site.
GVAL-31A	-66.58894, 143.35924	855	80	0	80	Early/Middle Eocene climate and environmental conditions. Hyperthermals? Alternate site.
GVAL-32A	-66.59027, 143.36556	848	80	0	80	Early/Middle Eocene climate and environmental conditions. Hyperthermals? Alternate site.

GVAL-33A	-66.81877, 144.47948	1013	80	0	80	Early Cretaceous environment and vegetation on Antarctica. Primary site.
GVAL-34A	-66.82192, 144.49311	1005	80	0	80	Early Cretaceous environment and vegetation on Antarctica. Primary site.
GVAL-35A	-66.86100, 144.63940	1050	80	0	80	Early Cretaceous environment and vegetation on Antarctica. Alternate site.
GVAL-36A	-66.86544, 144.65615	1058	80	0	80	Early Cretaceous environment and vegetation on Antarctica. Alternate site.
GVAL-37A	-66.87030, 144.67273	1065	80	0	80	Early Cretaceous environment and vegetation on Antarctica. Alternate site.
GVAL-38A	-66.85764, 144.81591	960	80	0	80	?Early Eocene climate and environmental conditions. Hyperthermals? Alternate site.
GVAL-39A	-66.85935, 144.80628	975	80	0	80	?Early Eocene climate and environmental conditions. Hyperthermals? Alternate site.
GVAL-40A	-66.86087, 144.79772	990	80	0	80	?Early Eocene climate and environmental conditions. Hyperthermals? Alternate site.
GVAL-41A	-66.81340, 144.48011	1013	80	0	80	Cretaceous or Paleogene temperature and vegetation on Antarctica. Alternate site.
GVAL-42A	-66.80577, 144.48733	954	80	0	80	Cretaceous or Paleogene (?Early Eocene) temperature and vegetation on Antarctica. Alternate site.
GVAL-43A	-66.71453, 144.56810	863	80	0	80	Middle Eocene climate conditions, nature of paleoenvironmental change represented by high-amplitude reflector. Alternate site.
GVAL-44A	-66.70213, 144.58519	870	80	0	80	Middle Eocene climate conditions, nature of paleoenvironmental change represented by high-amplitude reflector. Alternate site.
GVAL-45A	-66.67110, 144.62679	844	80	0	80	Middle/Late Eocene climate and environmental conditions Alternate site.
GVAL-46A	-66.64422, 144.65613	713	80	0	80	Middle/Late Eocene climate and environmental conditions Alternate site.
GVAL-47A	-66.62866, 144.66952	690	80	0	80	Middle/Late Eocene climate and environmental conditions Alternate site.

Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments

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1. Introduction

1.1 Background

Antarctica is a keystone of the Earth's ocean and climate system: the size of its ice sheets controlled sea-level for most of the last 34 Myr; ice sheet and sea-ice extent influence the latitude of the polar fronts, circulation between ocean basins, and deep-water formation (e.g. McKay et al., 2012, Collins et al., 2012); the Southern Ocean is the likely gateway of CO_2 to the atmosphere during Pleistocene deglaciations (Skinner et al., 2009, Barker et al., 2009, Jaccard et al., 2013), and is a major sink of CO_2 in the present day (Sallée et al., 2012); and the release of carbon from Antarctic permafrost may have been the cause of Eocene hyperthermals (DeConto et al., 2012). Understanding the operation of these systems under elevated CO_2 conditions in the past can inform our understanding of future climates. However, continental and near-offshore records of this Antarctic ice and climate history are still relatively few, because Antarctica is ice-covered, its sediment records are often glacially eroded, and floating ice can be inhospitable to drill ships. Some time intervals have not been sampled on Antarctica (e.g., 47-37 Ma), and those that are sampled are represented at very few localities around the entire Antarctic continent, for example, Eocene warmth, subsequent cooling, and the transition to the icehouse world.

Trends, steps, cyclicity, and events in Earth's climate history are best known from the benthic oxygen isotope records collected by scientific ocean drilling (e.g., Zachos et al., 2008). But their interpretation in terms of Antarctic conditions relies on more direct records from close to the continent, such as the first occurrence of tills and ice-rafted debris (IRD) at the Eocene/Oligocene boundary (e.g. IRD at Site 748, Kerguelen Plateau, Zachos et al., 1992), on ice-proximal offshore records of ice sheet ebb and flow (e.g. McMurdo ice shelf, Site AND-1B, Naish et al., 2009), and on records of Antarctic vegetation and landscape history (e.g. Lewis et al., 2007, Hambrey et al., 2007, Wilson et al., 2011, Pross et al., 2012).

In 2010, IODP Expedition 318 drilled sedimentary sections offshore of the Wilkes Land margin (Fig. 1) (Escutia et al., 2011), an area where the East Antarctic ice sheet is modeled to be among the most sensitive to climate warming (e.g. Huybrechts, 2004). Early Pliocene super-interglacials are recorded in diatom and ice-rafted debris (IRD) records at deepwater Sites U1359 and U1361 (Cook et al., submitted, Patterson et al., in prep.). At deepwater Site U1356 (66.3°S, 136°E), large IRD pulses mark the mid-Miocene climate transition, the Eocene/Oligocene boundary unconformity was crossed, and sub-tropical vegetation was found at 53.6–51.9 Ma in the early Eocene (Pross et al., 2012).

The continental shelf is the only place that contains a direct record of advances and retreats of the grounding line (e.g. Naish et al., 2009). As well as sites on the continental rise, Expedition 318 also targeted erosion surfaces on the shelf (Escutia et al., 2005, 2011, Figs. 1, 3). While these unconformities were not reached, the overlying sediments indicate that they represent the Eocene/Oligocene boundary and the basal Pliocene. A third shelf site, U1357, cored a remarkable 200m diatom ooze record of Holocene environmental conditions.

Here we propose to collect new shelf sediment records of Antarctic climate from the Eocene and Cretaceous greenhouses to the Neogene icehouse (Figs. 1, 2, 3). Many of these intervals have not been drilled before on Antarctica. Shelf records offer three major advantages over deepwater records: 1) older parts of the stratigraphy are accessible in the shallow subsurface, due to tilting and glacial erosion of the overlying strata; 2) the shelf holds direct records of ice margin fluctuations (diamicts, erosion surfaces, thin interglacial deposits), continental vegetation

(palynology), and temperatures (continental biomarkers); 3) the relatively shallow water depths favor preservation of any carbonate microfossils such as foraminifera.

1.2 Related Antarctic initiatives

The SCAR research program PAIS (Past Antarctic Ice Sheet Dynamics), focuses on ice sheet behavior based on linking data along ice to deep-ocean transects, together with data-model intercomparison. The proposed George V Land and Adélie Land (GVAL) sites are an ideal fit in PAIS, because they link the Southern Ocean sites from IODP Expedition 318 and ODP Leg 189 to the potentially unstable ice overlying the Wilkes Subglacial Basin, which contains 2000-m-deep glacially-eroded trenches that were carved under contrasting ice configurations of the past (Fretwell et al., 2013), as well as potential outburst flood landscapes (Ferraccioli et al., 2009; Jordan et al., 2010, 2012). This proposal is complementary to IODP expeditions and proposals in other Antarctic sectors, and to the ANDRILL MIS and SMS programs and to potential future ANDRILL proposals, which will allow variations between different ice sheet sectors to be assessed. This proposal arises from presentations and discussions at recent workshops of the Antarctic drilling community at the Granada ACE meeting (August 2009), the Bremen INVEST meeting (September 2009), the Edinburgh ISAES meeting (July 2011) and the Portland SCAR meeting (July 2012) (De Santis et al., 2012).

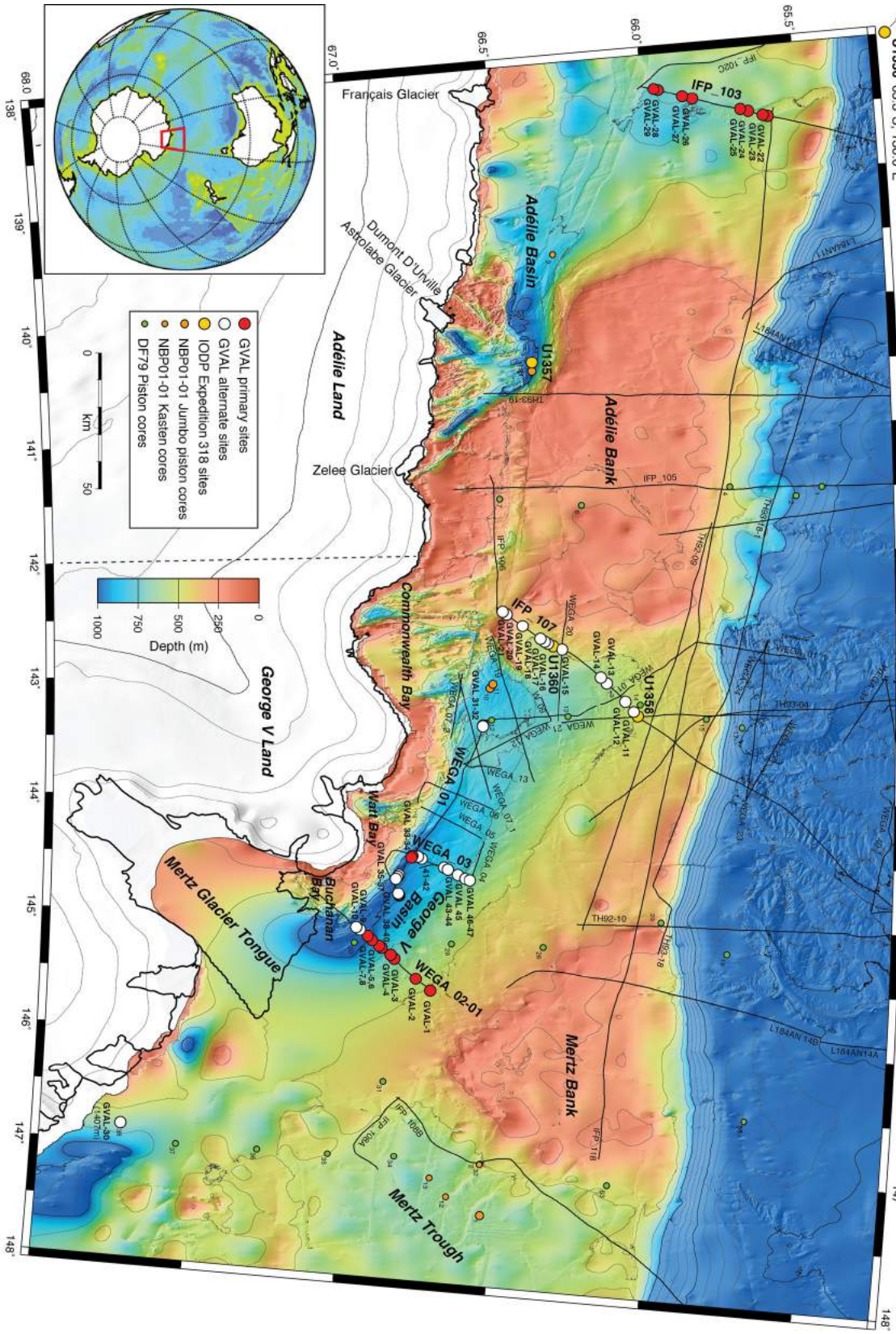

Figure 1. Proposed sites, bathymetry, seismic coverage, and existing cores of the Antarctic shelf off George V Land and Adélie Land (Bathymetry data from Beamann et al., 2011). Basins and troughs, scoured by ice streams, reach over 1 km deep in the inner shelf; they separate shallow banks. Primary sites are located mainly along seismic lines WEGA-02 and IFP-103 . See supplementary figures for detailed maps of the main transects

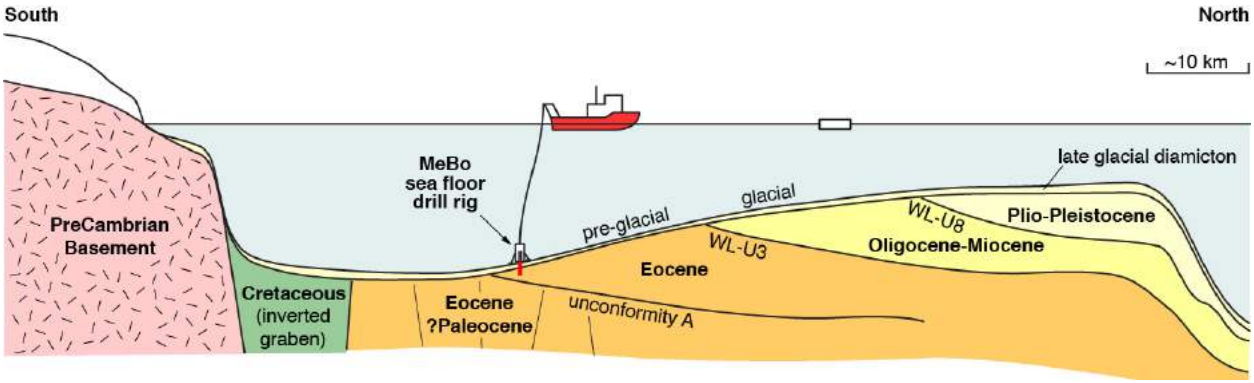

Figure 2. Schematic composite transect along seismic lines WEGA-02 and IFP-103/107. Seaward-dipping strata mean younger sediments are found on the outer shelf, and older sediments are found in the inner shelf. Vessel and MeBo rig not to scale.

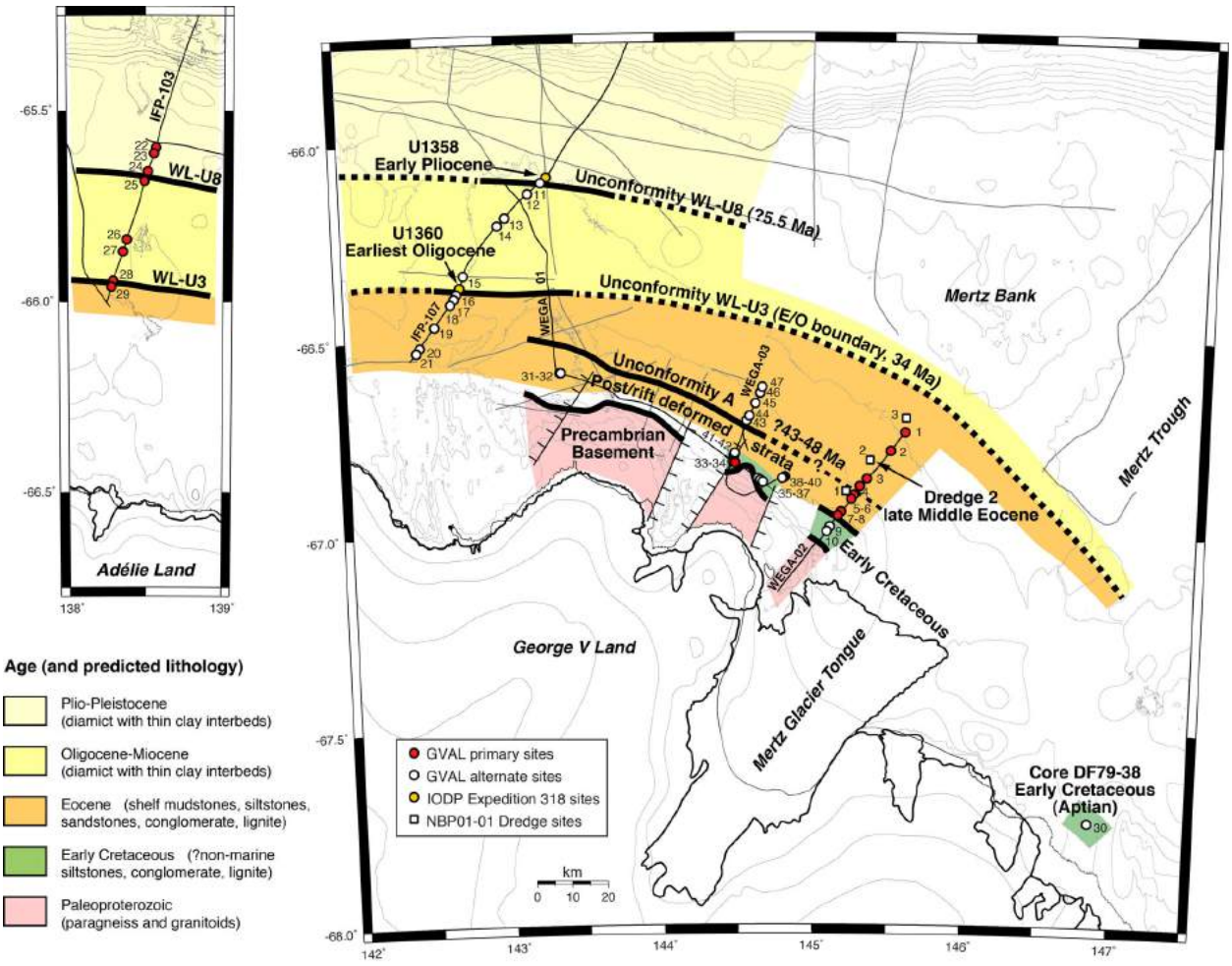

Figure 3. Map showing the outcrop/subcrop of major unconformities and the age of sediment samples, based on Figure 4 of De Santis et al., 2010, and new examination of the seismic lines by the proponents. For the age of unconformity A, our working hypothesis is that it is 43 Ma, but it could be as old as ~48 Ma (see text). Note: late glacial diamicton covers the shelf, from zero to a few10s of m thick. Despite the bubble-pulse, areas of thick diamicton can be imaged on seismic lines and avoided. It is <15m thick at IODP Sites U1358 and U1360.

2. Stratigraphy of the George V Land and Adélie Land shelf

Our understanding of the stratigraphy of the George V shelf is based on existing sediment samples, seismic stratigraphy, and on the rifting history between Antarctica and its counterpart Australia. Major events are represented by unconformities that can be mapped across the shelf in the seismic profiles, and thus provide a stratigraphic framework for this proposal (Figs. 2, 3). Sediments recovered during IODP Expedition 318 dated unconformity WL-U3 to the Eocene/Oligocene boundary, and dated WL-U8 to the latest Miocene or earliest Pliocene. A third major unconformity, unconformity A, marks the end of tectonic faulting and gentle folding on the shelf. Its age is not well constrained but is probably middle Eocene in age (see below). Existing George V shelf lithostratigraphy, seismic stratigraphy, and tectonic history are described in more detail below.

2.1 Sediment samples

Previous scientific expeditions have recovered IODP cores, shallow piston and gravity cores, and dredged glacial erratic clasts (Figure 3). As early as 1912, the Australian Antarctic Expedition dredged lignite samples, thought to be Cretaceous, from offshore of the Mertz Glacier (Mawson, 1940). In 1979, the U.S. Deep Freeze expedition to the George V Land shelf cored 40 cm of early Cretaceous (Aptian) organic-rich non-marine siltstone breccia (Core DF79-38). The remaining Deep Freeze piston cores, as well as cores collected by the U.S. Geological Survey (Hampton et al., 1987) and the Japanese National Oil Corporation (JNOC), sampled Holocene diatomites and late glacial diamicton; none of them recovered sediments older than Pleistocene.

Three dredges taken during *N.B Palmer* cruise 01-01 (Leventer et al., 2001) recovered over 1,300 clasts, between 15-43% (per dredge) of which were sedimentary in origin (Schrum et al., 2004). Palynological analysis of 7 clasts dated them to be Paleogene and early Cretaceous in age. Lignite clasts were inferred to be from the Paleogene, based on their thermal maturity. One clast, from Dredge 2, was more precisely dated as late Middle Eocene by the presence of the dinocyst *Vozzhennikova apertura*.

IODP Expedition 318 reached earliest Oligocene diamict in Hole U1360A (70.8 mbsf) and early Pliocene diamict in Hole U1358B (35.6 mbsf) (Escutia et al., 2011, Iwai et al., pers. comm.). Although drilling stopped before the major unconformities could be reached, Hole U1360A confirmed that unconformity WL-U3 is related to the Eocene/Oligocene boundary (the age of WL-U3 was also confirmed at Site 1356). The early Pliocene sediments at the base of Hole U1358B show that WL-U8 is latest Miocene or earliest Pliocene.

2.2 Tectonics, seismic stratigraphy, and sedimentation

The eastern Wilkes Land continental margin formed during the Late Cretaceous separation of Australia and Antarctica, with the first oceanic crust magnetic anomally identified at 83 Ma (Cande and Mutter, 1982; Sayers et al., 2001; Veevers, 1987; Colwell et al., 2006; O'Brien and Stagg, 2007; Leitchenkov et al., 2007; Close et al., 2009). The pre-glacial sediments found on the George V Land shelf were likely deposited during two rift phases: 1) A former extensional (breakup) phase opened structural grabens, with axes oriented WNW-ESE and possibly NE-SW; 2) A latter transpressional phase reactivated previous structures and tilted, faulted and folded sedimentary strata, located in the inner continental shelf (De Santis et al., 2010). The first tectonic phase is likely related with the Cretaceous rifting between the Antarctic and Australian plates. The second tectonic phase might be related to the onset of the fast spreading phase of Pacific-Indian Ocean, that caused uplift, inversion and folding of post-rift strata in a narrow east-west oriented region, near coastal basement outcrop, in Paleocene-Eocene times (De Santis et al., 2010).

The Cretaceous grabens run adjacent to the coastal Paleoproterozoic bedrock of George V Land (Fig. 3). Early Paleogene graben inversion, together with glacial erosion, brought the Cretaceous strata to the surface. Vitrinite reflectance of the Aptian siltstone of core DF79-38 indicates it had been buried to a depth of approximately 1.5 km (Domack, 1986). Overlying strata to the north are gently folded and faulted, and the age of these post-rift transpressionally-deformed strata is inferred to be late Paleocene to early Eocene age (De Santis et al., 2010).

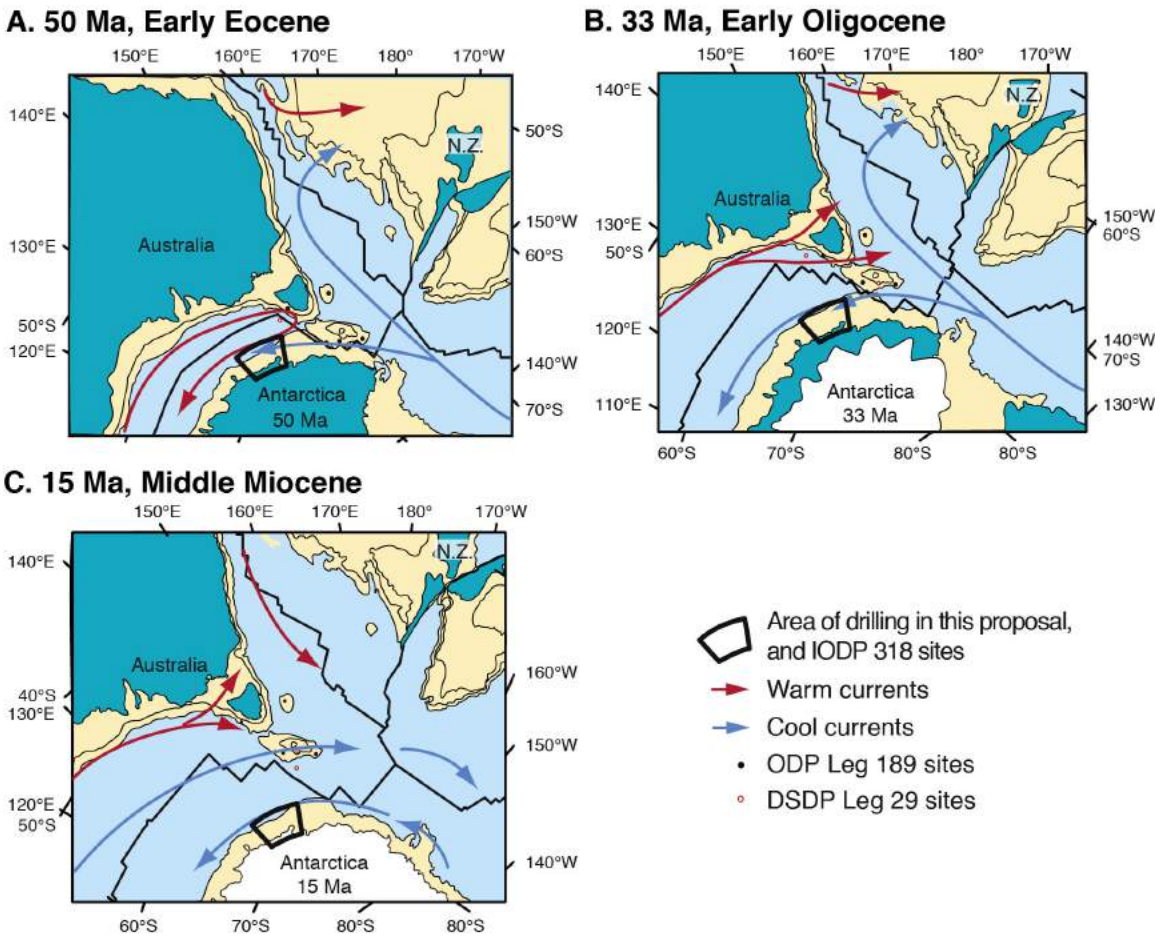

Figure 4. Paleogeography during rifting and drifting of Australia from Antarctica (edited from Escutia et al., 2011, based originally on Kennett et al., 2001).

The termination of significant faulting and folding on the shelf is marked by unconformity A, above which the reflectors are continuous and dip gently seaward (De Santis et al., 2010). The age of A is probably related to the start of rapid sea floor-spreading between Australia and Antarctica (Fig. 4). This rapid spreading is inferred to be as young as 43 Ma (Weissel and Hayes, 1971, 1972; De Santis et al., 2010; Hayden et al., subm.), or up to 50 Ma (Cande and Mutter, 1982; Colwell et al., 2006; Close et al., 2009). Shallow paleodepths of sediments dated at 49 Ma at IODP Site U1356 (currently at 4 km water depth) indicate that significant shelf tectonics continued after 49 Ma (Escutia et al., 2011).

Unconformity WL-U3 eroded 300-600m of the underlying strata (Eittriem et al., 1995), before glacial sedimentation started in the earliest Oligocene, as confirmed at Site U1360 (Escutia et al., 2011). Subsequent sedimentation consisted of glacial diamictites, sandstones, and mudstones

(Escutia et al., 2011). Glacial erosion is evident as truncation and downlap surfaces in the seismic profiles. Unconformity WL-U8 can be mapped regionally across the shelf, and also down to the base of the slope. It is constrained to be not much older than the bottom of Site U1358 (5.12-4.4 Ma, Iwai, pers. comm.). It is not straightforward to trace the unconformity to the sites on the continental rise, but at Site U1361, WL-U8 could be early Pliocene in age, (4.2 Ma, Tauxe et al., 2012), or older (Gonzalez, in prep.). These glacial sediments were deposited as aggradational sub-horizontal topsets in shelf banks (e.g., along most of seismic line IFP 107) and progradational seaward-dipping foresets in shelf troughs (e.g., along IFP 103). Both subglacial and proglacial sediment was found at Site U1358, along IFP-107, but although diatoms were present, they were few and poorly preserved. If the shelf foresets along line IFP 103 are analogous to the sediments of the Prydz Bay trough mouth fan (ODP Site 1167), they could contain thin clay-rich beds deposited during interglacials, and preserve microfossils including foraminifera (Theissen et al., 2003). Hence our primary sites are located along Line IFP-103, and our alternates along IFP-107.

On the GVAL continental shelf, gently dipping topset and foreset strata are truncated at or near the seafloor. This provides a unique opportunity to access older records with shallow penetrations. The thickness of the post Last Glacial Maxima sediments blanketing the older record varies from site to site. During Expedition 318, shelf Sites U1360 and U1358 were found to be covered by <15m of diamicton (Escutia et al., 2011), even though the estimated thickness based on seismic data was about 50 m. This is because the outcropping topsets are obscured by the seafloor bubble-pulse in the seismic profiles. We are reprocessing the main seismic lines to get the best view of the strata immediately below the seabed (Laura De Santis' group).

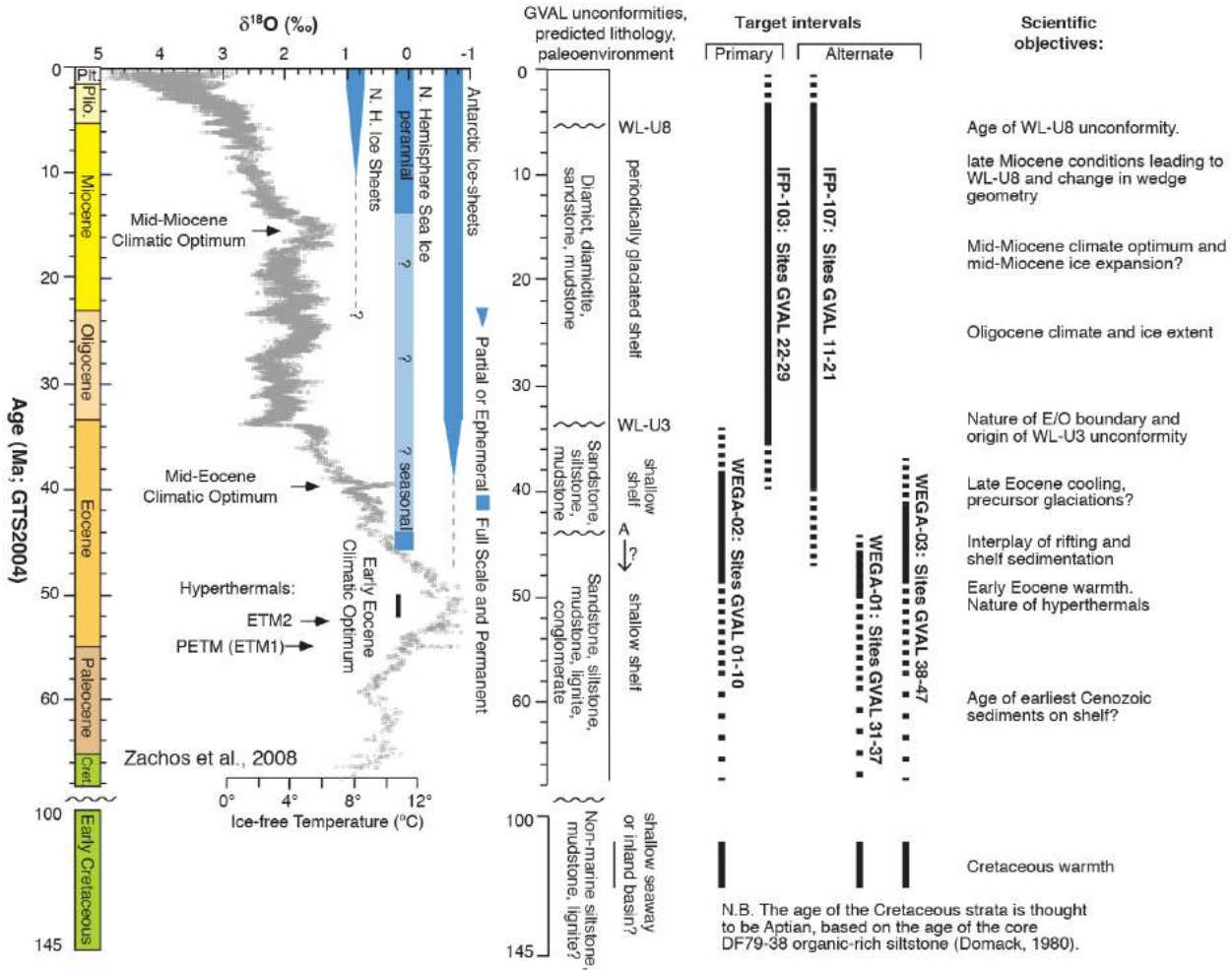

Figure 5. Expected age coverage of the drilling transects, together with expected lithologies and paleoenvironments, in the context of paleoclimatic history (Zachos et al., 2008). Dashed and dotted lines indicate where we are not certain if sedimentary rocks of this age are present along the transects on the GVAL shelf.

3. Research Questions and Scientific Rationale

The proposed drilling will address Cretaceous and Eocene greenhouse warmth, subsequent cooling, and development of the Antarctic ice sheet, in a paleoclimate framework provided by $\delta^{18}O$ records, sea level estimates, and the emerging records of global CO_2 history (e.g. Hönisch et al., 2012) (Fig. 5). The stratigraphic intervals on the GVAL shelf offer a wide range of ice and paleoclimate analogies to projected future CO_2 levels and warming (including early Pliocene, mid-Miocene, Eocene, and Cretaceous), and thus would provide an Antarctic type-section for greenhouse to icehouse climates. The new drilling will contribute to the following topics and questions:

3.1 Early Cretaceous Antarctic conditions *(Primary sites GVAL 33, 34; Alternate sites GVAL 9, 10, 30,35, 36, 37, 41, 42)*

The Early Cretaceous (Aptian) non-marine pollen-rich siltstone breccia found to the east of the Mertz Ice Tongue (Domack et al., 1980, Domack, 1982), together with the Cretaceous graben structures observed in the seismic profiles from the shelf, indicates that the George V Land shelf probably holds a record of Cretaceous warm climates in Antarctica. Until now, the Antarctic Cretaceous is represented only by the sediments of Seymour Island off the Antarctic Peninsula, and a small handful of ODP core sections from Site 1166, Prydz Bay, and Site 693 (Aptian).

3.2 Eocene Warmth *(Primary sites GVAL 7, 8; Alternate sites GVAL 31, 32, 38, 39, 40)*

High temperatures were found for a short 1.7-Myr interval of the early Eocene at Site U1356 (recorded by Bombacoideae (Baobab) pollen and TEX_{86} data, Pross et al. 2012). These Eocene high polar temperatures and low equator-to-pole temperature gradients are difficult to explain, but they can be modeled if earth system (climate) sensitivity is greater than previously supposed (Huber and Caballero, 2011, Lunt et al., 2012). Temperature and vegetation data from the GVAL shelf will provide high-latitude data on how the high temperatures and the equator-to-pole temperature gradient evolves during Paleocene warming, the Eocene climate optimum, and subsequent cooling. We are not certain of the exact ages represented on the GVAL shelf, but late Early Eocene and Middle Eocene are likely to be present.

3.3 Eocene Hyperthermals *(there are chances to sample one or two in the Eocene sites listed above)*

What is the Antarctic record of the PETM and Eocene hyperthermals? DeConto et al., 2012, proposed that the atmospheric CO_2 that caused these hyperthermal events came from rapid thawing of peatland permafrost on Antarctica. Such a rapid change in Antarctica's vegetation would be observed in pollen, biomarkers, and lithology at the proposed sites (Paleogene lignite pieces have been dredged from the GVAL shelf (Schrum et al., 2004)). The accelerated global warming during these events is analogous to current and future warming and can provide clues to the fate of arctic permafrost.

3.4 Middle-Late Eocene climate cooling *(Primary sites GVAL 1-6; Alternate sites GVAL 19-21, 43-47)*

Details of climate cooling in the Middle-Late Eocene are recorded in GVAL strata, which are known to contain sediments of this age by NBP 01-01 Dredge 2 (late Middle Eocene sediment Schrum et al., 2004). The seismic profiles show that these strata are not faulted or folded, and therefore may represent reasonably continuous sedimentation. Evidence may be found for late Eocene precursor glaciations (Lyle et al., 2005, Scher et al., 2009). Seismic data from the WEGA cruise document a network of channels that could represent a former fluvial pre-glacial system or a proglacial-subglacial drainage system (De Santis et al., 2010).

3.5 Eocene-Oligocene Ice Expansion *(Primary sites GVAL 28-29; alternate sites GVAL 15-18)*

The Eocene-Oligocene ice expansion is recorded on GVAL by the erosional surface WL-U3, which was drilled at continental rise Site 1356 during Expedition 318. On the continental shelf, there are two hypotheses for the origin of this unconformity. The first is that initial glacial expansion to the shelf edge (which is expected from $\delta^{18}O$ data on total E/O ice volume, Coxall et al., 2005) eroded 300-600m of underlying sediment (Eittreim et al., 1995). A second interpretation of WL-U3 is that it formed as a regressive surface caused by sea level fall and continental ice increase (Wannesson, 1991; De Santis et al., 2003). This is consistent with the recent GIA interpretation (Stocchi et al., in press), in which the erosion results from the uplift of the shelf as part of a foreland bulge from the smaller first step of E/O ice expansion, followed by subsidence and sea level rise during the second (larger) step of ice expansion, allowing accumulation of sediments in the newly created accommodation space. For this second interpretation to explain the observed large amount of erosion, the foreland bulge would have to have raised the shelf on the order of 100s of m, and the inland ice would have to have been present for some time prior to the E/O boundary itself. A relatively thick sequence of earliest Oligocene sediment was found at shelf Site U1360 (Escutia et al., 2011), but U1360 did not cross the unconformity. The two hypotheses can only be tested by drilling the unconformity itself to establish the environmental conditions leading up to and following the E/O ice advance. Also, Oligocene climate and ice extents are very poorly known, and drilling the GVAL shelf could provide information on them (alternate site GVAL 15).

3.6 Miocene and Pliocene Antarctic climate and ice extent (Primary sites GVAL 22-27, Alternate sites GVAL 11-14)

The age of a second major erosion surface on the GVAL shelf, WL-U8, appears to be earliest Pliocene or latest Miocene (Site U1358, Escutia et al., 2011; Tauxe et al., 2012). Curiously, this date is younger than the expected date for major ice advance and erosion (~14 Ma) following the mid Miocene climate optimum, and is older than another major Antarctic ice advance at ~3 Ma (Volpi et al., 2009, Rebesco et al., 2006, McKay et al., 2012). Drilling unconformity WL-U8 itself will establish the timing, paleoenvironments, and time gap represented by the unconformity. Other significant erosion surfaces, on which the overlying strata downlap, are represented along line IFP-103. We expect that the mid Miocene ice expansion probably left its mark on the GVAL shelf in some way, and although there is no certain way to predict which of the erosion surfaces is mid-Miocene in age, we have chosen regional unconformity that should represent a major event (Sites 26-27). Regardless of its predicted age, drilling will record the timing and environmental conditions leading to this particular ice advance.

Ice/climate coupled models predict that East Antarctic ice is very difficult to destabilize under estimated Pliocene temperature maxima, with a modeled upper limit of 7 m equivalent sea level rise (ESL) from Antarctic ice loss and some minor ice drawback from the GVAL area (Pollard and DeConto, 2009). The late Miocene situation is probably not significantly different. Yet paleo sea levels indicate 15 ±5m ESL from Antarctica during Pliocene highstands (Miller et al., 2012), and provenance data from Site U1361 indicate significant glacial erosion of the Wilkes Subglacial Basin during Early Pliocene interglacials (Cook et al., submitted). The combination of ice proximity data from new GVAL shelf drilling and paleoceanographic data from Expedition 318 can help resolve this mismatch between ice sheet models and geological data.

3.7 Australia-Antarctica rifting history and the tectonic development of the GVAL shelf (Cretaceous and Eocene sites)

The sediments of the GVAL shelf hold information on the rifting history between Australia and Antarctica, such as the onset of marine sedimentation, and the age the syn-rift grabens and the age of post-rift transpression (De Santis et al., 2010), which is relevant to the opening of the Tasmanian gateway and the initiation of the circumpolar ocean current (Fig. 4). The GVAL

continental margin formed during the Late Cretaceous separation of Australia and Antarctica, and rapid seafloor spreading is thought to have started at about 50 Ma (early Eocene) (e.g. Cande and Mutter, 1982), with the final clearance of the Australian and Antarctic plates southwest of the South Tasman Rise taking place by the middle late Eocene (~35.5 Ma) (Stickley et al., 2004). An alternative timetable, based on recent work on Site U1356, dates break-up as young as 43 Ma (Hayden et al., submitted).

4. Drilling, operations, and measurement plan

4.1 Sea floor drill rig

Previous drilling on Antarctic shelves from the JOIDES Resolution was hampered by ship heave and floating ice, resulting in generally low core recovery of glacial shelf sediments (around 30% overall, and 38% at sites where the material was compacted or semi-lithified). Drilling from a stable platform enables a steady weight-on-bit, which in turn enables diamond-impregnated drill bits to be used, resulting in much better core recovery. For example, the ANDRILL project achieved ~98% core recovery, where the drill rig sat on shelf ice (AND-1B) and multi-year sea ice (AND-2A).

Therefore we propose to use the MeBo sea bed drill rig, which would provide a stable platform and would overcome many of the difficulties associated with drilling from a floating ship. Operations would have to be able to cope with operations in sea ice covered waters and therefore it is desirable that the research vessel would be ice-strengthened.

Of the available sea bed drill rigs, we prefer the use of the MeBo because it is a mature technology that has been tested during several years of deployments including drilling glacial sediments, because it can drill to 80m, and because it has a downhole logging capability (*www.marum.de/en/Sea_floor_drill_rig_MeBo.html*). The MeBo system has been operating since 2005, and has achieved hole depths up to 80 m and up to five sites in 10 days with 90% core recovery. It successfully cored glacial sediments in the Baltic. MeBo can operate in water depths down to 2000 m, and can be deployed from medium to large oceanographic vessels with

an A-frame SWL of at least 16 t (16 tonnes static line load on the overboard sheave, plus dynamic loads). The MeBo system has made wireline downhole natural gamma measurements, and other downhole tools are under development. Other sea bed drills may be available from industry or academia (see presentations on technology from the Shallow Drilling workshop at Edinburgh, July 2011, at http://shaldril.org/inside_science.html) but these generally can not achieve the required penetrations for our objectives and have not been tested in glacial sediments.

4.2 Time requirements

We propose 18 sites and estimate 2.5 days per site (system deployment, coring and logging to 80m, system retrieval, and turnaround for the next deployment), giving a total of 45 drilling and logging days. Seabed video surveys can be carried out while the cores are retrieved from the MeBo rig and it is prepared for the next deployment. In Antarctic waters, it is expected that some time will be lost to weather and ice conditions (based on operations/weather/sea-ice/icebergs in this area during Expedition 318), but we do not attempt to assign this lost time here. A total of about 15 days transit time are required (to and from Hobart and between sites), giving a total of approximately 60 days for the expedition. The optimum ice and weather window generally runs from mid-January to the end of February.

4.3 Drilling Strategy

We propose two main transects of primary and alternate sites along existing seismic lines, with sites stepping up the gently dipping stratigraphic section (Figures 1, 3, 5). One will cover mainly icehouse objectives (Line IFP-103 (Fig. 6); alternate IFP-107 (Fig. 7)), and the other will cover the greenhouse objectives (Line WEGA-0201 (Fig. 8); alternate sites along lines WEGA 01 (Fig. 9) and WEGA 03 (Fig. 10)). At each site, one hole will be drilled to 80m depth. We target sites with thin late glacial diamicton, based on the seismic profiles, reprocessed to better define the reflectors just under the sea bed. At each stratigraphic target (mostly erosion surfaces) our strategy is to core one site above the target and one below it – this reduces the risk of missing a target by aiming to cross it with just one hole. Our 80m holes are not deep by IODP standards, but the recovered sections will be long enough to sample the full range of lithologies at a site, and record any Milankovitch-scale variability in climate and environment, providing a window

into the ancient conditions on Antarctica. On the GVAL shelf, post-rift sediments have a total thickness of about ~2700 m, and our strategy could potentially collect up to 1280 m of core.

4.4 Icehouse transect *(Line IFP-103, Primary Sites GVAL 22-29):*

This transect covers late Eocene to Pliocene objectives with a total of 8 sites (Figures 1, 3, 6). Dated cores from Sites U1358 and U1360 (Fig. 3, 7) give age control for erosional surfaces WL-U8 (latest Miocene to earliest Pliocene) and WL-U3 (earliest Oligocene), which can be mapped along the shelf (and to the continental rise) by seismic correlation (Escutia et al., 1997, 2005). For other sites, targets are selected based on interpolation between known age points along the line and features (e.g. erosion or downlap surfaces) in the seismic section. Alternate sites are located along line IFP-107 (Fig. 7), in case line IFP-103 is inaccessible.

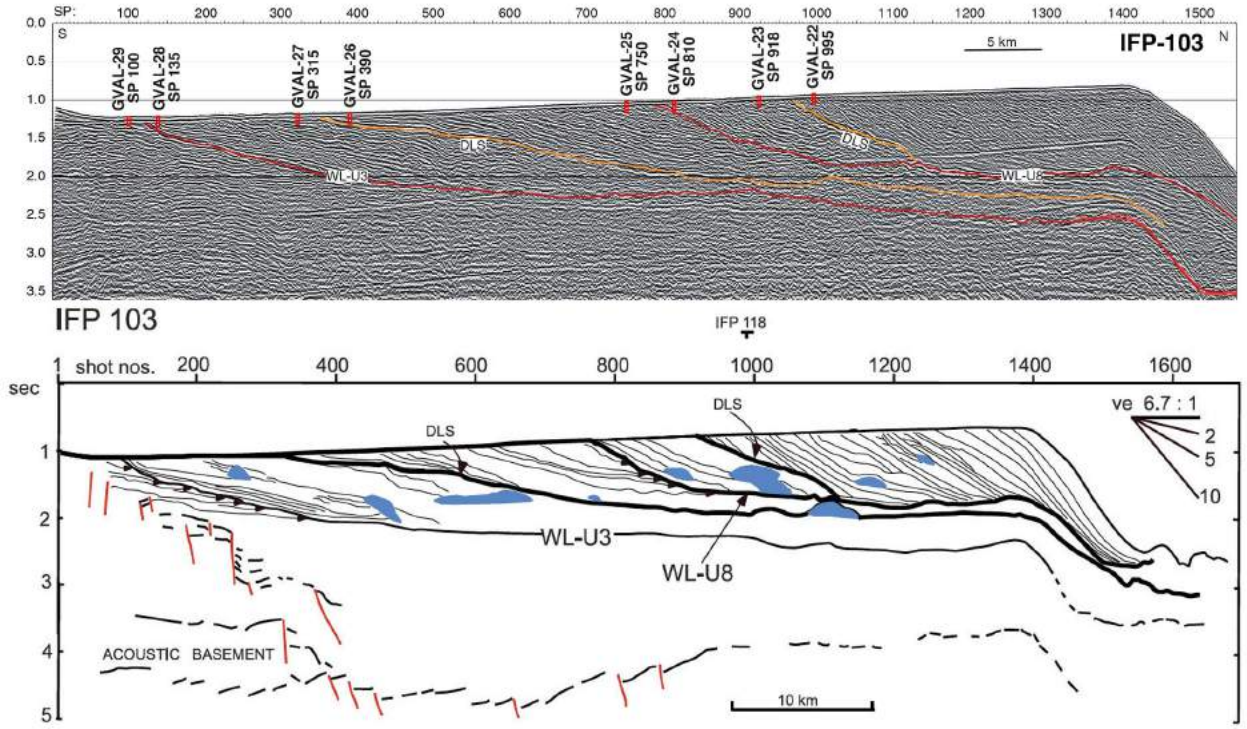

Figure 6. Icehouse transect site locations (primary) covering late Eocene to Pliocene objectives along seismic line IFP 103, after Eittreim et al., 1995. See GVAL-22A Site Survey form 6 for a map of the trackline and sites.

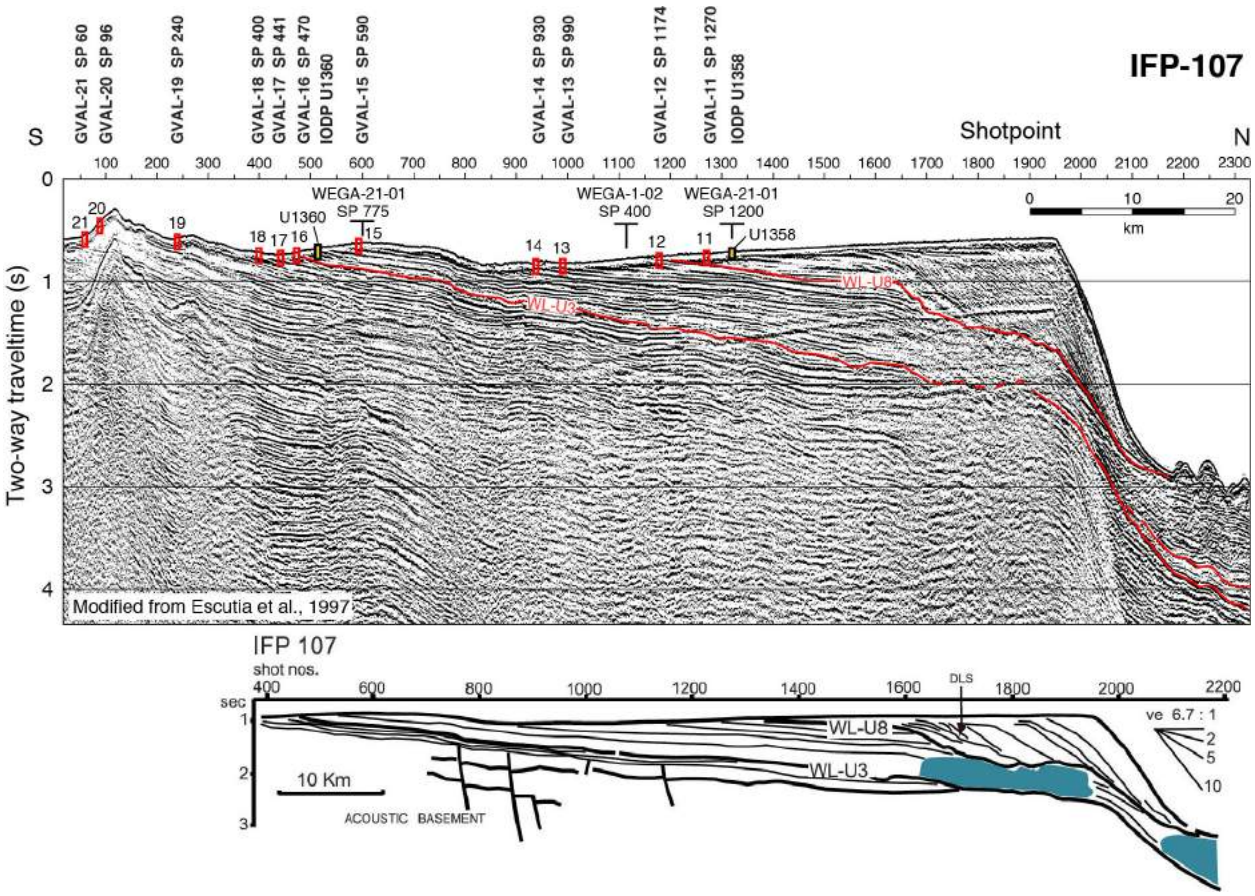

Figure 7. Icehouse transect site locations (alternate) covering late Eocene to Pliocene objectives along seismic line IFP 107, after Eittreim et al., 1995. See GVAL-11A Site Survey form 6 for a map of the trackline and sites.

4.5 Eocene Greenhouse transect *(Line WEGA-02-01, Primary Sites GVAL 1-8):*

This transect covers Eocene objectives with a total of 8 sites. The anticipated age at the site locations are based on the late Middle Eocene dredge sample (Schrum et al., 2004), and the tentative age of 43 Ma for unconformity A (Fig. 3). Thus the age of the first hole to be drilled will not be precisely known. The drilling priority of the other sites in the transect may be adjusted based on the sediment ages determined in the first holes: we would move up the stratigraphy if the first site is older than the targets, and down if the site is younger. Alternate Eocene sites are located along lines WEGA 01-02, WEGA 01-03, WEGA 03-01, and WEGA 03-02 (Figs. 9, 10).

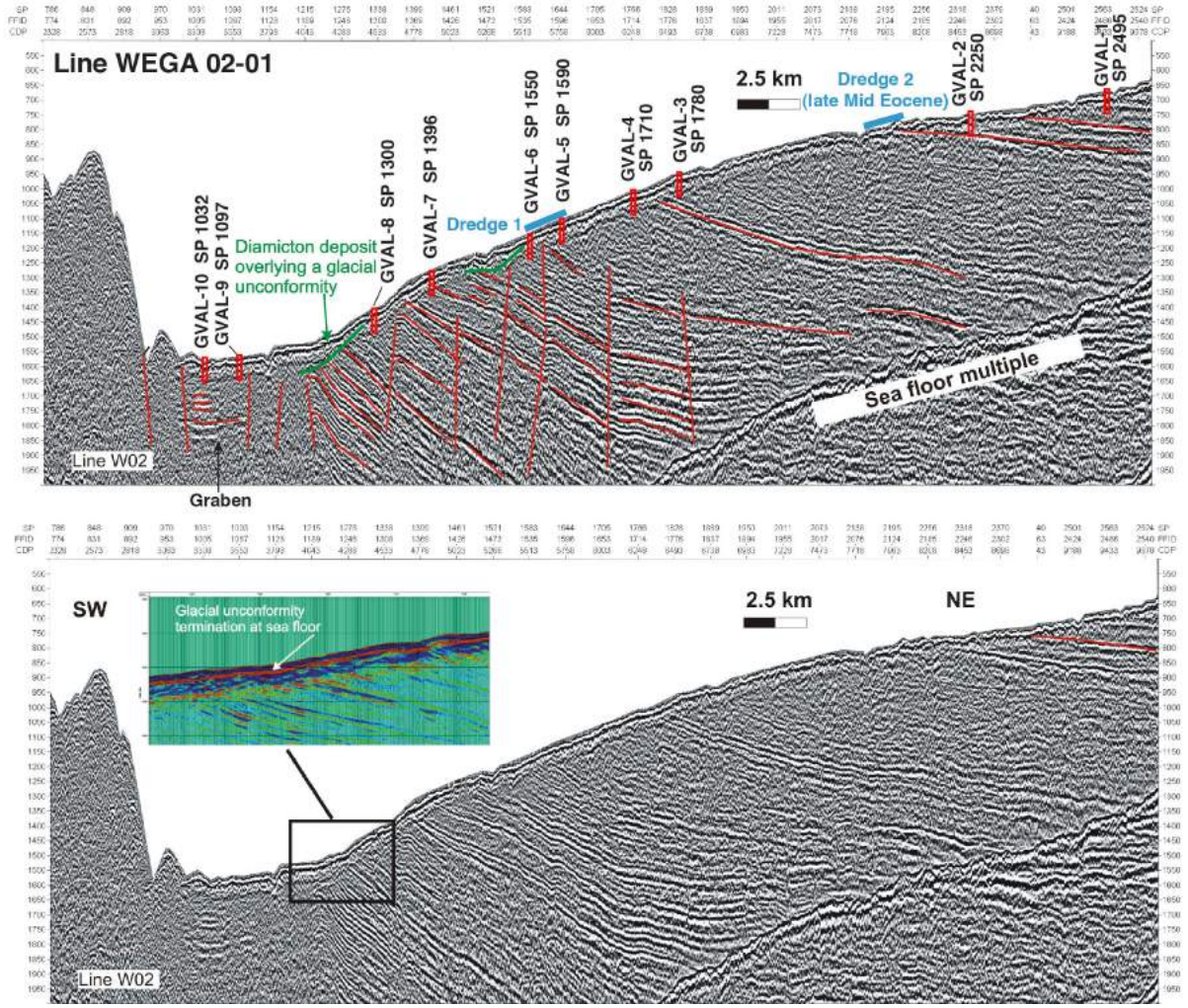

Figure 8. Greenhouse Transect site locations covering Paleocene to middle Eocene objectives along seismic line WEGA 02-01 (see also Figure 6 of De Santis et al., 2010). See GVAL-01A Site Survey form 6 for a map of the trackline and sites.

*4.6 **Cretaceous Greenhouse sites** (Primary Sites GVAL 33 and 34):*

Early Cretaceous non-marine organic-rich siltstone was found to the east of the Mertz Glacier in DF79-38 (Figures 1, 3), a 40-cm core (Domack, 1982), at alternate site GVAL 30. Although currently no seismic line exists over DF79-38, the age of the rock, the paleoclimatic value and the absence of overburden make it an attractive target for drilling. However, Cretaceous strata are also predicted to be found near the sea bed further to the west, and of these, Sites GVAL 33 and 34, along WEGA 01-02, are our priority sites (Fig. 9). Sites GVAL 9 and 10, at the landward end of line WEGA 02-01 (Fig. 8) appear to be covered by thickish late glacial diamicton (example diamicton from Site U1360 pictured in Figure 11), and so are alternates. Other alternate Cretaceous sites lie along lines WEGA 01-03 and WEGA 03.

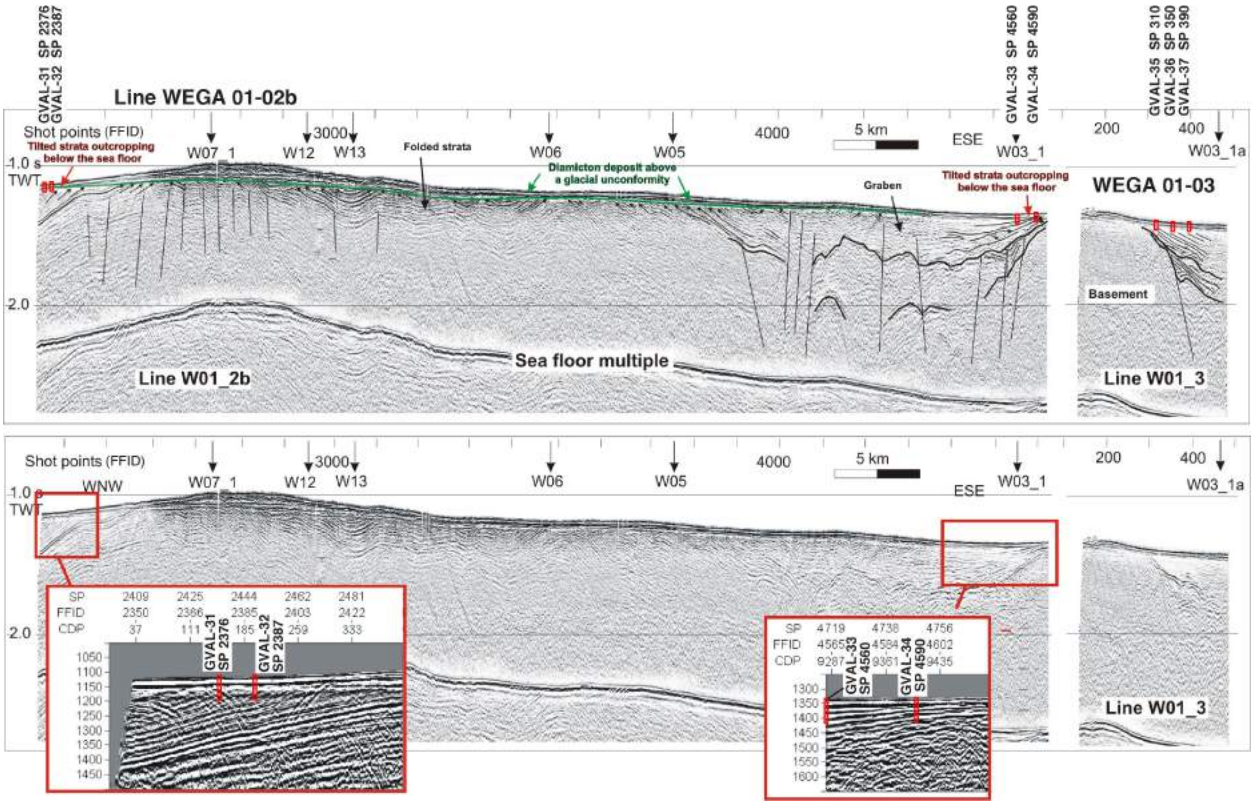

Figure 9. WEGA 01-02b and WEGA 01-03. Sites GVAL 33 and 34 are primary sites for targeting Cretaceous sediments. See Site Survey form 6 for GVAL-31A and GVAL-11A for maps of the trackline and sites.

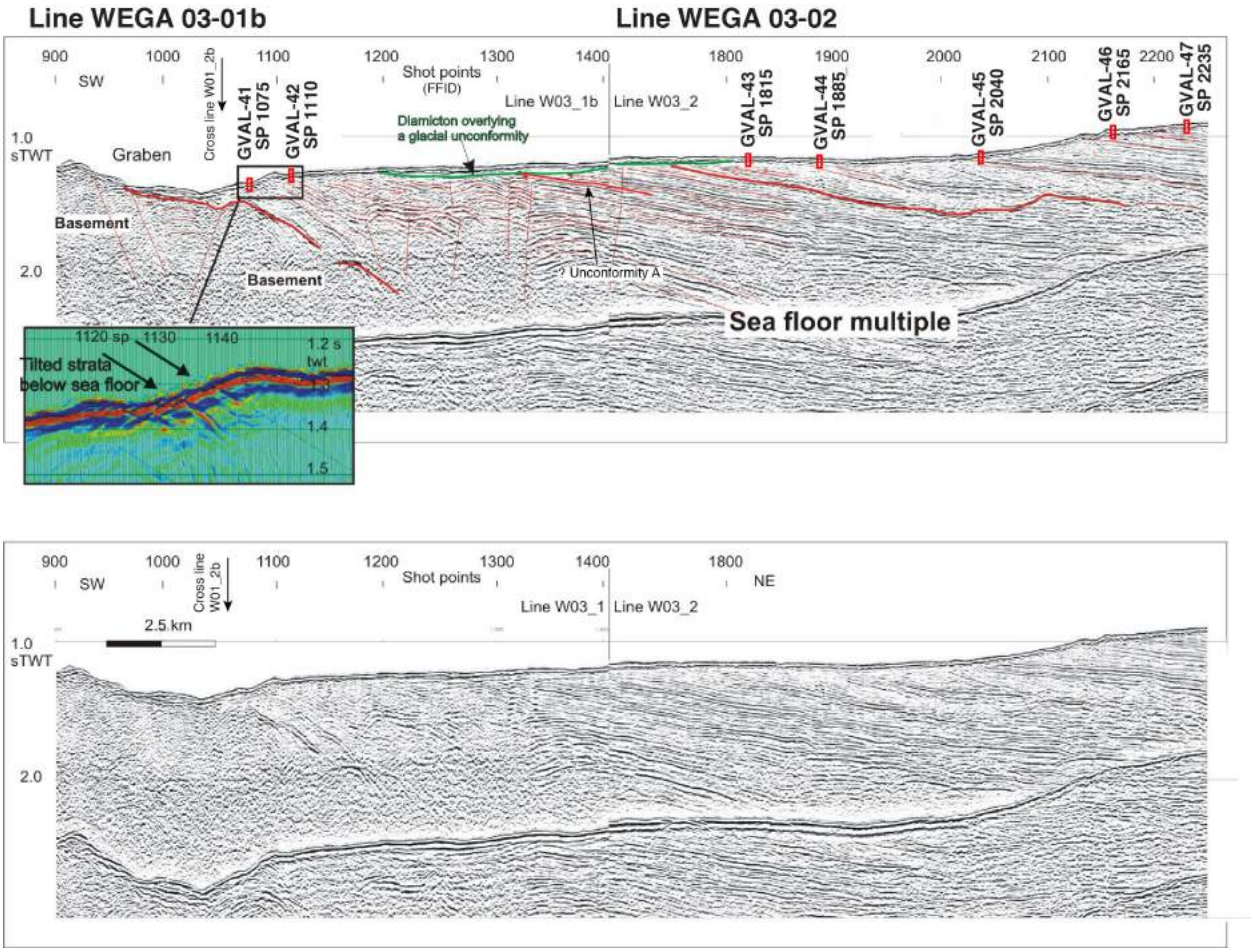

Figure 10. Alternate Early to Late Eocene sites along line WEGA 03-01b and WEGA 03-02. See GVAL-41A Site Survey form 6 for a map of the trackline and sites.

4.7 Further pre-cruise site characterization

Although the geology of the shelf is sufficiently well known to construct a stratigraphic model to select appropriate site locations, further sediment sampling and surveys would add valuable information prior to drilling. The area is visited reasonably often by research vessels, and the George V shelf's oceanography, seabed habitats, bathymetry, and geology are all active areas of research in the international science community.

In early 2014, the US *RV N.B Palmer* will return to the George V Land shelf to take dredge samples and run high-resolution seismic surveys (PIs Eugene Domack and Amy Leventer). The dredge samples would refine the pre-glacial stratigraphy, and the seismic profiles would enable better imaging of the upper 100m, and possibly include a crossing line to link line WEGA-02 to

the rest of the WEGA and IFP network (Figure 1). Sediment sampling was planned for the early 2013 cruise of the New Zealand *RV Tangaroa* (Bostock, pers. comm.), but sea ice prevented shallow coring on the shelf. The French *RV Astrolabe* operates in the area annually, to resupply the Dumont D'Urville station (Fig. 1). Although its science cruise in early 2013 was cancelled because of sea ice conditions, they have offered to obtain samples in future cruises. The Australian *RV Investigator* may also be in the area in coming years. All of these cruises have the potential to collect sediment samples (dredges, grab cores), and to assess sea bed environments (e.g. swath bathymetry), which will be extremely useful information to refine our site locations.

4.8 Expected measurements, and how they provide insights to the scientific objectives

Over the last decade, new techniques have become available that greatly increase the quantitative information that shelf sediments can yield. Firstly, for pre-glacial and warm interglacial sediment, bio-molecular fossils can give both sea surface temperatures (e.g. alkenones) and indications of land temperature (plant waxes, MBT and CBT (tetraethers), e.g. Pross et al., 2012), and new studies are extending the low temperature applicability for TEX_{86} (Shevenell et al, 2011). Secondly, isotope geochemical fingerprinting can be used to trace sediment components (like IRD) to their source areas on the continent, and therefore to identify the main areas of glacial erosion and infer the general location of the ice margin (Williams et al., 2010; Pierce et al., 2011). Deploying these techniques means that phenomena like high-latitude temperature amplification and the related retreat of the ice margin can be studied and compared to ice sheet models. We plan an integrated suite of measurements will be taken on the recovered material (Table 1), which we have been discussing with Antarctic research colleagues with the relevant expertise.

Table 1. Planned measurements and how they relate to the science objectives

Measurements	**Use/objective**
lithostratigraphic description	depositional environment, sedimentation model, proximity of the ice margin, approximate water depth
grain-size analyses	sedimentation model, IRD
macro- and micro-fabric of diamict sediments	proglacial vs. subglacial environment
microfossils: diatoms, radiolaria, calcareous nannofossils, dinocysts, silicoflagelates, foraminifera	biostratigraphy, ecosystem evolution, assemblages (sea ice indicators, SST estimates)
palynology	continental vegetation (pre-mid-Miocene)
bio-molecular fossils (TEX_{86}, alkenones, CBT, MBT, etc.)	biota and temperatures
paleomagnetism	magnetostratigraphy
physical properties	high resolution (cycle) stratigraphy; origin of seismic reflectors
bulk geochemical analyses	for chemical indexes of alteration, carbonate, opal, terrigenous vs biogenic sedimentation
XRF scanning	high resolution (cycle) stratigraphy, terrigenous vs biogenic sedimentation
petrography of lithic clasts	Provenance of glacially-eroded material
Geochemical isotopes: Nd, Sr, Ar, U/Pb	Provenance
XRD clay mineralogy	Provenance, chemical vs. physical weathering
Combined data	Ice sheet modeling, paleotopography, and GIA

4.9 Microfossils

The microfossil assemblages at the icehouse transect drill sites will likely include diatoms, dinoflagelates and silicoflagelates. We have selected the foresets of line IFP-103 because this environment offers the best chance to preserve interglacial sediment and carbonate microfossils. This inference is based on the similar environment at Site 1167 in the trough mouth fan of Prydz Bay, where foraminifera were found, particularly in thin interglacial clay layers (Thiessen et al., 2003). The greenhouse transect sites are expected to have a rich palynoflora (based on existing samples), as well as other microfossils.

4.10 Risks and risk planning

Scientific research vessels have been operating in the GVAL shelf area for many years (particularly Australian and French ships), so the operating conditions in these waters are quite well understood. However, drilling from a sea-bed rig in this environment is new, and additional risks need to be anticipated and planned for:

- Sea ice cover is monitored by satellite (e.g., MODIS), and by ships resupplying Dumont D'Urville station. Ice-free conditions generally occur from mid-January to mid-February (Figure 12). Although the 2012/2013 season was choked by sea ice, and boundary conditions were altered by the break-off of the Mertz Glacier tongue in 2010 and the continued presence of iceberg B9B, the Mertz Polynya is expected to be a persistent feature of the GVAL shelf, owing to the offshore wind pattern (Tamura et al., 2012).
- Alternate transects of sites that can achieve the same objectives are identified as backup in case the primary sites are ice-infested and inaccessible. The risk of sea ice is the reason we have so many (29) alternate sites.
- Observers would be necessary to monitor and forecast weather and ice conditions.
- Sites will be chosen to have acceptable sea bed slope angles and an absence of boulders, based on high-resolution bathymetry (Beaman et al., 2011), sea floor surveys (e.g. Post et al., 2011), and pre-site camera surveys.
- Valuable sediment records will be obtained even if 80 m penetration is not fully achieved, because the target ages (particularly the Eocene and Cretaceous) have been sampled in very few places in Antarctica.
- We target sites that have the thinnest late glacial and Holocene sediment cover, as determined from seismic profiles.

5. Summary

Here we propose to obtain Cretaceous to Pliocene sediment records from the George V and Adélie Land shelf that will open a window on Antarctic greenhouse and icehouse climates. This is a prime location because a very broad range age range of sediments are accessible by shallow drilling, as confirmed by existing cores and dredge samples. These archives of past Antarctica warmth and ice history will provide apt analogues for future warm climates.

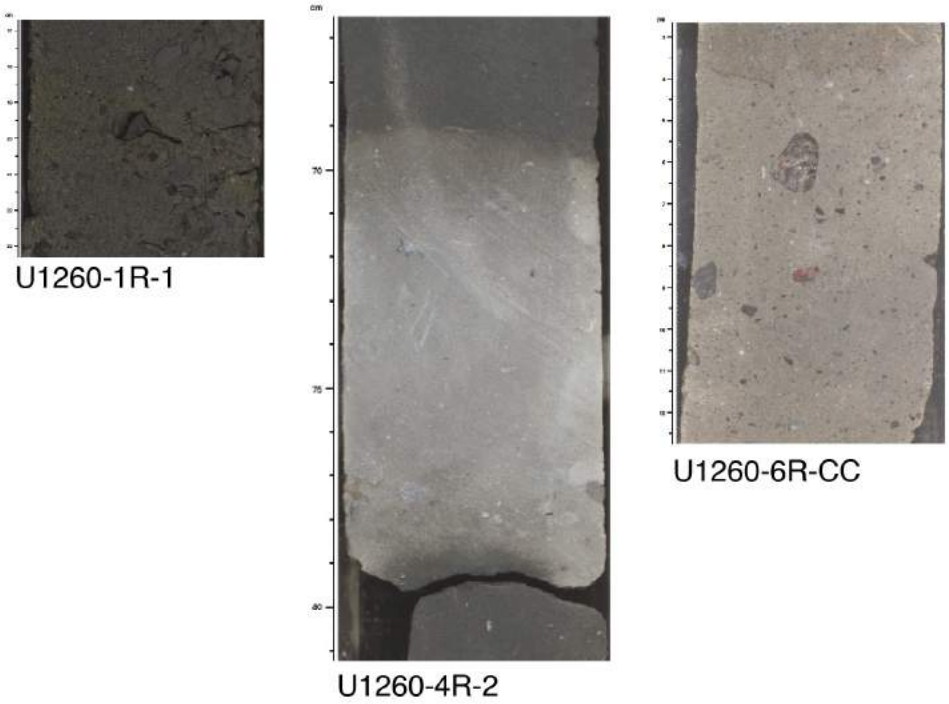

Figure 11. Core photos from IODP Site U1360, showing typical examples of what glacial sediment can be expected. A thin layer of unconsolidated diamicton (left, 1R-1) overlies (semi-) lithified older diamicts.

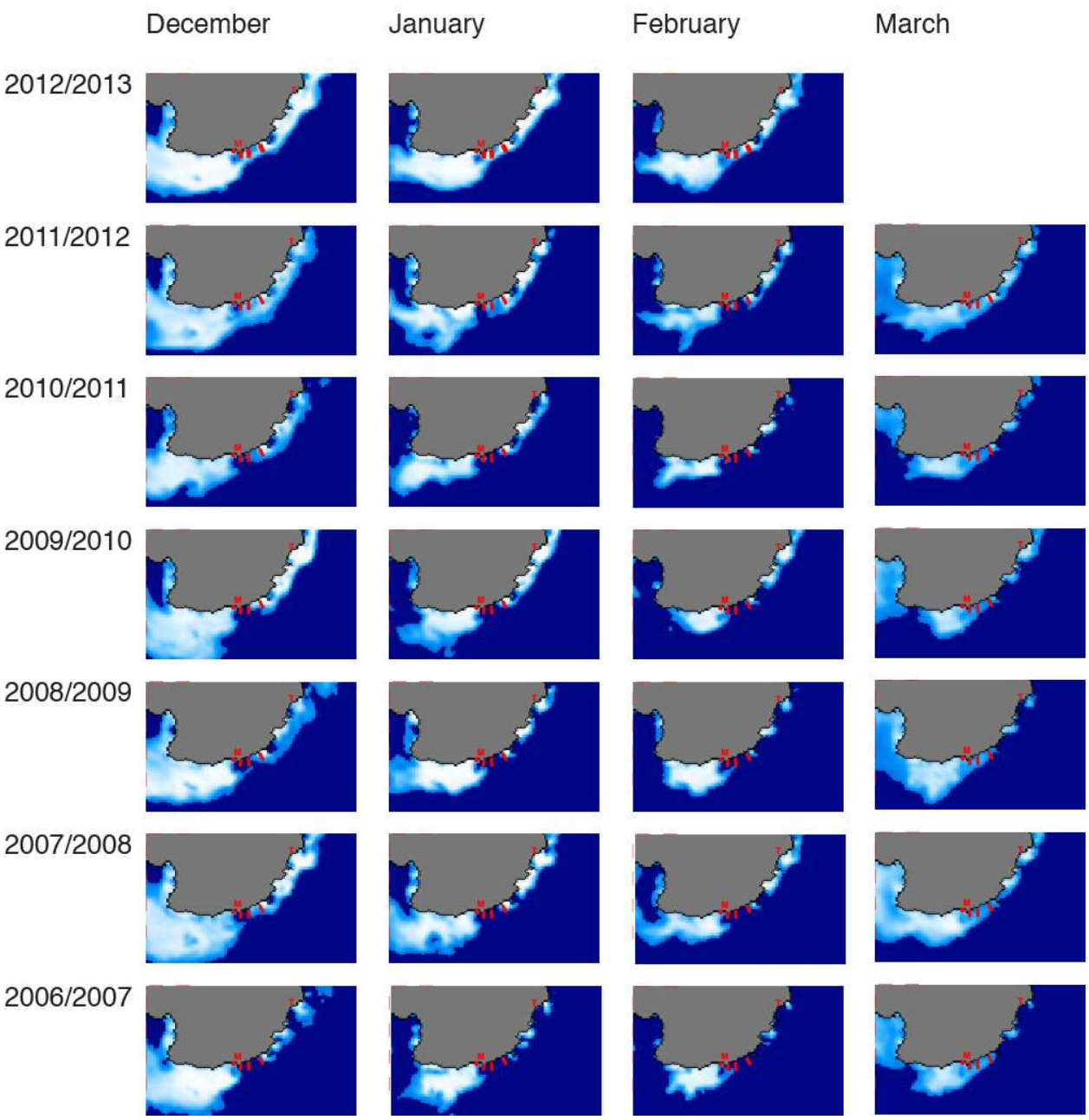

Figure 12. Sea ice conditions, 2006-2013 (NSIDC: http://nsidc.org/data/seaice_index/). Although 2013 had bad ice conditions, during most years the Mertz Polynya permits access to the shelf. Our proposed George V Land and Adélie Land transects are marked in red. M = Mertz Glacier; T = Totten Glacier.

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Proponent List

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Antarctic marine geology and geophysics, paleoclimate, sediment physical properties and provenance.

Carlota Escutia
Instituto Andaluz de Ciencias de la Tierra, Granada, Spain.
Antarctic marine geology and geophysics, seismic stratigraphy, paleoclimate.

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Antarctic marine geology and geophysics, seismic stratigraphy, paleoclimate.

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Antarctic marine geology and geophysics, seismic stratigraphy, paleoclimate, sea bed morphology.

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Queens College, New York, USA.
Antarctic marine geology and geophysics, paleoclimate, sea level change.

Henk Brinkhuis
Royal Netherlands Institute for Sea Research NIOZ, Texel, Netherlands.
Antarctic marine geology, marine palynology, paleoclimate.

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Hamilton College, Clinton, NY, USA.
Antarctic marine geology, paleoclimate.

List of Potential Reviewers

Frank Rack
University of Nebraska-Lincoln, USA.

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Professional Preparation

Edinburgh University, UK,	Geology and Geophysics,	Ph.D. 1994
Durham University, UK,	Geology and Geophysics,	B.Sc. 1989
CEREGE, Aix, France	Post-doc in Paleomagnetism	1994-1995

Appointments

2007 – present	Research Scientist, L-DEO
2004 – 2007	Associate Research Scientist, L-DEO
1999 – 2004	Senior Staff Associate, L-DEO
1995 – 1999	Research Associate, Dept. of Geology, Leicester University, UK
1994 – 1995	Royal Society fellowship, LGQ, CEREGE, Aix, France.
1990	Assistant Geologist, Robertson Group, plc. Llandudno, UK.

Publications relevant to proposed research

T. Williams, T. van de Flierdt, S.R. Hemming, E. Chung, M. Roy, S.L. Goldstein (2010), Evidence for iceberg armadas from East Antarctica in the Southern Ocean during the late Miocene and early Pliocene. Earth and Planetary Science Letters, 290, p351-361.

E. L. Pierce, **T. Williams**, T. van de Flierdt, S. R. Hemming, S. L. Goldstein, and S. A. Brachfeld (2011), Characterizing the sediment provenance of East Antarctica's weak underbelly: The Aurora and Wilkes sub-glacial basins. Paleoceanography, 26, PA4217, doi:10.1029/2011PA002127

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T . Naish, R. Powell, [53 other authors], **T. Williams**, (2009), Obliquity-paced Pliocene West Antarctic Ice Sheet oscillations. Nature, 458, 322-328.

Other significant publications

T. Williams and D. Handwerger, (2005), A high-resolution record of Early Miocene Antarctic glacial history from downhole logs, ODP Site 1165. Paleoceanography, 20, PA2017, doi:10.1029/2004PA001067.

A. McAuley, **T. Williams** and G. Winckler. (2004), Duration of Pliocene ice-rafting events offshore of Prydz Bay, Antarctica, derived from extraterrestrial Helium-3. *Eos Trans. AGU*, 85(47), Fall Meet. Suppl. Abstract PP51A-1328.

T. Williams, N. Thouveny & K.M. Creer (1996), Paleoclimatic significance of the 300 kyr mineral magnetic record from the sediments of Lac du Bouchet, France. Quaternary Science Reviews 15, 233-235.

N. Thouveny, J-L. de Beaulieu, E. Bonifay, K.M. Creer, J. Guiot, M. Icole, S. Johnsen, J. Jouzel, M. Reille, **T. Williams** & D. Williamson (1994), Climate variations in Europe over the past 140 kyr deduced from rock magnetism." Nature, 371, p 503-506.

R.H. Morin, **T. Williams**, S.S. Henrys, D. Magens, F. Niessen, D. Hansaraj (2010), Heat Flow and Hydrologic Characteristics at the AND-1B borehole, ANDRILL McMurdo Ice Shelf Project, Antarctica. Geosphere, v. 6; no. 4; p. 370-378.

Synergistic Activities

Co-advisor to graduate students Elizabeth Pierce (LDEO) and Carys Cook (Imperial College London) (both working on Antarctic sediment provenance).

Co-supervision of Lamont summer intern students Andrew McAuley (2004), Elena Chung (2005), Michelle Mabson (2010), Ethan Dahlhauser (2010), Amanda Duchesne (2012) and Daniel Johnson (2012). All projects were/are on Antarctic glacimarine sediment cores.

Popular Mechanics: Three series of online articles for Popular Mechanics, from the IODP Wilkes Land Antarctic expedition (Jan 2010), IODP Equatorial Pacific (April 2009), and ANDRILL, Antarctica (Nov-Dec 2006). E.g. www.popularmechanics.com/science/environment/climate-change/4349415

Session co-convenor, ISAES Edinburgh 2011, Unravelling the geologic, climatic, and topographic evolution of Antarctica

Staff Scientist for IODP Expedition 307, Porcupine Basin Carbonate Mounds (2005), including a general interest article in EOS.

Collaborators

Stefanie Brachfeld, Montclair State University
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Graduate and Postdoctoral Advisors

Ph.D. advisor: Ken Creer, University of Edinburgh, UK (retired)
Post doctoral mentor: Nicolas Thouveny, Université de la Méditerranée, Marseille, France
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Current Positions

- **Research Scientist, Spanish Research Council (CSIC)** (Since 2002).
- **Chair of ESSAC:** Science Support and Advisory Committee of ECORD (the European Consortium of Ocean Research Drilling) (since October 2010).
- **Vice-Chair Science Advisory Committee for IODP** (Integrated Ocean Drilling Program)**- ICDP** (International Continental Drilling Program) **Spain** (since 2007).
- **Chair of the Scientific Committee for Antarctic Research (SCAR)-Antarctic Evolution (ACE) Program** (2008-2012-2008) and of **SCAR Past Ice Sheet Dynamics (PAIS)**

Education

1992 Ph.D. in Marine Sciences, University of Barcelona / Polytechnic University of Barcelona, Spain.
1985 M.S. in Structural Geology., Autonomous University of Barcelona, Spain.
1982 B.S. in Geology, Autonomous University of Barcelona, Spain.

Previous Employment

Research

1998-2002 Assistant Research Scientist/Leg Project Manager, Ocean Drilling Program-Texas A&M University, USA
1997-1998 Visiting Scientist, United States Geological Survey, Menlo Park, California, USA.
1995-1997 Post-doctoral Fellow: United States Geological Survey, Menlo Park, California, USA.
1994-1995 Visiting Scholar, Stanford University, California, USA.
1987-1992 Ph.D. Fellow, Spanish Research Council. (CSIC)-Instituto Jaime Almera (IJA), Barcelona.
1984-1986 Marine Geologist, CSIC-Instituto de Ciencias del Mar, Barcelona (Spain)

Teaching

1984-1995 Part-time lecturer in Oceanography, Geology, and Environmental Geology at San Jose State University, Santa Clara University, Foothill College, and College of San Mateo – California, USA.
1995 Consulting Assistant Professor: Deep Water Depositional Systems. Stanford University (USA)
2002-2011 Graduate courses, University of Granada and Stanford University,

Research Projects and Programs

Current International Research Grants as PI

- Integrated Ocean Drilling Program (IODP) East Antarctic Ice Sheet History from Wilkes Land Sediments (482-Full3).
- ERA-NET European Partnership in Polar Climate Science (EUROPOLAR) - EUI2009-04040: Holocene climate variability at high-southern latitudes: an integrated perspective.
- Scientific Committee for Antarctic Research - Past Ice Sheet Dynamics (PAIS) Program

Other Grants

- Principal Investigator in 15 projects funded by the Spanish Ministry of Science (MEC, MICINN), the Spanish Research Council (CSIC), the US National Science Foundation (NSF), the Joint Oceanographic Institutions/US Science Support Programs (JOI/USSSP), and the Commission for Cultural, Educational and Scientific Exchange between the United States of America and Spain.
- Member of the Science Team in three Core-Projects of the International Polar Year: "Antarctic Climate Evolution (ACE)", "Bipolar Climate Machinery (BIPOMAC)" & "Plate Tectonics and Polar Gateways in Earth History (PLATES&GATES)"
- Co-proponent in IODP Proposal 644-Full: Mediterranean outflow, scheduled for drilling in winter 2011-2012.

Publications

More than 60 publications, and 10 books and special volumes.

Ten Selected Publications Related to the Proposal

- Stocchi, P., Escutia, C., Houben, A.J.P., Bijl, P.K., Brinkhuis, H., DeConto, R., Galeotti S, Vermeersen, B.L.A., and Expedition 318 Scientists. Relative sea levelrise around East Antarctica during Oligocene glaciation. ***Nature Geosciences,*** *in press*.

- Houben, A.J.P., Bjil, P.K., Pross, J., Bohaty, S.M., Stckley, C.E., Passchier, S., Roel, U., Sugisaki, S., Tauxe, L.,van de Flierdt, T., Olney, M., Sangiorgi, F., Sluijs, A., Escutia, C., Brinkhuis, H., and the Expedition 318 Scientists. Modern Southern Ocean plankton ecosystems arose at the onset of Antarctic glaciation. ***Science****, in press*.

- Pross, J., Contreras, L., Bijl, P.K., Greenwood, D.R., Bohaty, S.M., Schouten, S., Bendle, J.A., Röhl, U.,Tauxe, L., Raine, J.I., Huck, C.E., van de Flierdt, T., Jamieson, S.S.R., Stickley, C.E., van de Schootbrugge, B., Escutia, C., Brinkhuis, H., and IODP Expedition 318 Scientists. Persistent near-tropical warmth on the Antarctic continent during the early Eocene epoch**.** ***Nature*** *Vol 488, No. 7409: 73-77, doi:10.1038/nature11300*

- Escutia, C., Florindo, F., DeConto, R. Bentley, M. In C. Escutia, F. Florindo, R. DeConto and M. Bentley (EDS): Cenozoic Evolution of Antarctic Climates, Oceans and Ice Sheets. ***Palaeogeography, Palaeoclimatology, Palaeoecology,*** *335-336: 1-3. doi:10.1016/j.palaeo.2012.04.005*.

- Tauxe, L., Stickley, C.E., Sugisaki, S., Bijl, P.K., Bohaty, S.M., Brinkhuis, H., Escutia, C., Flores, J.A., Houben, S., Iwai, M., Jiménez-Espejo, F., McKay, R., Passchier, S., Pross, J., Riesselman, C.R., Roehl, U., Sangiorgi, F., Welsh, K., Klaus, A., Fehr, A., Bendle, A.P.J., Dunbar, R., Gonzalez, J., Hayden, T., Katsuki, K., Olney, M.P., Pekar, S.F., Shrivaska, P.K., van de Flierdt, T., Williams, T., Yamane, M. Chronostratigraphic framework for the IODP Expedition 318 Wilkes Land Margin: constraints for paleoceanographic reconstruction. ***Paleoceanography,*** *Vol. 27, Issue 2, PA2214: doi:10.1029/2012PA002308*

- Escutia, C., Bárcena, M.A., Lucchi, R.G., Romero, O., Ballegeer, M., Gonzalez, J.J., and Harwood, D. 2009. Circum-Antarctic Warming Events Between 4 and 3.5 Ma Recorded in Sediments from the Prydz Bay (ODP Leg 188) and the Antarctic Peninsula (ODP Leg 178) margins. ***Global and Planetary Change*** *(2009), 69: 170-184*.

- Barker, P.F., Diekmann, B., and Escutia, C. 2006. Onset of Cenozoic Antarctic Glaciation. ***Deep Sea Research II*** *, 54, 21-22: 2293-2307*.

- Escutia C., De Santis, L., Donda, F., Dunbar, R.B., Brancolini, G., Eittreim, S.L., and Cooper, A.K. 2005. Cenozoic ice sheet history from east Antarctic Wilkes Land continental margin sediments. ***Global and Planetary Change****, 45, 1-3: 51-81*.

- Escutia, C., Warnke, D., Acton, G.D., Barcena, A., Burckle, L., Canals, M., and Frazee, C.S. 2003. Sediment distribution and sedimentary processes across the Antarctic Wilkes Land margin during the Quaternary. ***Deep-Sea Research II*** *, 50: 1481- 1508*.

- Escutia, C., Nelson, C.H., Acton, G.D., Eittreim, S.L., Cooper, A.K., Warnke, D.A., and Jaramillo, J.M. 2002. Current controlled deposition on the Wilkes Land continental rise, Antarctica. ***Geological Society, London, Memoirs****, 22: 373-384*.

- Escutia, C., Eittreim, S.L., Cooper, A.K., and Nelson, C.H. 2000. Morphology and acoustic character of the Antarctic Wilkes Land turbidite systems: ice-sheet sourced versus river-sourced fans. ***Journal of Sedimentary Research****, 70: 84-93*.

Invited Lectures (last 5 years):

3 Keynote lectures in international meetings; 9 invited lectures in international forums (AGU, EGU, IPY); and 6 in University forums (Stanford, Santa Cruz & Santa Barbara –USA; Victoria Univ. of Wellington-NZ, etc).

Oceanographic Cruises/ODP Legs

- ODP/IODP Expeditions: PI and Co-chief Scientist IODP Expedition 318 (Wilkes Land Glacial history) (2010); Sedimentologist in ODP Leg 178 (1998); ODP Staff Scientist in ODP Legs 185 and 191 (2000 & 2001).
- Participation in other 15 Oceanographic cruises.

Outreach:

Dissemination of research findings and information about paleoclimate and research projects to non-scientists through: (1) Appearances in national and international TV (TVE, Aragon TV, Canal Sur TV, San Francisco KRON TV-USA, BBC, ABC Australia, etc); (2) interviews in national and international Radio (RNE, SER, Onda Cero, Canal Sur Radio, COPE, Hispanic Radio Network, Mundo 2000, NPR, etc); (3) articles in national and international newspapers (El Pais, El Mundo, Granada Hoy, Ideal, and newspapers in the USA, Nueva Zelanada, Australia, etc); and (4) numerous public lectures.

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1990	*Laurea* in Geology, University of Parma, Italy
1995	*Ph.D.* in Earth Science, University of Parma, Italy
1995-2003	Post-doc contract at OGS - Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, Italy, Geophysics of the Lithospehere Department

Professional appointments

- Researcher at Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS) Trieste, Italy, 1996 - present
- Coordinator of group INGE (Analysis and interpretation of geological and geophysics data) – Geophysics of the Lithosphere Dept. GDL – OGS 2007-2012.
- Deputy director of Department of Geophysics of the Lithosphere (GDL) at OGS 2011-2012
- Member of the Scientific National Antarctic Committee (CSNA) of Programma Nazionale delle Ricerche in Antartide (PNRA), designed by the Ministry of Research 2007-current
- Co-leader of the SCAR/ACE sub-committees "Paleoclimate Records from the Antarctic Margin and Southern Ocean" (PRAMSO)" and CircumAntarctic Stratigraphy and Paleobathymetry (CASP).
- Member of the Scientific Review Panel of the FP7/EU Eurofleets 1 project 2009-2013 and Eurofleets 2 project 2013-2017
- Co-proponent of the IODP full-proposal 751 Direct chronologic and environmental change constraints on the WAIS late Neogene grounding events at the Eastern Basin, Ross Sea outer continental margin, 2010
- Co-proponent of the IODP full-proposal 482 "Cenozoic Glacial History and Sea Level Change of the Wilkes Land Margin, Antarctica" achieved by Expedition Leg 318, 2010.

History of Research Grants in Related Areas

- WEGA - Wilkes Basin Glacial History project funded by Programma Nazionale delle Ricerche in Antartide – PNRA and by the Australian National Agency for Research Expedition (1999-2001).
- MOGAM - MOrphology and Geology of Antarctic Margins. Funded by PNRA (2002-2004).

Google scholar publication profile

http://scholar.google.it/citations?hl=it&user=XX6l9l0AAAAJ&view_op=list_works&cstart=40

SELECTED PEER REVIEWED PUBLICATIONS

De Santis L., Brancolini G., Donda F., Seismo-stratigraphic analysis of the Wilkes Land continental margin (East Antarctica). In: Deep Sea Research Special Volume II, 50, Issues 8-9, (May 2003) Recent investigations of the Mertz Polynya and George Vth Land continental margin, East Antarctica Edited by P. Harris, G. Brancolini, N. Bindoff, L. DeSantis Elsevier Publ., 1563-1594.

Donda F., Brancolini G., O'Brien P. E., De Santis L., Escutia C., 2007. Sedimentary processes in the Wilkes Land margin: a record of the Cenozoic East Antarctic Ice Sheet evolution. Journal of the Geological Society of London, Vol. 164, , pp. 243–256

Donda, F., O'Brien, P.E., De Santis, L., Rebesco, M., Brancolini, G. Mass wasting processes in the Western Wilkes Land margin: Possible implications for East Antarctic glacial history (2008) Palaeogeography, Palaeoclimatology, Palaeoecology, 260 (1-2), pp. 77-91.

Caburlotto A., Lucchi R.G., De Santis L., Macrì P., Tolotti R. 2009. Sedimentary processes on the Wilkes Land continental rise reflect changes in glacial dynamic and bottom water flow. International Journal of Earth Sciences (Geol Rundsch) DOI 10.1007/s00531-009-0422-8

Caburlotto A., Lucchi R.G., De Santis L., Macrì P., Tolotti R. 2010. Sedimentary processes on the Wilkes Land continental rise reflect changes in glacial dynamic and bottom water flow. International Journal of Earth Sciences (Geol Rundsch), vol. 99 (4), p. 909-926, ISSN: 1437-3254 DOI 10.1007/s00531-009-0422-8

De Santis L., Brancolini G., Donda F., O'Brien P., 2010. Cenozoic deformation in the George V Land continental margin (East Antarctica), Marine Geology volume 269, issues 1-2, pp 1-17, 2010.DOI information: 10.1016/j.margeo.2009.12.001

Post Alexandra L., O'Brien Philip E., Beaman Robin J., Riddle Martin J., De Santis Laura, 2010. Physical controls on deep water coral communities on the George V Land slope, East Antarctica Antarctic Science, volume 22, (04), pp. 371-378.

Beaman Robin J., Philip E. O'brien, Alexandra L. Post and Laura De Santis. 2010. A new high-resolution bathymetry model for the Terre Adélie and George V continental margin, East Antarctica. Antarctic Science page 1 of 9 . Antarctic Science Ltd 2010.

Presti M., Barbara L., Denis D., Schmidt S., De Santis L., Crosta X., 2011. Sediment delivery and depositional patterns off AdélieLand (East Antarctica) in relation to late Quaternary climatic cycles. Marine Geology, 284 (1-4): 96-113

Bart, P.J., and L. De Santis. 2012. Glacial intensification during the Neogene: A review of seismic stratigraphic evidence from the Ross Sea, Antarctica, continental shelf. *Oceanography* 25(3):166–183, http://dx.doi.org/10.5670/oceanog.2012.92.

THESIS CO-ADVISOR AND POSTGRADUATE-SCHOLAR TUTOR

- EU-Marie Curie Actions (2 years), funded with 170.000 Euro—Intra-European Fellowships (IEF) FP7-PEOPLE-2009. Title: PLUMES—Impact of subglacial meltwater plumes on sediment dispersal, ocean circulation, ecosystems and climate change.
- Beneficiary: Dr. Renata Lucchi (Univ. Di Barcellona) - EU-Marie Curie European Re-Integration Grant (ERG) (1 year), funded with 40.000 Euro, *non activated for burocratic problems*
- HoloSed HOLOocene SEDdiment record of Antarctic deep water production project. Contract 039566. Beneficiary Dr. Massimo Presti.
- Co-advisor of 3 PhD thesis in Polar Science (2002-2003)

RESEARCH INTERESTS

- Antarctic marine geology and geophysics, Seismic/sequence stratigraphy, Glacial sedimentology, Global-scale climate change

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Late Eocene cooling, precursor interglacials? Youngest available strata along WEGA-02-01. Primary site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-01A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.74533	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 145.59042	Distance to Land: (km)	58
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	506

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Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	1000	
Total Penetration (m):	80	

General Lithologies: Unconsolidated diamict overyling semi-lithified siltstone, mudstone, sandstone, and conglomerate

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-01A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 02-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Location: 2495
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		3.5 kHz profiles are available for line WEGA 02-01
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the WEGA cruise is available from SDLS (Antarctic Seismic Data Library System)

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Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-01A	Date Form Submitted:	2013-04-23
Water Depth (m):	506	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-01A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	We might encounter lignite layers (Eocene, Cretaceous), but not oil or gas.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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Proposal #:	813 - Full	Site #:	GVAL-01A	Date Form Subm.:	2013-03-28 17:30:29

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Late Eocene	1.8	semi-lithified siltstone, mudstone, sandstone, and conglomerate	siliciclastic shallow shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4166)

Proposal #:	813 - Full	Site #:	GVAL-01A	Date Form Subm.:	2013-03-28 17:30:29

Site Summary Figure Comment	See Site Summary Figure for GVAL-01A, which covers the whole transect of sites along line WEGA 02-01 (Sites GVAL 01-10).

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PDF name: SSF_2_16

Prpsl user: Trevor. Prpsl #: 2

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Late Eocene cooling, precursor interglacials? Can Antarctica sustain any ice sheets when the atmosphere is above 1000 ppm CO2? Nature of high amplitude reflector. Primary site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-02A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.78851	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 145.50550	Distance to Land: (km)	50
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	563

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Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	1000	
Total Penetration (m):	80	

General Lithologies: Unconsolidated diamict overyling semi-lithified siltstone, mudstone, sandstone, and conglomerate

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-02A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 02-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Location: 2250
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		3.5 kHz profiles are available for line WEGA 02-01
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the WEGA cruise is available from SDLS (Antarctic Seismic Data Library System)

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Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-02A	Date Form Submitted:	2013-04-23
Water Depth (m):	563	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-02A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	We might encounter lignite layers (Eocene, Cretaceous), but oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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Proposal #:	813 - Full	Site #:	GVAL-02A	Date Form Subm.:	2013-04-02 19:30:29

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Late Eocene	1.8	semi-lithified siltstone, mudstone, sandstone, and conglomerate	siliciclastic shallow shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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Proposal #:	813 - Full	Site #:	GVAL-02A	Date Form Subm.:	2013-04-02 19:30:29

Site Summary Figure Comment	See Site Summary Figure for GVAL-01A, which covers the whole transect of sites along line WEGA 02-01 (Sites GVAL 01-10).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle/Late Eocene climate conditions, nature of paleoenvironmental change represented by underlying high-amplitude reflector. Primary site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-03A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.87160	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 145.32064	Distance to Land: (km)	40
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	713

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Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	1000	
Total Penetration (m):	80	

General Lithologies: Unconsolidated diamict overyling semi-lithified siltstone, mudstone, sandstone, and conglomerate

Coring Plan: (Specify or check): Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-03A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 02-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Location: 1780
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		3.5 kHz profiles are available for line WEGA 02-01
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the WEGA cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6548)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-03A	Date Form Submitted:	2013-04-23
Water Depth (m):	713	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4223)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-03A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	We might encounter lignite layers (Eocene, Cretaceous), but not oil or gas.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4604)

Proposal #:	813 - Full	Site #:	GVAL-03A	Date Form Subm.:	2013-04-02 19:30:35

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Middle/Late Eocene	1.8	semi-lithified siltstone, mudstone, sandstone, and conglomerate	siliciclastic shallow shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4167)

Proposal #:	813 - Full	Site #:	GVAL-03A	Date Form Subm.:	2013-04-02 19:30:35

Site Summary Figure Comment	See Site Summary Figure for GVAL-01A, which covers the whole transect of sites along line WEGA 02-01 (Sites GVAL 01-10).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle Eocene climate conditions, nature of paleoenvironmental change represented by overlying high-amplitude reflector. Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-04A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.88356	Distance to Land: (km)	39
Longitude:	Deg: 145.29604		
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	765

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(user 0.1991)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	1000	
Total Penetration (m):	80	

General Lithologies: Unconsolidated diamict overyling semi-lithified siltstone, mudstone, sandstone, and conglomerate

Coring Plan: (Specify or check): Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-04A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 02-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Location: 1710
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		3.5 kHz profiles are available for line WEGA 02-01
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the WEGA cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6521)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-04A	Date Form Submitted:	2013-04-23
Water Depth (m):	765	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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by if353_t_pdf / kk+w 2007 - 2011
(user 0.4224)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-04A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	We might encounter lignite layers (Eocene, Cretaceous), but not oil or gas.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4610)

Proposal #:	813 - Full	Site #:	GVAL-04A	Date Form Subm.:	2013-04-02 19:51:08

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Middle Eocene	1.8	semi-lithified siltstone, mudstone, sandstone, and conglomerate	siliciclastic shallow shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4173)

Proposal #:	813 - Full	Site #:	GVAL-04A	Date Form Subm.:	2013-04-02 19:51:08

Site Summary Figure Comment	See Site Summary Figure for GVAL-01A, which covers the whole transect of sites along line WEGA 02-01 (Sites GVAL 01-10).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle Eocene climate and environmental conditions, nature of paleoenvironmental change (close to Dredge 1). Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-05A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.90627	Distance to Land: (km)	35
Longitude:	Deg: 145.26001		
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	844

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(user 0.2001)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	1000	

Total Penetration (m): 80

General Lithologies: Unconsolidated diamict overyling semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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(user 0.2001)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-05A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 02-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Location: 1590
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		3.5 kHz profiles are available for line WEGA 02-01
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the WEGA cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6528)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-05A	Date Form Submitted:	2013-04-23
Water Depth (m):	844	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4228)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-05A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	We might encounter lignite layers (Eocene, Cretaceous), but oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4704)

Proposal #:	813 - Full	Site #:	GVAL-05A	Date Form Subm.:	2013-04-02 19:57:03

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Middle Eocene	1.8	semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite	siliciclastic shallow shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

generated: Tue Apr 23 02:43:43 2013
by if355_pdf / kk+w 2007 - 2011
(user 0.4183)

Proposal #:	813 - Full	Site #:	GVAL-05A	Date Form Subm.:	2013-04-02 19:57:03

Site Summary Figure Comment	See Site Summary Figure for GVAL-01A, which covers the whole transect of sites along line WEGA 02-01 (Sites GVAL 01-10).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle Eocene climate and environmental conditions, nature of paleoenvironmental change (close to Dredge 1). Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-06A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.91162	Distance to Land: (km)	34
Longitude:	Deg: 145.25153		
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	881

generated: Tue Apr 23 02:43:48 2013
by if351_pdf / planiglobe 2007 - 2013
(user 0.1996)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	1000	

Total Penetration (m): 80

General Lithologies: Unconsolidated diamict overyling semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-06A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 02-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Location: 1560
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		3.5 kHz profiles are available for line WEGA 02-01
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the WEGA cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-06A	Date Form Submitted:	2013-04-23
Water Depth (m):	881	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4213)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-06A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	We might encounter lignite layers (Eocene, Cretaceous), but oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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Proposal #:	813 - Full	Site #:	GVAL-06A	Date Form Subm.:	2013-04-03 03:16:43

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Middle Eocene	1.8	semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite	siliciclastic shallow shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4173)

Proposal #:	813 - Full	Site #:	GVAL-06A	Date Form Subm.:	2013-04-03 03:16:43

Site Summary Figure Comment	See Site Summary Figure for GVAL-01A, which covers the whole transect of sites along line WEGA 02-01 (Sites GVAL 01-10).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early/Middle Eocene climate and environmental conditions. Pre-unconformity A. Hyperthermals? Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-07A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.93843	Distance to Land: (km)	31
Longitude:	Deg: 145.20008		
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	956

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(user 0.2000)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	1000	
Total Penetration (m):	80	

General Lithologies: Unconsolidated diamict overyling semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days:	Drilling/Coring: 1.8	Logging: 0.2	Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-07A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 02-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Location: 1396
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		3.5 kHz profiles are available for line WEGA 02-01
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the WEGA cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6569)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-07A	Date Form Submitted:	2013-04-23
Water Depth (m):	956	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-07A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	We might encounter lignite layers (Eocene, Cretaceous), but oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4641)

Proposal #:	813 - Full	Site #:	GVAL-07A	Date Form Subm.:	2013-04-03 03:39:55

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Early/Middle Eocene	1.8	semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite	siliciclastic shallow shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4163)

Proposal #:	813 - Full	Site #:	GVAL-07A	Date Form Subm.:	2013-04-03 03:39:55

Site Summary Figure Comment	See Site Summary Figure for GVAL-01A, which covers the whole transect of sites along line WEGA 02-01 (Sites GVAL 01-10).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early/Middle Eocene climate and environmental conditions. Pre-unconformity A. Hyperthermals? Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-08A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.95185	Distance to Land: (km)	30
Longitude:	Deg: 145.16873		
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	1069

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(user 0.2008)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	1000	

Total Penetration (m): 80

General Lithologies: Unconsolidated diamict overyling semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-08A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 02-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Location: 1300
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		3.5 kHz profiles are available for line WEGA 02-01
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the WEGA cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6547)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-08A	Date Form Submitted:	2013-04-23
Water Depth (m):	1069	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-08A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	We might encounter lignite layers (Eocene, Cretaceous), but oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4636)

Proposal #:	813 - Full	Site #:	GVAL-08A	Date Form Subm.:	2013-04-03 03:45:10

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Early Eocene	1.8	semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite	siliciclastic shallow shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4235)

Proposal #:	813 - Full	Site #:	GVAL-08A	Date Form Subm.:	2013-04-03 03:45:10

Site Summary Figure Comment	See Site Summary Figure for GVAL-01A, which covers the whole transect of sites along line WEGA 02-01 (Sites GVAL 01-10).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Cretaceous temperature and vegetation on Antarctica. What were the Cretaceous greenhouse conditions like compared to Eocene warmth? Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-09A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.98382	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 145.10865	Distance to Land: (km)	26
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	1193

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(user 0.1995)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	1000	

Total Penetration (m): 80

General Lithologies: Unconsolidated diamict overyling semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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(user 0.1995)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-09A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 02-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Location: 1097
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		3.5 kHz profiles are available for line WEGA 02-01
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the WEGA cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6521)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-09A	Date Form Submitted:	2013-04-23
Water Depth (m):	1193	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4272)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-09A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	We might encounter lignite layers (Eocene, Cretaceous), but oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4647)

Proposal #:	813 - Full	Site #:	GVAL-09A	Date Form Subm.:	2013-04-03 03:48:55

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Early Cretaceous	1.8	semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite	shallow seaway or inland basin	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4179)

Proposal #:	813 - Full	Site #:	GVAL-09A	Date Form Subm.:	2013-04-03 03:48:55

Site Summary Figure Comment	See Site Summary Figure for GVAL-01A, which covers the whole transect of sites along line WEGA 02-01 (Sites GVAL 01-10).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Cretaceous temperature and vegetation on Antarctica. What were the Cretaceous greenhouse conditions like compared to Eocene warmth? Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-10A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.99644	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 145.08846	Distance to Land: (km)	25
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	1200

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(user 0.1998)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	1000	

Total Penetration (m): 80

General Lithologies: Unconsolidated diamict overyling semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-10A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 02-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Location: 1032
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		3.5 kHz profiles are available for line WEGA 02-01
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the WEGA cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-10A	Date Form Submitted:	2013-04-23
Water Depth (m):	1200	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4232)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-10A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	We might encounter lignite layers (Eocene, Cretaceous), but oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4694)

IODP Site Summary Forms: Form 5 – Lithologies

Proposal #:	813 - Full	Site #:	GVAL-10A	Date Form Subm.:	2013-04-03 03:55:39

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Early Cretaceous	1.8	semi-lithified siltstone, mudstone, sandstone, conglomerate, and lignite	shallow seaway or inland basin	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4177)

Proposal #:	813 - Full	Site #:	GVAL-10A	Date Form Subm.:	2013-04-03 03:55:39

Site Summary Figure Comment	See Site Summary Figure for GVAL-01A, which covers the whole transect of sites along line WEGA 02-01 (Sites GVAL 01-10).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Pliocene ice advances and warm intervals. Age of WL-U8 unconformity. Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-11A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.10396	Distance to Land: (km)	82
Longitude:	Deg: 143.27648		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	540

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(user 0.1998)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-11A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107. Location: 1270
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected along most of line WEGA 02-01, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6452)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-11A	Date Form Submitted:	2013-04-23
Water Depth (m):	540	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

generated: Tue Apr 23 02:45:02 2013
by if353_t_pdf / kk+w 2007 - 2011
(user 0.4230)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-11A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4575)

Proposal #:	813 - Full	Site #:	GVAL-11A	Date Form Subm.:	2013-04-03 04:00:59

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Early Pliocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

generated: Tue Apr 23 02:45:07 2013
by if355_pdf / kk+w 2007 - 2011
(user 0.4215)

Proposal #:	813 - Full	Site #:	GVAL-11A	Date Form Subm.:	2013-04-03 04:00:59

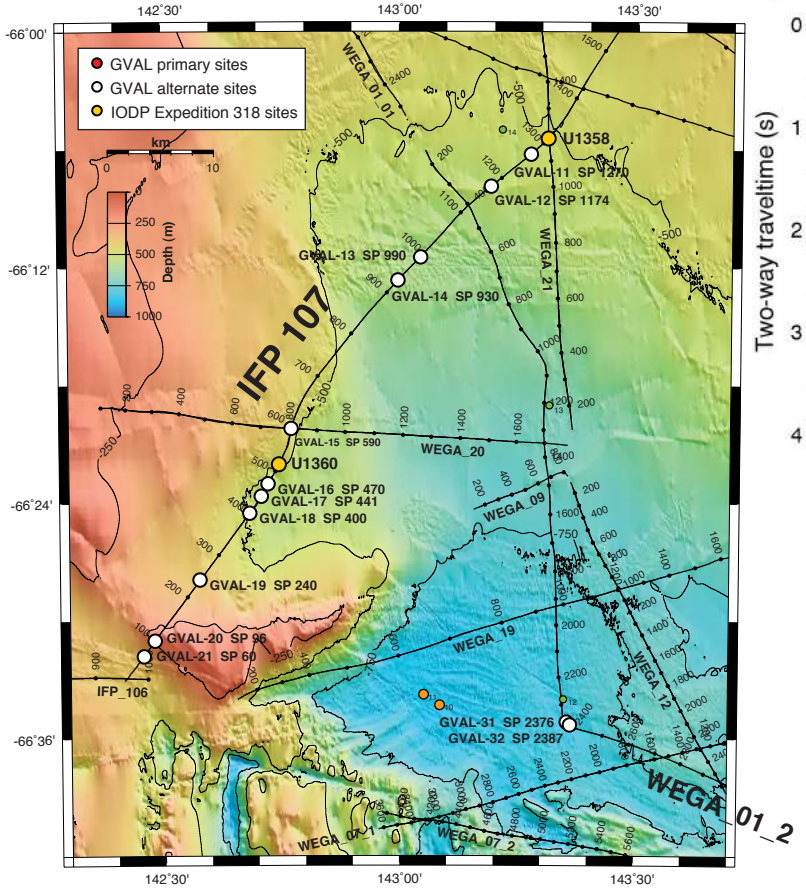
Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

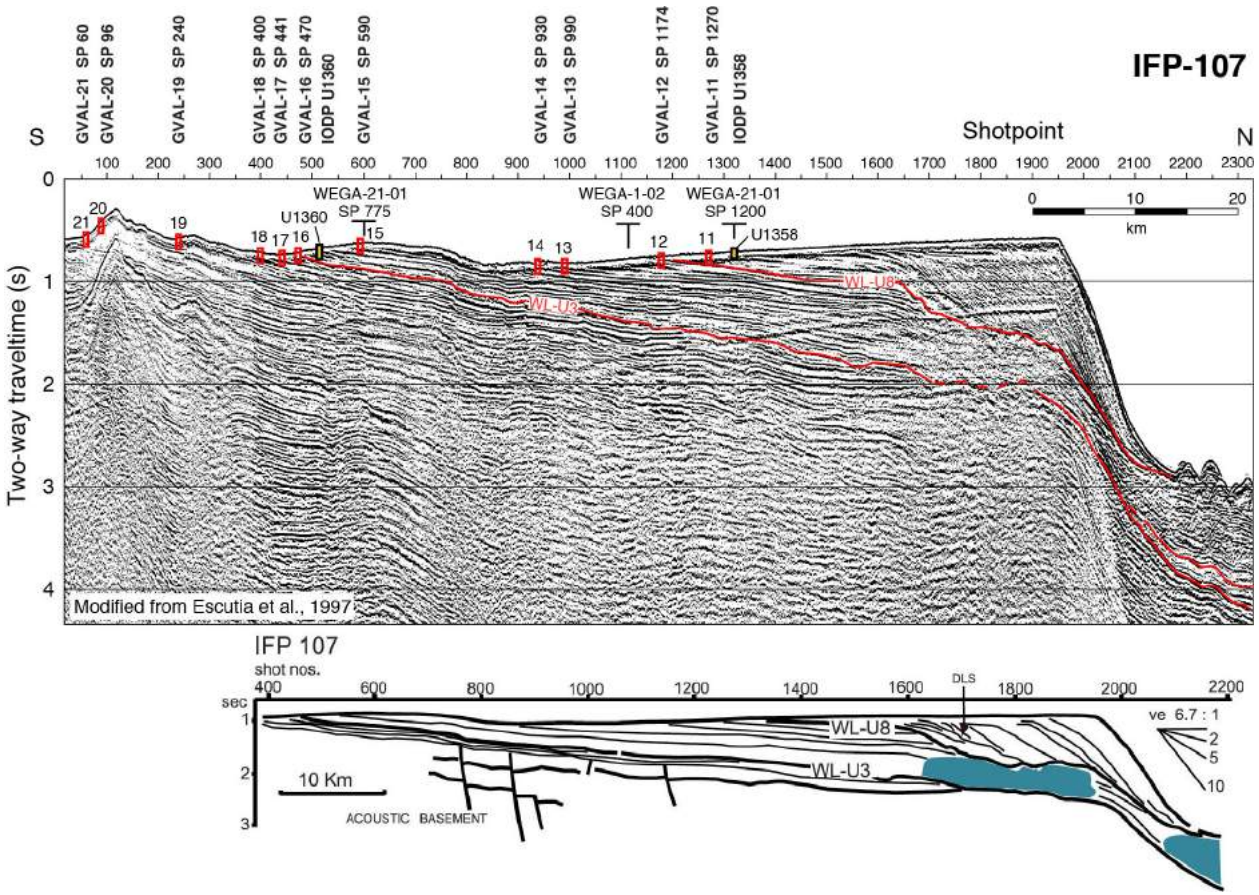
Proposal 813 **Site Summary Form 6**

George V Land Shelf, Antarctica: Cenozoic Paleoclimate

Sites GVAL 11 to 21

Seismic line IFP-107. Not yet in SSDB





WL-U8 - Late Miocene / Early Pliocene unconformity
WL-U3 - Eocene/Oligocene boundary unconformity
DLS - downlap surface

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	I. Miocene (?) environmental conditions leading to the formation of the WL-U8 unconformity and the observed change in the geometry of the sedimentary wedge. Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-12A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.13133	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 143.19281	Distance to Land: (km)	80
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	570

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(user 0.1996)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	

Total Penetration (m): 80

General Lithologies: Diamict, diamictite, sandstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-12A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107. Location: 1174
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-107, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-12A	Date Form Submitted:	2013-04-23
Water Depth (m):	570	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-12A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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Proposal #:	813 - Full	Site #:	GVAL-12A	Date Form Subm.:	2013-04-03 04:28:59

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Late Miocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4152)

Proposal #:	813 - Full	Site #:	GVAL-12A	Date Form Subm.:	2013-04-03 04:28:59

Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	?mid-Miocene ice expansion (~14Ma) across downlap surface following the Mid-Miocene Climate Optimum Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-13A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.19123	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 143.04521	Distance to Land: (km)	76
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	600

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by if351_pdf / planiglobe 2007 - 2013
(user 0.1994)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

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IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-13A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107. Location: 990
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-107, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-13A	Date Form Submitted:	2013-04-23
Water Depth (m):	600	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-13A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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Proposal #:	813 - Full	Site #:	GVAL-13A	Date Form Subm.:	2013-04-03 04:35:54

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		?Middle Miocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4243)

Proposal #:	813 - Full	Site #:	GVAL-13A	Date Form Subm.:	2013-04-03 04:35:54

Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle Miocene (climate optimum?) and environmental conditions leading to mid-Miocene ice expansion Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-14A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.21104	Distance to Land: (km)	75
Longitude:	Deg: 142.99714		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	607

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(user 0.1992)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	

Total Penetration (m): 80

General Lithologies: Diamict, diamictite, sandstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-14A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 930
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-107, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6518)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-14A	Date Form Submitted:	2013-04-23
Water Depth (m):	607	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-14A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4541)

Proposal #:	813 - Full	Site #:	GVAL-14A	Date Form Subm.:	2013-04-03 04:41:14

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		?Middle Miocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4165)

Proposal #:	813 - Full	Site #:	GVAL-14A	Date Form Subm.:	2013-04-03 04:41:14

Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Oligocene environmental conditions. How did the Antarctic ice sheets respond the last time Earth's atmosphere was between 600-1000ppm CO2? Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-15A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.33685	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 142.77142	Distance to Land: (km)	62
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	465

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(user 0.1988)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-15A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 590
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-107, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

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Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-15A	Date Form Submitted:	2013-04-23
Water Depth (m):	465	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-15A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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Proposal #:	813 - Full	Site #:	GVAL-15A	Date Form Subm.:	2013-04-03 04:49:59

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		?Oligocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4148)

Proposal #:	813 - Full	Site #:	GVAL-15A	Date Form Subm.:	2013-04-03 04:49:59

Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Earliest Oligocene environmental conditions and glacial advance leading to a continental-wide ice sheet. Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-16A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.38363	Distance to Land: (km)	57
Longitude:	Deg: 142.72241		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	540

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(user 0.1994)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-16A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 470
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-107, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-16A	Date Form Submitted:	2013-04-23
Water Depth (m):	540	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-16A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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IODP Site Summary Forms: Form 5 – Lithologies

Proposal #:	813 - Full	Site #:	GVAL-16A	Date Form Subm.:	2013-04-03 04:54:30

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Earliest Oligocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4181)

Proposal #:	813 - Full	Site #:	GVAL-16A	Date Form Subm.:	2013-04-03 04:54:30

Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	E/O transition. Environmental changes across the WL-U3 unconformity (in combination with proposed site GVAL-16A) Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-17A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.39432	Distance to Land: (km)	55
Longitude:	Deg: 142.70773		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	532

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(user 0.1996)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	

Total Penetration (m): 80

General Lithologies: Diamict, diamictite, sandstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-17A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 441
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-107, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-17A	Date Form Submitted:	2013-04-23
Water Depth (m):	532	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-17A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4625)

Proposal #:	813 - Full	Site #:	GVAL-17A	Date Form Subm.:	2013-04-03 04:58:32

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80	crossing unconformity WL-U3 (E/O)	Late Eocene - Early Oligocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4199)

Proposal #:	813 - Full	Site #:	GVAL-17A	Date Form Subm.:	2013-04-03 04:58:32

Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Late Eocene environmental conditions leading to establishment of continental-wide ice sheet. Age of sediments underlying unconformity WL-U3 Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-18A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.40869	Distance to Land: (km)	53
Longitude:	Deg: 142.68304		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	518

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(user 0.1993)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-18A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 400
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-107, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-18A	Date Form Submitted:	2013-04-23
Water Depth (m):	518	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4219)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-18A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4539)

Proposal #:	813 - Full	Site #:	GVAL-18A	Date Form Subm.:	2013-04-03 05:03:24

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80	below unconformity WL-U3 (E/O)	Late Eocene	1.8	Diamict, diamictite, siltstone, sandstone, mudstone	siliclastic shelf.	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4171)

Proposal #:	813 - Full	Site #:	GVAL-18A	Date Form Subm.:	2013-04-03 05:03:24

Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Late Eocene cooling, precursor interglacials? Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-19A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.46560	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 142.57710	Distance to Land: (km)	45
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	428

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by if351_pdf / planiglobe 2007 - 2013
(user 0.1966)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-19A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 240
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-107, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-19A	Date Form Submitted:	2013-04-23
Water Depth (m):	428	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4240)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-19A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4571)

Proposal #:	813 - Full	Site #:	GVAL-19A	Date Form Subm.:	2013-04-03 12:55:02

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		?Late Eocene	1.8	Diamict, diamictite, siltstone, sandstone, mudstone	siliclastic shelf.	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4124)

Proposal #:	813 - Full	Site #:	GVAL-19A	Date Form Subm.:	2013-04-03 12:55:02

Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle Eocene climate and environmental conditions, Eocene cooling. Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-20A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.51689	Distance to Land: (km)	38
Longitude:	Deg: 142.48008		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	353

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(user 0.1981)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	

Total Penetration (m): 80

General Lithologies: Diamict, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-20A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 96
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-107, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-20A	Date Form Submitted:	2013-04-23
Water Depth (m):	353	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-20A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4527)

Proposal #:	813 - Full	Site #:	GVAL-20A	Date Form Subm.:	2013-04-03 13:01:32

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		?Middle Eocene	1.8	Diamict, diamictite, siltstone, sandstone, mudstone	siliclastic shelf.	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4153)

Proposal #:	813 - Full	Site #:	GVAL-20A	Date Form Subm.:	2013-04-03 13:01:32

Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle Eocene climate and environmental conditions, Eocene cooling. Alternate Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-21A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.53017	Distance to Land: (km)	38
Longitude:	Deg: 142.45635		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	428

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(user 0.1989)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-21A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	yes	X	multi-channel seismic line IFP 107, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 60
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-107, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-21A	Date Form Submitted:	2013-04-23
Water Depth (m):	428	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4223)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-21A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4602)

Proposal #:	813 - Full	Site #:	GVAL-21A	Date Form Subm.:	2013-04-03 13:04:11

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80	just above WL-2B (Gonzalez et al, in prep)	?Middle Eocene	1.8	Diamict, diamictite, siltstone, sandstone, mudstone	siliclastic shelf.	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4182)

Proposal #:	813 - Full	Site #:	GVAL-21A	Date Form Subm.:	2013-04-03 13:04:11

Site Summary Figure Comment	See Site Summary Figure for GVAL-11A, which covers the whole transect of sites along line IFP 107 (Sites GVAL 11-21).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Pliocene ice advances and warm intervals. Age of downlap surface. Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-22A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -65.59561	Distance to Land: (km)	105
Longitude:	Deg: 138.56735		
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	698

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(user 0.1980)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-22A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line IFP 103, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 995
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-103, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-22A	Date Form Submitted:	2013-04-23
Water Depth (m):	698	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4210)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-22A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4578)

Proposal #:	813 - Full	Site #:	GVAL-22A	Date Form Subm.:	2013-04-03 13:07:56

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Early Pliocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4152)

Proposal #:	813 - Full	Site #:	GVAL-22A	Date Form Subm.:	2013-04-03 13:07:56

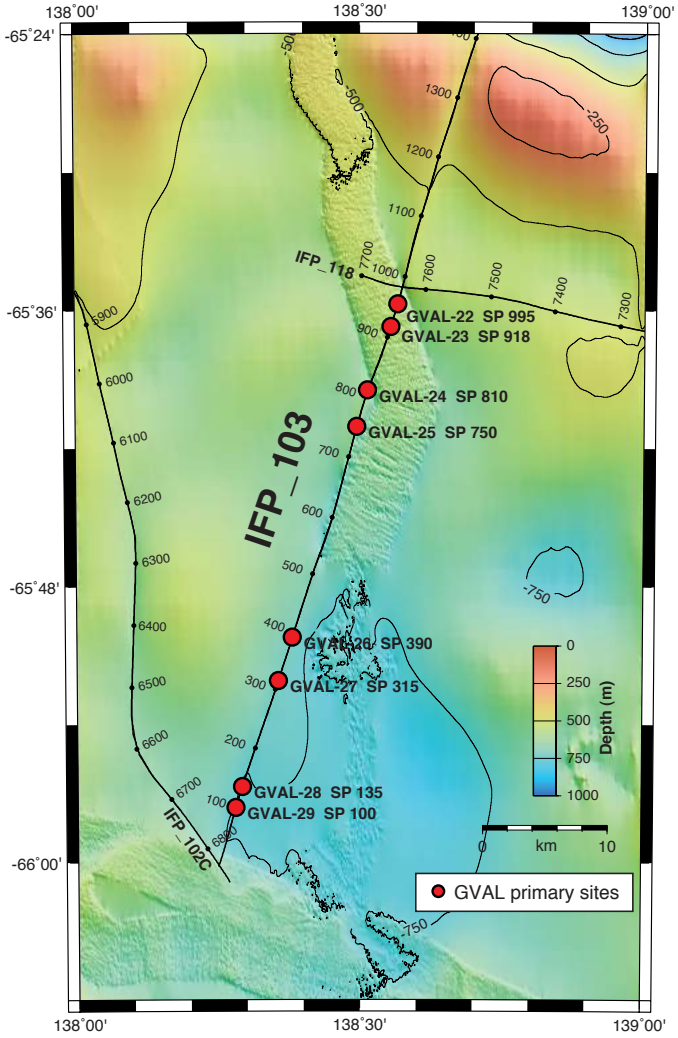
Site Summary Figure Comment	See Site Summary Figure for GVAL-22A, which covers the whole transect of sites along line IFP 103 (Sites GVAL 22-29).

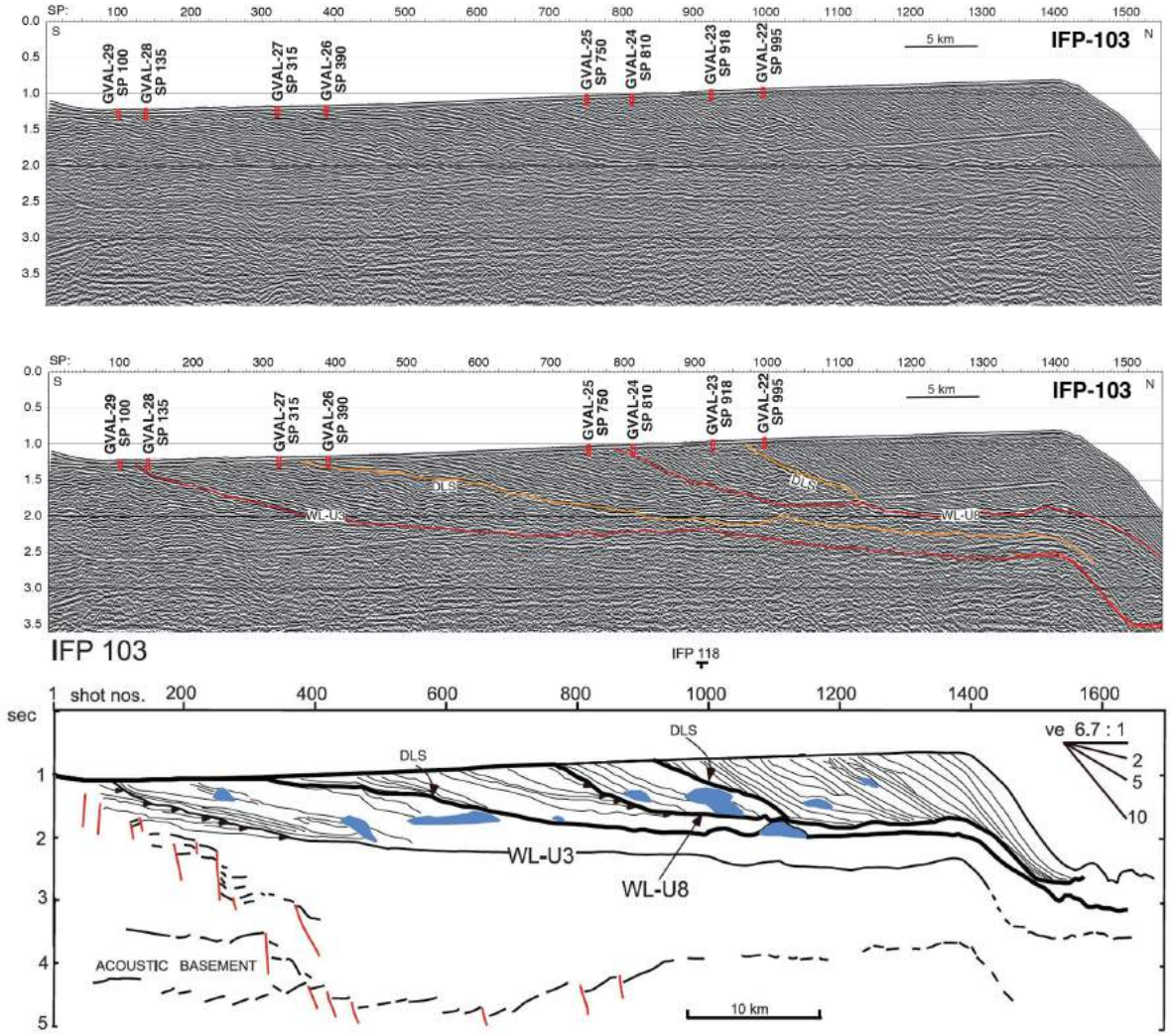
Proposal 813 **Site Summary Form 6**

George V Land Shelf, Antarctica: Cenozoic Paleoclimate

Sites GVAL 22 to 29

Seismic line IFP-103. Not yet in SSDB





WL-U8 - Late Miocene / Early Pliocene unconformity
WL-U3 - Eocene/Oligocene boundary unconformity
DLS - downlap surface

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Pliocene ice advances and warm intervals. Age of downlap surface. Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-23A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -65.61177	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 138.55483	Distance to Land: (km)	102
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	705

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(user 0.1985)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-23A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line IFP 103, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 918
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-103, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6478)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-23A	Date Form Submitted:	2013-04-23
Water Depth (m):	705	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4201)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-23A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4608)

Proposal #:	813 - Full	Site #:	GVAL-23A	Date Form Subm.:	2013-04-03 16:15:38

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Early Pliocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4144)

Proposal #:	813 - Full	Site #:	GVAL-23A	Date Form Subm.:	2013-04-03 16:15:38

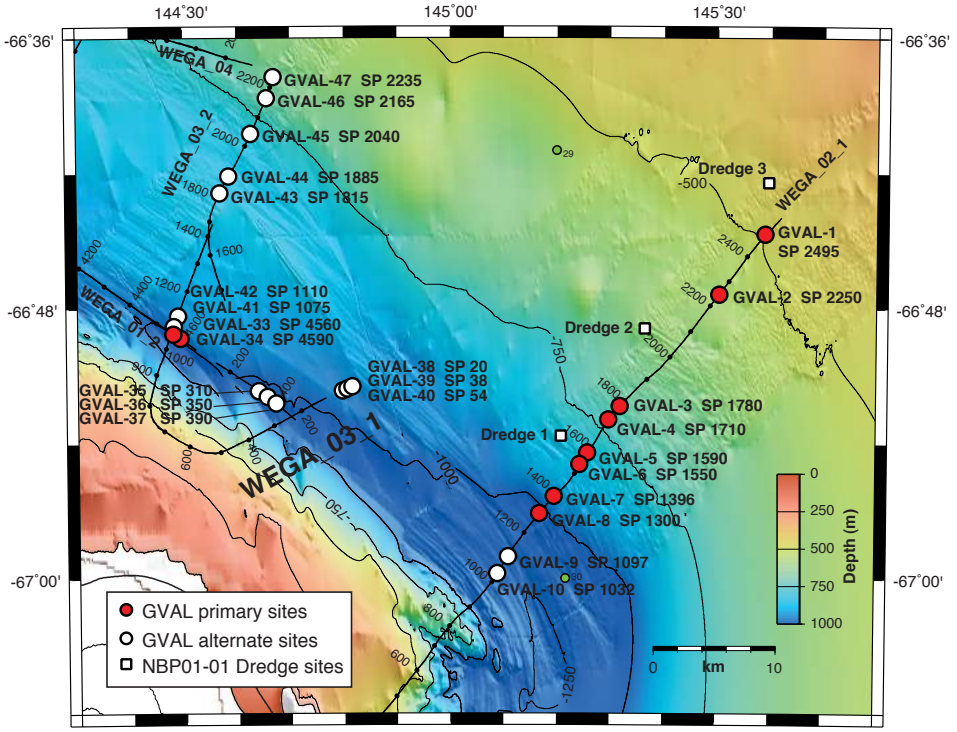
Site Summary Figure Comment	See Site Summary Figure for GVAL-22A, which covers the whole transect of sites along line IFP 103 (Sites GVAL 22-29).

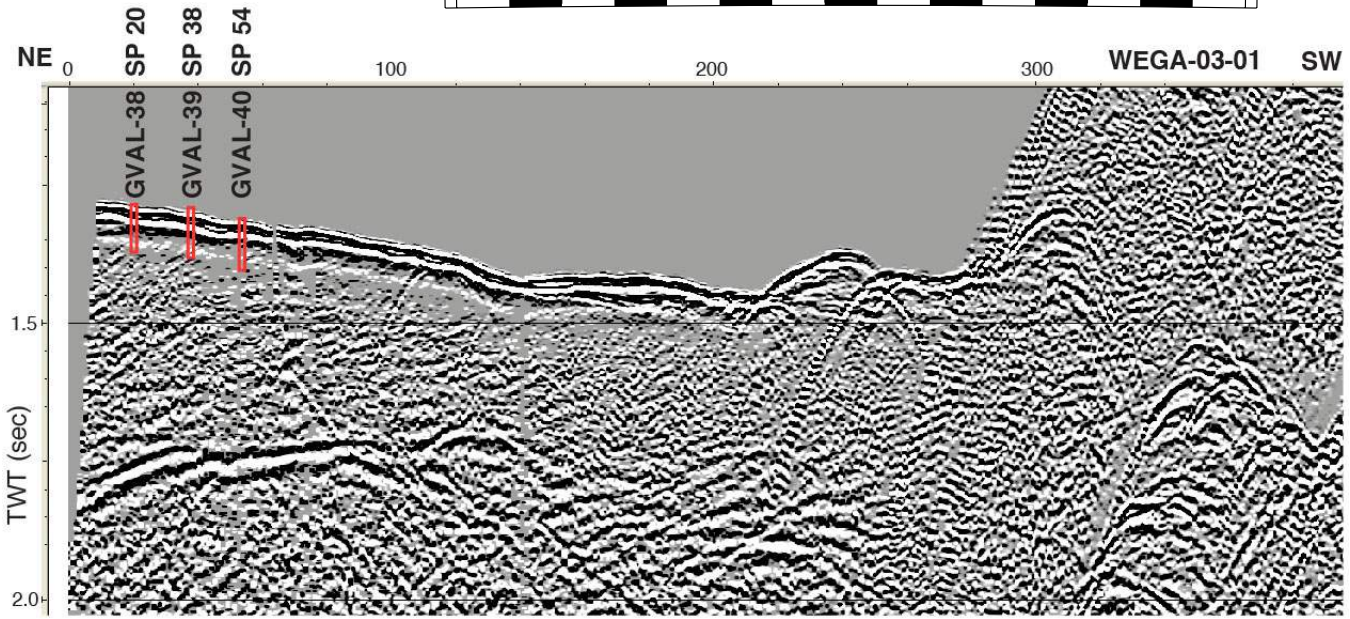
Site Summary Form 6

Proposal 813
George V Land Shelf, Antarctica:
Cenozoic Paleoclimate

Sites GVAL 38 to 40

Seismic line WEGA 03-01. Not yet in SSDB





NB. For these sites, the seismic line locations are in SP, trackline navigation is in FFID.

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Pliocene ice advances and warm intervals. Age of WL-U8 unconformity. Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-24A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -65.65785	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 138.51445	Distance to Land: (km)	97
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	750

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(user 0.1991)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

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(user 0.1991)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-24A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line IFP 103, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 810
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-103, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

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Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-24A	Date Form Submitted:	2013-04-23
Water Depth (m):	750	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4185)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-24A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4514)

Proposal #:	813 - Full	Site #:	GVAL-24A	Date Form Subm.:	2013-04-03 16:25:16

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80	Above unconformity WL-U8	Early Pliocene / Late Miocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4273)

Proposal #:	813 - Full	Site #:	GVAL-24A	Date Form Subm.:	2013-04-03 16:25:16

Site Summary Figure Comment	See Site Summary Figure for GVAL-22A, which covers the whole transect of sites along line IFP 103 (Sites GVAL 22-29).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	I. Miocene (?) environmental conditions leading to the formation of the WL-U8 unconformity and the observed change in the geometry of the sedimentary wedge. Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-25A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -65.68413	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 138.49526	Distance to Land: (km)	93
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	758

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(user 0.1967)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-25A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line IFP 103, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 750
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-103, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

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Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-25A	Date Form Submitted:	2013-04-23
Water Depth (m):	758	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4189)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-25A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4522)

Proposal #:	813 - Full	Site #:	GVAL-25A	Date Form Subm.:	2013-04-03 16:29:15

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80	Below unconformity WL-U8	Late Miocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4165)

Proposal #:	813 - Full	Site #:	GVAL-25A	Date Form Subm.:	2013-04-03 16:29:15

Site Summary Figure Comment	See Site Summary Figure for GVAL-22A, which covers the whole transect of sites along line IFP 103 (Sites GVAL 22-29).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	?mid-Miocene ice expansion (~14Ma) across downlap surface following the Mid-Miocene Climate Optimum. Age of downlap surface. Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-26A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -65.83677	Distance to Land: (km)	76
Longitude:	Deg: 138.38131		
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	863

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by if351_pdf / planiglobe 2007 - 2013
(user 0.1975)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-26A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line IFP 103, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 390
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-103, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6524)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-26A	Date Form Submitted:	2013-04-23
Water Depth (m):	863	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

generated: Tue Apr 23 02:48:35 2013
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(user 0.4194)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-26A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4522)

Proposal #:	813 - Full	Site #:	GVAL-26A	Date Form Subm.:	2013-04-03 16:32:44

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80	Downlap surface	?Middle Miocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4205)

Proposal #:	813 - Full	Site #:	GVAL-26A	Date Form Subm.:	2013-04-03 16:32:44

Site Summary Figure Comment	See Site Summary Figure for GVAL-22A, which covers the whole transect of sites along line IFP 103 (Sites GVAL 22-29).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Environmental conditions leading to (?mid-Miocene) ice expansion. Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-27A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -65.86841	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 138.35631	Distance to Land: (km)	72
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	870

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(user 0.1972)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

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(user 0.1972)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-27A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line IFP 103, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 315
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-103, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6472)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-27A	Date Form Submitted:	2013-04-23
Water Depth (m):	870	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

generated: Tue Apr 23 02:48:49 2013
by if353_t_pdf / kk+w 2007 - 2011
(user 0.4213)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-27A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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by if354_t_pdf / kk+w 2007 - 2011
(user 0.4579)

Proposal #:	813 - Full	Site #:	GVAL-27A	Date Form Subm.:	2013-04-03 16:37:06

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80	below Downlap surface	?Middle Miocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4151)

Proposal #:	813 - Full	Site #:	GVAL-27A	Date Form Subm.:	2013-04-03 16:37:06

Site Summary Figure Comment	See Site Summary Figure for GVAL-22A, which covers the whole transect of sites along line IFP 103 (Sites GVAL 22-29).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Earliest Oligocene environmental conditions and glacial advance to a continental-wide ice sheet. Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-28A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -65.94511	Distance to Land: (km)	63
Longitude:	Deg: 138.29178		
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	900

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(user 0.1995)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	

Total Penetration (m): 80

General Lithologies: Diamict, diamictite, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-28A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line IFP 103, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 135
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-103, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-28A	Date Form Submitted:	2013-04-23
Water Depth (m):	900	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-28A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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Proposal #:	813 - Full	Site #:	GVAL-28A	Date Form Subm.:	2013-04-03 16:40:56

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80	Unconformity WL-U3 (E/O boundary)	Earliest Oligocene	1.8	Diamict, diamictite, sandstone, mudstone	periodically glaciated shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4143)

Proposal #:	813 - Full	Site #:	GVAL-28A	Date Form Subm.:	2013-04-03 16:40:56

Site Summary Figure Comment	See Site Summary Figure for GVAL-22A, which covers the whole transect of sites along line IFP 103 (Sites GVAL 22-29).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Late Eocene environmental conditions leading to establishment of continental-wide ice sheet. Age of sediments underlying unconformity WL-U3 Primary Site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-29A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -65.96027	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 138.28022	Distance to Land: (km)	60
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	908

generated: Tue Apr 23 02:49:13 2013
by if351_pdf / planiglobe 2007 - 2013
(user 0.1979)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Diamict, diamictite, sandstone, siltstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-29A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line IFP 103, collected in 1982 by the Institute Francais de Petrole ATC-82 cruise of the S/V Explora Location: 100
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-103, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)

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(user 0.6488)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-29A	Date Form Submitted:	2013-04-23
Water Depth (m):	908	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4204)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-29A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4587)

Proposal #:	813 - Full	Site #:	GVAL-29A	Date Form Subm.:	2013-04-03 16:45:10

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80	below unconformity WL-U3 (E/O boundary)	Late Eocene	1.8	Diamict, diamictite, sandstone, mudstone	siliciclastic shelf (periodically glaciated?)	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4164)

Proposal #:	813 - Full	Site #:	GVAL-29A	Date Form Subm.:	2013-04-03 16:45:10

Site Summary Figure Comment	See Site Summary Figure for GVAL-22A, which covers the whole transect of sites along line IFP 103 (Sites GVAL 22-29).

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Cretaceous (Aptian) temperature and vegetation on Antarctica. What were the Cretaceous greenhouse conditions like compared to Eocene warmth? Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-30A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -67.73300	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 146.85000	Distance to Land: (km)	15
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	1407

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(user 0.1978)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Organic-rich non-marine siltstone, sandstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-30A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)			Location:
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line IFP-103, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		GVAL-30 is at the location of DF79-38, which recovered a 40-cm core of Early Cretaceous (Aptian) siltstone breccia (Domack 1982). Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6569)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-30A	Date Form Submitted:	2013-04-23
Water Depth (m):	1407	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

generated: Tue Apr 23 02:49:31 2013
by if353_t_pdf / kk+w 2007 - 2011
(user 0.4195)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-30A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4525)

IODP Site Summary Forms: Form 5 – Lithologies

Proposal #:	813 - Full	Site #:	GVAL-30A	Date Form Subm.:	2013-04-03 16:48:45

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Early Cretaceous (Aptian)	1.8	organic-rich siltstone, mudstone, sandstone, lignite?	shallow seaway or inland basin	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4151)

Proposal #:	813 - Full	Site #:	GVAL-30A	Date Form Subm.:	2013-04-03 16:48:45

Site Summary Figure Comment	See Figures 1 and 3 in the main proposal for site location. Currently, there are no seismic lines across this site.

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early/Middle Eocene climate and environmental conditions. Hyperthermals? Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-31A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.58894	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 143.35924	Distance to Land: (km)	28
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	855

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by if351_pdf / planiglobe 2007 - 2013
(user 0.1968)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: Organic-rich non-marine siltstone, sandstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-31A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 01-02. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 2376
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6533)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-31A	Date Form Submitted:	2013-04-23
Water Depth (m):	855	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4177)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-31A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4596)

Proposal #:	813 - Full	Site #:	GVAL-31A	Date Form Subm.:	2013-04-03 17:00:57

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Early/Middle Eocene	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

generated: Tue Apr 23 02:49:50 2013
by if355_pdf / kk+w 2007 - 2011
(user 0.4134)

Proposal #:	813 - Full	Site #:	GVAL-31A	Date Form Subm.:	2013-04-03 17:00:57

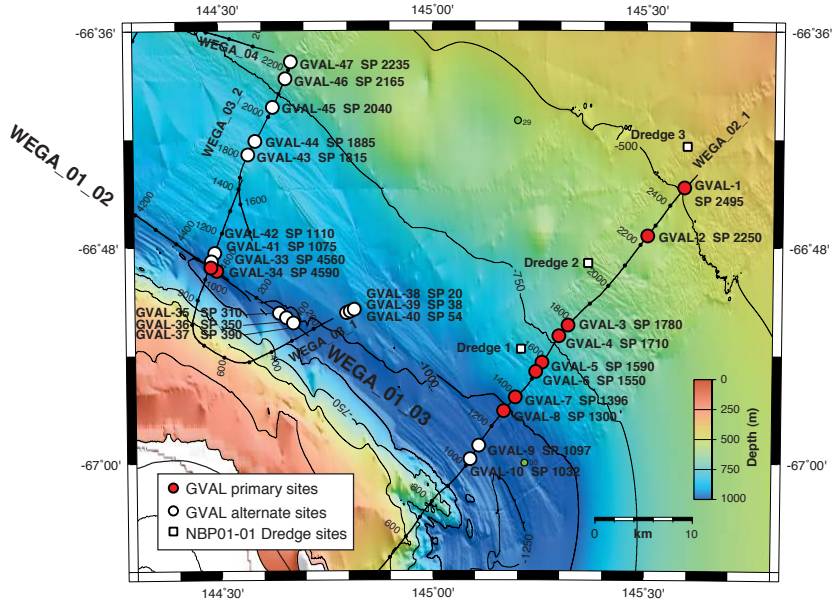
Site Summary Figure Comment	This form covers sites GVAL 31 and 32

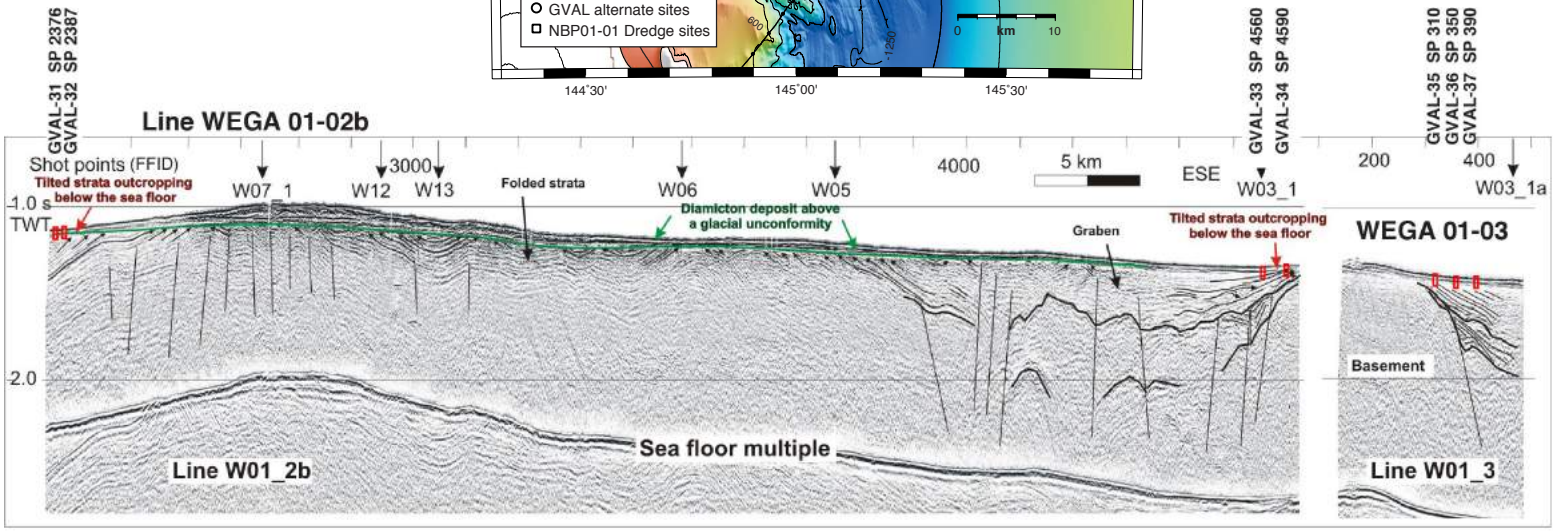
Site Summary Form 6

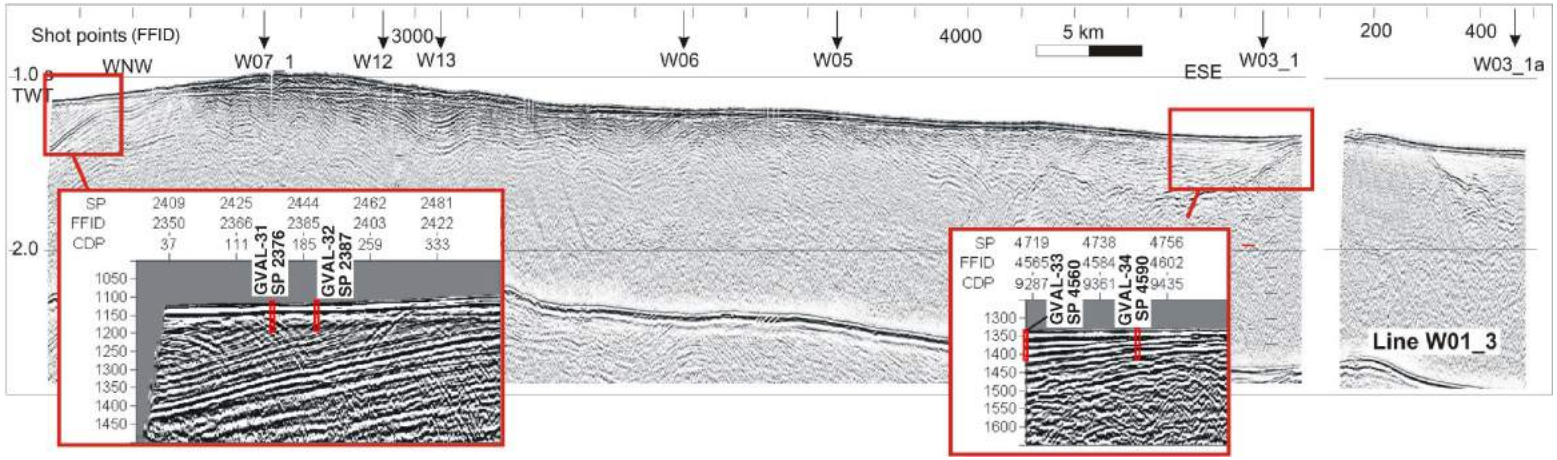
Proposal 813
George V Land Shelf, Antarctica: Cenozoic Paleoclimate

Sites GVAL 31 to 37

Seismic line WEGA 01-02b. Not yet in SSDB
Seismic line WEGA 01-03. Not yet in SSDB







NB. For the WEGA lines in this proposal, we are using the FFID numbers as the shot-point reference and in the navigation

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early/Middle Eocene climate and environmental conditions. Hyperthermals? Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-32A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.59027	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 143.36556	Distance to Land: (km)	28
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	848

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(user 0.1969)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	

Total Penetration (m): 80

General Lithologies: Organic-rich non-marine siltstone, sandstone, mudstone

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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(user 0.1969)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-32A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 01-02. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 2387
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6511)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-32A	Date Form Submitted:	2013-04-23
Water Depth (m):	848	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4219)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-32A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4522)

Proposal #:	813 - Full	Site #:	GVAL-32A	Date Form Subm.:	2013-04-03 17:09:58

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Early/Middle Eocene	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

generated: Tue Apr 23 02:50:05 2013
by if355_pdf / kk+w 2007 - 2011
(user 0.4146)

Proposal #:	813 - Full	Site #:	GVAL-32A	Date Form Subm.:	2013-04-03 17:09:58

Site Summary Figure Comment	This form covers sites GVAL 31 and 32.

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Cretaceous environment and vegetation on Antarctica. Primary site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-33A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.81877	Distance to Land: (km)	18
Longitude:	Deg: 144.47948		
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	1013

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by if351_pdf / planiglobe 2007 - 2013
(user 0.1960)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

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(user 0.1960)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-33A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 01-02. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 4560
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6499)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-33A	Date Form Submitted:	2013-04-23
Water Depth (m):	1013	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4251)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-33A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4533)

Proposal #:	813 - Full	Site #:	GVAL-33A	Date Form Subm.:	2013-04-03 22:10:55

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Cretaceous	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	shallow seaway or inland basin	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4131)

Proposal #:	813 - Full	Site #:	GVAL-33A	Date Form Subm.:	2013-04-03 22:10:55

Site Summary Figure Comment	This form covers sites GVAL 33 to GVAL 37

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Cretaceous environment and vegetation on Antarctica. Primary site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-34A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.82192	Distance to Land: (km)	18
Longitude:	Deg: 144.49311		
Coordinate System:	WGS 84		
Priority of Site:	Primary: yes Alt:	Water Depth (m):	1005

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(user 0.1973)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

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(user 0.1973)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-34A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 01-02. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 4590
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6536)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-34A	Date Form Submitted:	2013-04-23
Water Depth (m):	1005	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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by if353_t_pdf / kk+w 2007 - 2011
(user 0.4236)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-34A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4517)

IODP Site Summary Forms: Form 5 – Lithologies

Proposal #:	813 - Full	Site #:	GVAL-34A	Date Form Subm.:	2013-04-03 22:19:59

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Cretaceous	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	shallow seaway or inland basin	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

generated: Tue Apr 23 02:50:33 2013
by if355_pdf / kk+w 2007 - 2011
(user 0.4124)

Proposal #:	813 - Full	Site #:	GVAL-34A	Date Form Subm.:	2013-04-03 22:19:59

Site Summary Figure Comment	See form for Site GVAL-33

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Cretaceous environment and vegetation on Antarctica. Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-35A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.86100	Distance to Land: (km)	16
Longitude:	Deg: 144.63940		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	1050

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by if351_pdf / planiglobe 2007 - 2013
(user 0.1966)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-35A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 01-03. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 310
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6520)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-35A	Date Form Submitted:	2013-04-23
Water Depth (m):	1050	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4211)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-35A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4527)

Proposal #:	813 - Full	Site #:	GVAL-35A	Date Form Subm.:	2013-04-03 22:25:41

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Cretaceous	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	shallow seaway or inland basin	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4184)

Proposal #:	813 - Full	Site #:	GVAL-35A	Date Form Subm.:	2013-04-03 22:25:41

Site Summary Figure Comment	See form for Site GVAL-33

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Cretaceous environment and vegetation on Antarctica. Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-36A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.86544	Distance to Land: (km)	16
Longitude:	Deg: 144.65615		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	1058

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(user 0.2010)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-36A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 01-03. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 350
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.7820)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-36A	Date Form Submitted:	2013-04-23
Water Depth (m):	1058	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4212)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-36A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4604)

Proposal #:	813 - Full	Site #:	GVAL-36A	Date Form Subm.:	2013-04-03 22:28:37

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Cretaceous	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	shallow seaway or inland basin	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4185)

Proposal #:	813 - Full	Site #:	GVAL-36A	Date Form Subm.:	2013-04-03 22:28:37

Site Summary Figure Comment	See form for Site GVAL-33

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Early Cretaceous environment and vegetation on Antarctica. Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-37A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.87030	Distance to Land: (km)	16
Longitude:	Deg: 144.67273		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	1065

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(user 0.1988)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-37A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 01-03. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 390
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6566)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-37A	Date Form Submitted:	2013-04-23
Water Depth (m):	1065	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4241)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-37A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.6032)

Proposal #:	813 - Full	Site #:	GVAL-37A	Date Form Subm.:	2013-04-03 22:32:33

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Cretaceous	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	shallow seaway or inland basin	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.5154)

Proposal #:	813 - Full	Site #:	GVAL-37A	Date Form Subm.:	2013-04-03 22:32:33

Site Summary Figure Comment	See form for Site GVAL-33

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(user 0.3748)

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	?Early Eocene climate and environmental conditions. Hyperthermals? Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-38A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.85764	Distance to Land: (km)	20
Longitude:	Deg: 144.81591		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	960

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(user 0.1994)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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(user 0.1994)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-38A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 03-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 20
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6612)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-38A	Date Form Submitted:	2013-04-23
Water Depth (m):	960	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4240)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-38A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4533)

Proposal #:	813 - Full	Site #:	GVAL-38A	Date Form Subm.:	2013-04-03 22:46:02

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		?Early Eocene	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4118)

Proposal #:	813 - Full	Site #:	GVAL-38A	Date Form Subm.:	2013-04-03 22:46:02

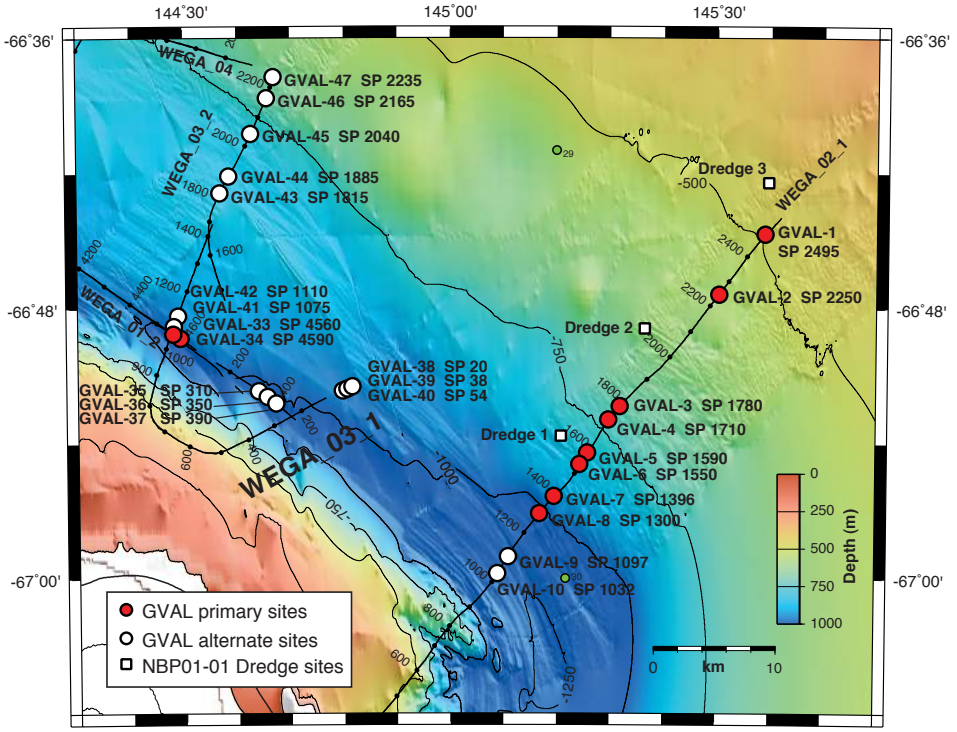
Site Summary Figure Comment	This form covers sites GVAL 38-40

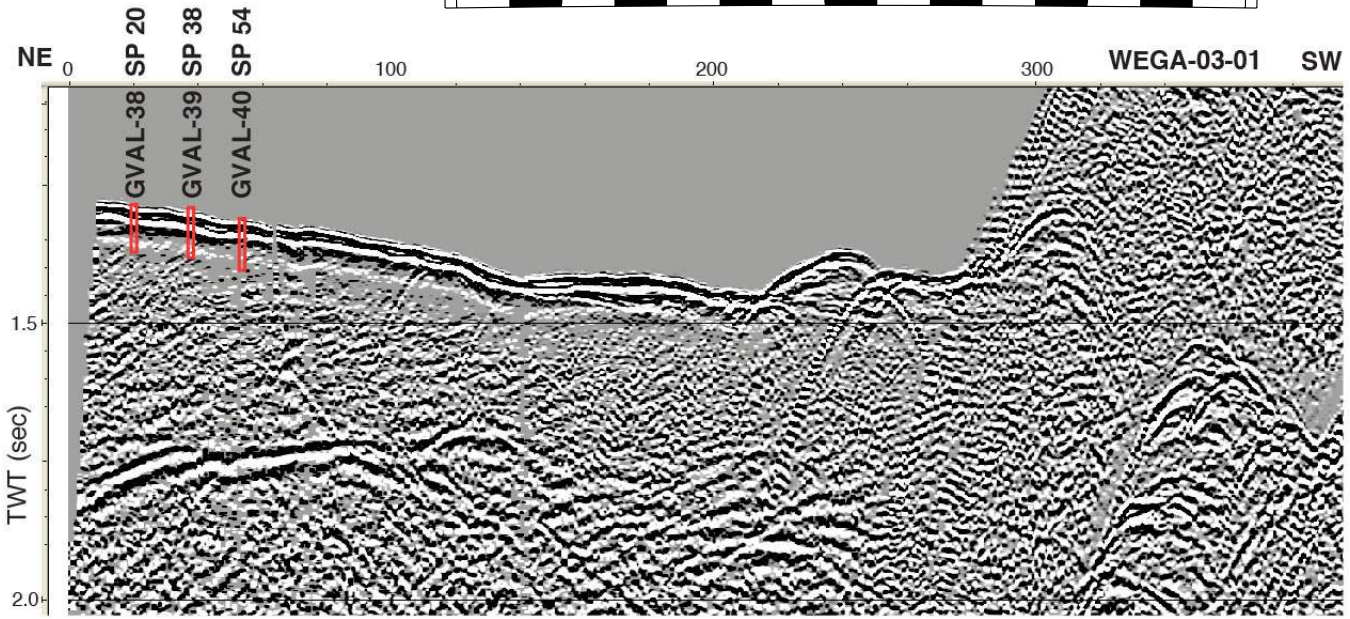
Site Summary Form 6

Proposal 813
George V Land Shelf, Antarctica:
Cenozoic Paleoclimate

Sites GVAL 38 to 40

Seismic line WEGA 03-01. Not yet in SSDB





NB. For these sites, the seismic line locations are in SP, trackline navigation is in FFID.

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	?Early Eocene climate and environmental conditions. Hyperthermals? Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-39A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.85935	Distance to Land: (km)	20
Longitude:	Deg: 144.80628		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	975

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(user 0.1964)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	

Total Penetration (m): 80

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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(user 0.1964)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-39A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 03-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 38
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6514)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-39A	Date Form Submitted:	2013-04-23
Water Depth (m):	975	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4302)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-39A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4522)

IODP Site Summary Forms: Form 5 – Lithologies

Proposal #:	813 - Full	Site #:	GVAL-39A	Date Form Subm.:	2013-04-03 22:53:23

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		?Early Eocene	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4117)

Proposal #:	813 - Full	Site #:	GVAL-39A	Date Form Subm.:	2013-04-03 22:53:23

Site Summary Figure Comment	Form for Site 38 covers sites GVAL 38-40

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	?Early Eocene climate and environmental conditions. Hyperthermals? Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-40A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.86087	Distance to Land: (km)	20
Longitude:	Deg: 144.79772		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	990

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(user 0.1980)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

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(user 0.1980)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-40A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 03-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 54
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6492)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-40A	Date Form Submitted:	2013-04-23
Water Depth (m):	990	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4193)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-40A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4560)

Proposal #:	813 - Full	Site #:	GVAL-40A	Date Form Subm.:	2013-04-03 22:58:09

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		?Early Eocene	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

generated: Tue Apr 23 02:51:58 2013
by if355_pdf / kk+w 2007 - 2011
(user 0.4110)

Proposal #:	813 - Full	Site #:	GVAL-40A	Date Form Subm.:	2013-04-03 22:58:09

Site Summary Figure Comment	Form for Site 38 covers sites GVAL 38-40

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Cretaceous or Paleogene temperature and vegetation on Antarctica. Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-41A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.81340	Distance to Land: (km)	19
Longitude:	Deg: 144.48011		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	1013

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(user 0.1981)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-41A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 03-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 1075
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6502)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-41A	Date Form Submitted:	2013-04-23
Water Depth (m):	1013	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4186)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-41A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4575)

Proposal #:	813 - Full	Site #:	GVAL-41A	Date Form Subm.:	2013-04-03 23:01:08

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		?Early Eocene	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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Proposal #:	813 - Full	Site #:	GVAL-41A	Date Form Subm.:	2013-04-03 23:01:08

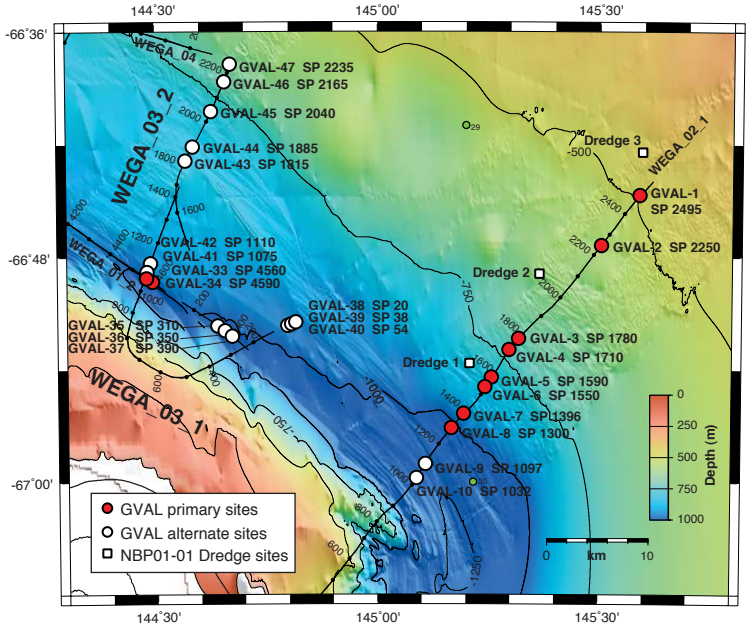
Site Summary Figure Comment	Form for Site 41 covers sites GVAL 41-47

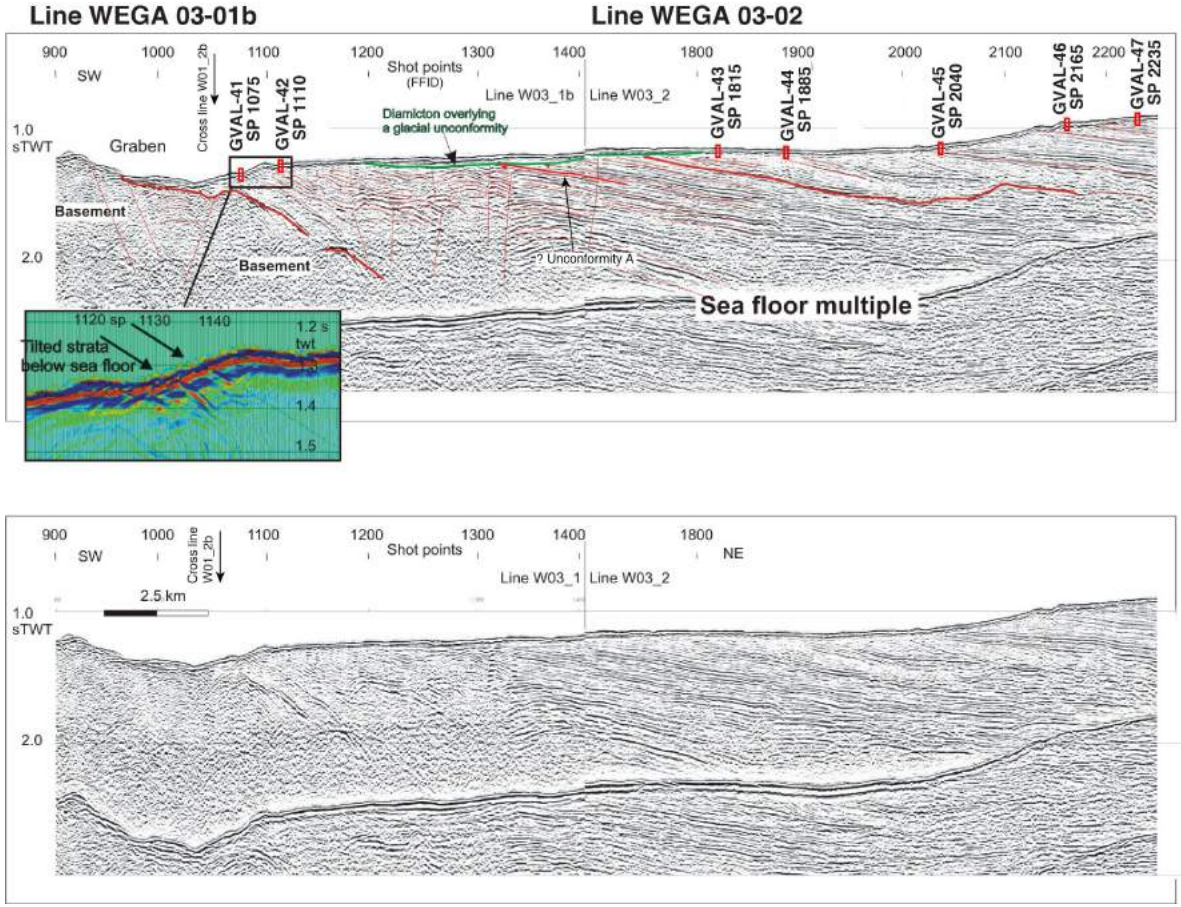
Proposal 813
George V Land Shelf, Antarctica:
Cenozoic Paleoclimate

Site Summary Form 6

Sites GVAL 41 to 47

Seismic line WEGA 03-01b. Not yet in SSDB
Seismic line WEGA 03-02. Not yet in SSDB





NB. For the WEGA lines in this proposal, we are using the FFID numbers as the shotpoint reference and in the navigation

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Cretaceous or Paleogene (?Early Eocene) temperature and vegetation on Antarctica. Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-42A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.80577	Distance to Land: (km)	20
Longitude:	Deg: 144.48733		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	954

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(user 0.2001)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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(user 0.2001)

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-42A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 03-01. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 1110
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 01-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6565)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-42A	Date Form Submitted:	2013-04-23
Water Depth (m):	954	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4215)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-42A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4667)

Proposal #:	813 - Full	Site #:	GVAL-42A	Date Form Subm.:	2013-04-03 23:06:04

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		?Early Eocene	1.8	siltstone, mudstone, sandstone, conglomerate, lignite?	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4151)

Proposal #:	813 - Full	Site #:	GVAL-42A	Date Form Subm.:	2013-04-03 23:06:04

Site Summary Figure Comment	Form for Site 41 covers sites GVAL 41-47

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle Eocene climate conditions, nature of paleoenvironmental change represented by high-amplitude reflector. Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-43A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.71453	Distance to Land: (km)	31
Longitude:	Deg: 144.56810		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	863

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(user 0.1994)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from ____ m to ____ m ____ m intervals

from ____ m to ____ m ____ m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site: ____

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				
Other:	Antarctic Treaty applies					

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-43A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 03-02. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 1815
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 03-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6612)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-43A	Date Form Submitted:	2013-04-23
Water Depth (m):	863	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-43A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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(user 0.4548)

Proposal #:	813 - Full	Site #:	GVAL-43A	Date Form Subm.:	2013-04-03 23:09:56

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Middle Eocene	1.8	diamict, siltstone, mudstone, sandstone, conglomerate	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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by if355_pdf / kk+w 2007 - 2011
(user 0.4198)

Proposal #:	813 - Full	Site #:	GVAL-43A	Date Form Subm.:	2013-04-03 23:09:56

Site Summary Figure Comment	Form for Site 41 covers sites GVAL 41-47

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(user 0.3733)

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle Eocene climate conditions, nature of paleoenvironmental change represented by high-amplitude reflector. Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-44A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.70213	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 144.58519	Distance to Land: (km)	33
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	870

generated: Tue Apr 23 02:52:47 2013
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(user 0.1984)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-44A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 03-02. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 1885
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 03-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6553)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-44A	Date Form Submitted:	2013-04-23
Water Depth (m):	870	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-44A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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Proposal #:	813 - Full	Site #:	GVAL-44A	Date Form Subm.:	2013-04-03 23:15:38

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Middle Eocene	1.8	diamict, siltstone, mudstone, sandstone, conglomerate	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4169)

Proposal #:	813 - Full	Site #:	GVAL-44A	Date Form Subm.:	2013-04-03 23:15:38

Site Summary Figure Comment	Form for Site 41 covers sites GVAL 41-47

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle/Late Eocene climate and environmental conditions Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-45A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#		Jurisdiction:	Antarctic Treaty
Latitude:	Deg: -66.67110	Distance to Land: (km)	36
Longitude:	Deg: 144.62679		
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	844

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(user 0.1976)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	
Total Penetration (m):	80	

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-45A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 03-02. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 2040
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 03-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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(user 0.6578)

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-45A	Date Form Submitted:	2013-04-23
Water Depth (m):	844	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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(user 0.4250)

IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-45A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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IODP Site Summary Forms: Form 5 – Lithologies

Proposal #:	813 - Full	Site #:	GVAL-45A	Date Form Subm.:	2013-04-03 23:18:26

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Middle/Late Eocene	1.8	diamict, siltstone, mudstone, sandstone, conglomerate	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4151)

Proposal #:	813 - Full	Site #:	GVAL-45A	Date Form Subm.:	2013-04-03 23:18:26

Site Summary Figure Comment	Form for Site 41 covers sites GVAL 41-47

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle/Late Eocene climate and environmental conditions Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-46A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.64422	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 144.65613	Distance to Land: (km)	40
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	713

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(user 0.1981)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	

Total Penetration (m): 80

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-46A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 03-02. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 2165
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 03-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-46A	Date Form Submitted:	2013-04-23
Water Depth (m):	713	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-46A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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IODP Site Summary Forms: Form 5 – Lithologies

Proposal #:	813 - Full	Site #:	GVAL-46A	Date Form Subm.:	2013-04-03 23:21:48

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Middle/Late Eocene	1.8	diamict, siltstone, mudstone, sandstone, conglomerate	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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(user 0.4137)

Proposal #:	813 - Full	Site #:	GVAL-46A	Date Form Subm.:	2013-04-03 23:21:48

Site Summary Figure Comment	Form for Site 41 covers sites GVAL 41-47

IODP Site Summary Forms:

Form 1 – General Site Information

813 - Full

Section A: Proposal Information

Title of Proposal:	Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments
Date Form Submitted:	2013-04-23 02:42:25
Site Specific Objectives with Priority (Must include general objectives in proposal)	Middle/Late Eocene climate and environmental conditions Alternate site.
List Previous Drilling in Area:	IODP 318

Section B: General Site Information

Site Name:	GVAL-47A	Area or Location:	George V Land shelf
If site is a reoccupation of an old DSDP/ODP Site, Please include former Site#			
Latitude:	Deg: -66.62866	Jurisdiction:	Antarctic Treaty
Longitude:	Deg: 144.66952	Distance to Land: (km)	42
Coordinate System:	WGS 84		
Priority of Site:	Primary: no Alt:	Water Depth (m):	690

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(user 0.1976)

Section C: Operational Information

	Sediments	Basement
Proposed Penetration (m):	80	0
Total Sediment Thickness (m)	2000	

Total Penetration (m): 80

General Lithologies: siltstone, sandstone, mudstone, lignite?

Coring Plan: (Specify or check)

Land MeBo drill rig on the sea bed and rotary core to 80m

APC ☐ XCB ☐ MDCB ☐ PCS ☐ RCB ☒ Re-entry ☐

Wireline Logging Plan:

Standard Measurements		Special Tools			
WL	☒	Magnetic Susceptibility	☐		
LWD	☐	Magnetic Field	☐	Formation Image (Acoustic)	☐
Porosity	☐	Borehole Temperature	☐	Formation Fluid Sampling	☐
Density	☐	Nuclear Magnetic Resonance	☐	Formation Temperature & Pressure	☐
Gamma Ray	☒	Geochemical	☐	VSP	☐
Resistivity	☐	Side-Wall Core Sampling	☐	Others:	other MeBo logging tools, as available
Sonic (Δt)	☐				
Formation Image (Res)	☐				
Check-shot (upon request)	☐				

Max. Borehole Temp.: 5 °C

Mud Logging: (Riser Holes Only)

Cuttings Sampling Intervals

from m to m m intervals

from m to m m intervals

Basic Sampling Intervals: 5m

Estimated Days: Drilling/Coring: 1.8 | Logging: 0.2 | Total On-site:

Observatory Plan: *Longterm Borehole Observation Plan/Re-entry Plan*

Potential Hazards/ Weather:

Shallow Gas	☐	Complicated Seabed Condition	☒	Hydrothermal Activity	☐	Preferred weather window: mid-January to end of February (best chance for open water free of sea-ice)
Hydrocarbon	☐	Soft Seabed	☐	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Gas Hydrate	☐	
Abnormal Pressure	☐	Fracture Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects (e.g., sea-floor cables, dump sites)	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☒	
CO_2	☐	Sensitive marine habitat (e.g., reefs, vents)				

Other: Antarctic Treaty applies

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IODP Site Summary Forms: Form 2 - Site Survey Detail

Proposal #:	813	Site #:	GVAL-47A	Date Form Submitted:	2013-04-23 02:42:25

*** Key to SSP Requirements**

X=required; X=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.*

Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
1a High resolution seismic reflection (primary)	no	X	multi-channel seismic line WEGA 03-02. Collected by the Wilkes Land Glacial History (WEGA) expedition on the R.V. Tangoroa in 2000. Available from SDLS (Antarctic Seismic Data Library System) Location: 2235
1b High resolution seismic reflection (crossing)			Location:
2a Deep penetration seismic reflection (primary)			Location:
2b Deep penetration seismic reflection (crossing)			Location:
3 Seismic Velocity			
4 Seismic Grid			
5a Refraction (surface)			
5b Refraction (bottom)			
6 3.5 kHz	no		
7 Swath bathymetry	no		Multibeam bathymetry has been collected across some of line WEGA 03-02, and is incorporated in the 100m-resolution bathymetry used in the maps in this proposal (Beaman et al., Antarctic Science, 2010). See Table 1 of Beaman et al. for list of original multibeam data.
8a Side looking sonar (surface)			
8b Side looking sonar (bottom)			
9 Photography or video			Photography and video was taken on the George V shelf by the Australian CEAMARC projec.
10 Heat Flow			
11a Magnetics			
11b Gravity			
12 Sediment cores	no		Several short sediment cores have been taken in the area by the Deep Freeze expedition (1979) and by NBP 01-01 (see Figure 1, main proposal).
13 Rock sampling			
14a Water current data			
14b Ice Conditions			Ice conditions are monitored by satellite: E.g. daily low res sea ice concentration: http://nsidc.org/dat a/seaice_index/ MODIS satellite images (Mertz area): nsidc.org/data/icesh elves_images/index_m odis.html On Exp 318, TeraScan sea ice images were most useful, and medium resolution sea ice images were provided by National Ice Center, Baltimore.
15 OBS microseismicity			

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Data Type	In SSDB	SSP Req.	Details of available data and data that are still to be collected
16 Navigation			Navigation data from the IFP cruise is available from SDLS (Antarctic Seismic Data Library System)
17 Other			

IODP Site Summary Forms:

Form 3 – Detailed Logging and Downhole Measurement Plan

Proposal #:	813	Site #:	GVAL-47A	Date Form Submitted:	2013-04-23
Water Depth (m):	690	Sed. Penetration (m):	80	Basement Penetration (m):	0

Are high temperatures or other special requirements (e.g., unstable formations), anticipated for logging at this site?

Estimated total logging time for this site: 0.2

Measurement Type	Scientific Objective	Relevance (1=high, 3=low)
Check Shot Survey	n/a	
Nuclear Magnetic Resonance	n/a	
Geochemical	n/a	
Side-wall Core Sample	n/a	
Formation Fluid Sampling	n/a	
Borehole Temperature	n/a	
Magnetic Susceptibility	n/a	
Magnetic Field	n/a	
VSP	n/a	
Formation Image (Acoustic)	n/a	
Formation Pressure & Temperature	n/a	
Other (SET, SETP, ...)	We plan to use the natural gamma radiation downhole tool that was developed for the MeBo rig. This tool has been run successfully from MeBo. Other tools are in the planning stages.	1

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IODP Site Summary Forms:

Form 4 – Environmental Protection

Proposal #:	813	Site #:	GVAL-47A	Date Form Submitted:	2013-04-23 02:42:25

Pollution & Safety Hazard	Comment
1. Summary of Operations at site.	Video survey to make sure there are no significant boulders at the MeBo landing site. Rotary core to 80 m or refusal. One hole per site.
2. All hydrocarbon occurrences based on previous DSDP/ODP/IODP drilling.	No hydrocarbon occurrences at Sites U1358, U1360, or U1357 on the George V shelf.
3. All commercial drilling in this area that produced or yielded significant hydrocarbon shows.	
4. Indications of gas hydrates at this location.	no indications of gas hydrates
5. Are there reasons to expect hydrocarbon accumulations at this site?	Oil or gas will be very unlikely at these drilling depths.
6. What "special" precautions will be taken during drilling?	
7. What abandonment procedures need to be followed?	
8. Natural or manmade hazards which may effect ship's operations.	The major hazard will be sea ice and icebergs of various sizes. If the MeBo rig is deployed from an A-frame, rather than a moon pool, which is likely, the umbilical will have to be protected. Probably this will require a frame or cage to be constructed.
9. Summary: What do you consider the major risks in drilling at this site?	Sea ice and icebergs of various sizes.

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IODP Site Summary Forms: Form 5 – Lithologies

Proposal #:	813 - Full	Site #:	GVAL-47A	Date Form Subm.:	2013-04-03 23:24:13

Subbottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Avg. rate of sed. accum. (m/My)	Comments
0-80		Middle/Late Eocene	1.8	diamict, siltstone, mudstone, sandstone, conglomerate	siliciclastic shelf	100	Target sediments overlain by 0 to ?20m of late glacial unconsolidated diamict

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Proposal #:	813 - Full	Site #:	GVAL-47A	Date Form Subm.:	2013-04-03 23:24:13

Site Summary Figure Comment	Form for Site 41 covers sites GVAL 41-47