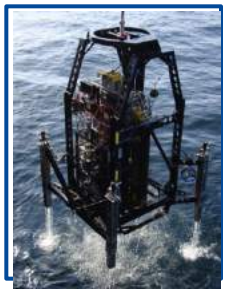
ECORD Industry Liaison Panel

11th/12th June 2014







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IODP-ESO Operations Manager

British Geological Survey, Edinburgh, UK

Technology Update - Seabed Drilling

BGS RD2

Marum MeBo/MeBo 200

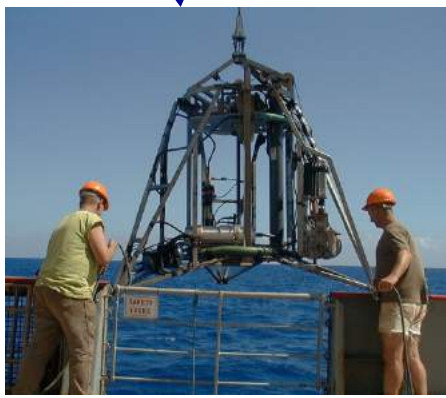
Common developments

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Consub 1960's

Midi-Drill 1975-83

5m Drill/Vibrocorer
1982-Present
2000m



Oriented Rockdrill
1995-Present
6000m

RD2

Development of BGS Remotely Operated Drills

BGS Seabed Drill - RD2

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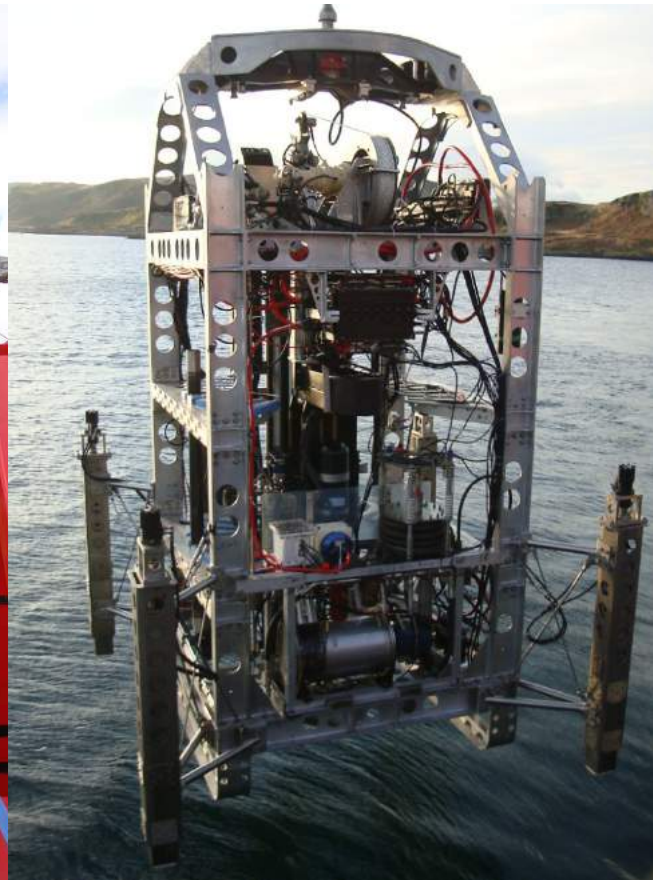
Water depth	4000m
Weight In water	5T
Depth below seabed	50m
Core size	63mm
Core barrel length	1.7m



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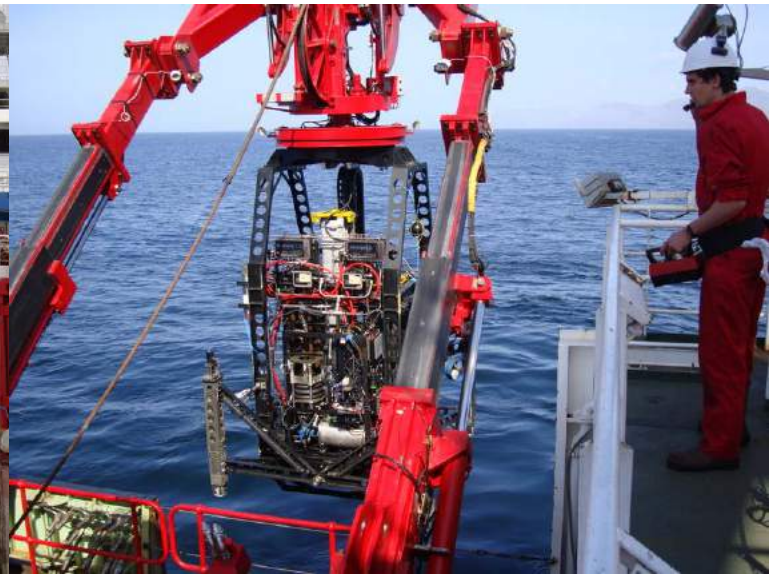
Mobile and flexible system
A series of 20ft container packages



2013 Hydrate Project - Japan

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Collaboration with Meiji University

Series of coring sites

New technology – capping core barrels

Downhole logging – Optical/Acoustic/Spectral Gamma

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Rapidly developing technology

New winch and umbilical 4600m – June 2014

Downhole Logging

OAG	Spectral Gamma, 360 Deg Optical, Acoustic,
In development	Dual Induction and Magnetic Sus

Other

CTD	Real time seawater: Conductivity, Temperature, Depth
Core barrel caps	Caps for core barrels – reduce contamination

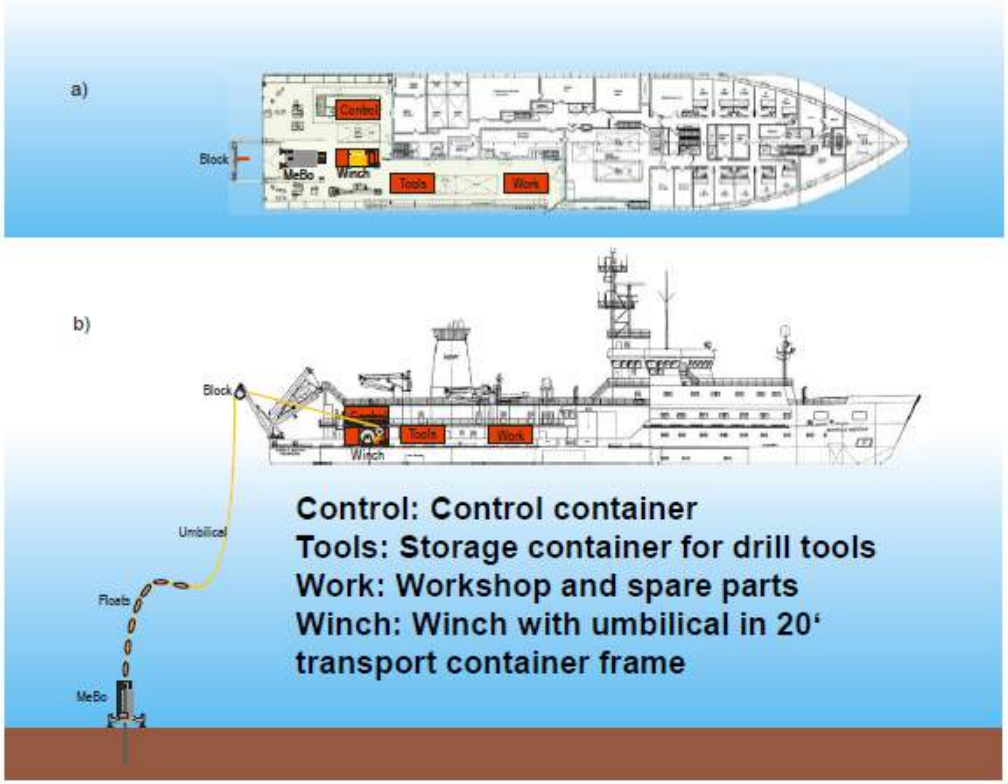
Drilling cores on the sea floor with the remote-controlled sea floor drilling rig MeBo

(04/2014, G. Wefer, T. Freudenthal)

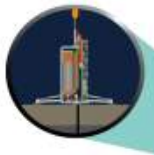
MeBo Specifications

- Drilling depth 80 m
- Coring of soft sediments and hard rocks
- Core diameter 55 –84 mm
- Deployment depth 0 –2000 m
- MeBo weight about 10 tonnes
- Total system weight about 75 tonnes
- Transport within six 20‘ containers

Concept of MeBo



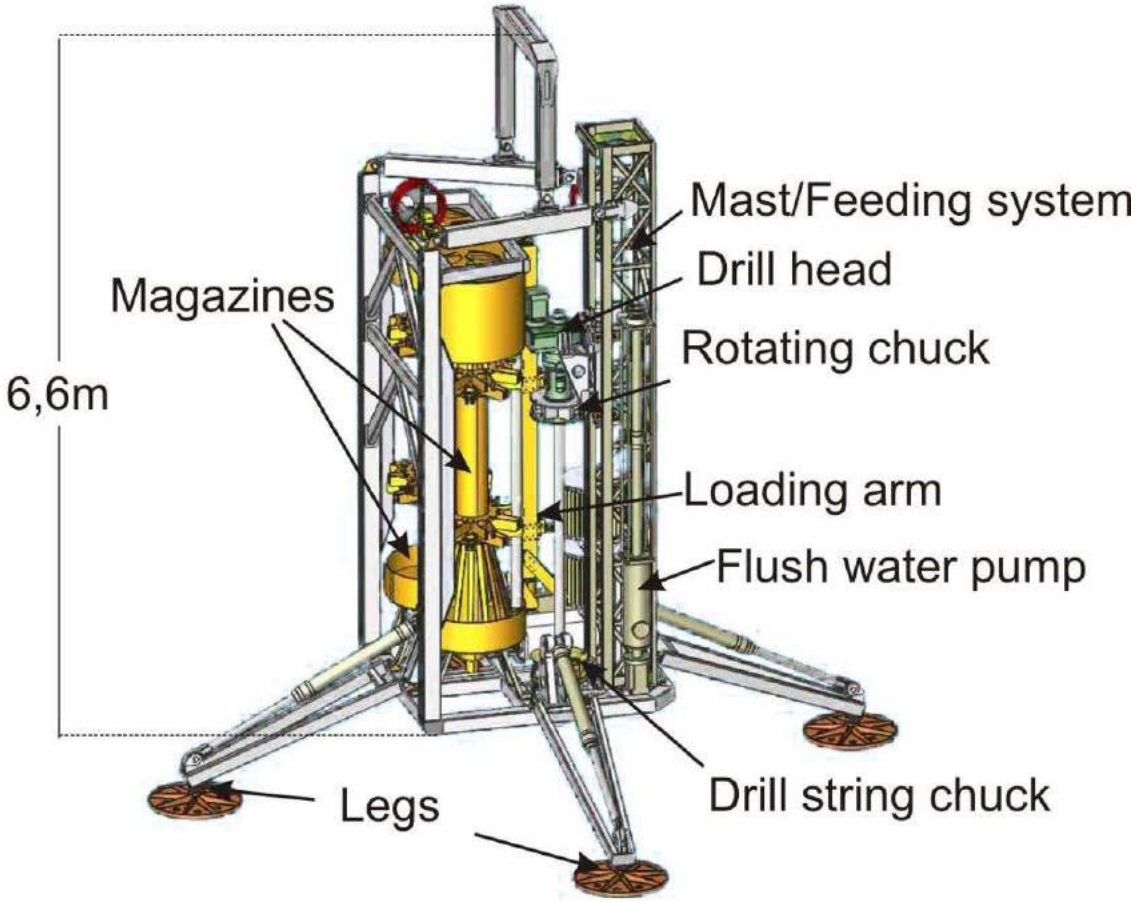
- Umbilical is used to lower the drill rig to the sea floor
- Umbilical is used for energy supply and remote control from the vessel



- Transport of the system within 20‘ shipping containers, that are mounted on the working deck of the research vessel

Concept of MeBo

- Mast, drill head and flush water pump form the central drilling unit
- Drill rig has access to drilling tools stored within two magazines
- The drill string is built up and down using a loading arm and two chucks
- Stability on the sea floor is increased by movable legs



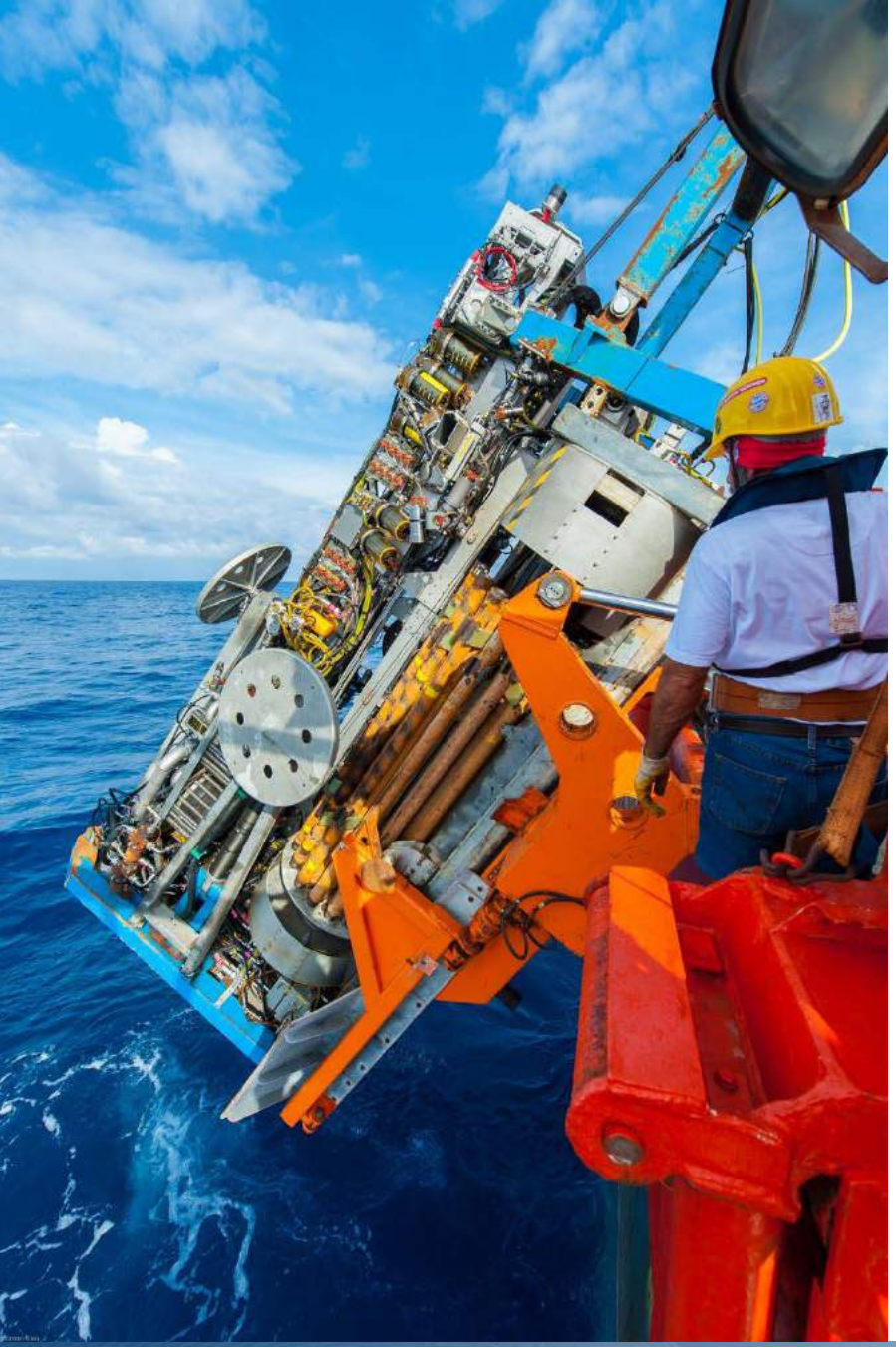
MeBo Expeditions

Joint Ifremer/Marum Expedition
GUINECO-MeBo
November 2011

Deployment statistics 2008-2014
(after modification for wire-line drilling in 2007/2008)

- 11 expeditions on five different vessels
- 90 deployments between 10 and 2050 m water depth
- Maximum drilling depth 80.85 m
- 2281 m drilled / 2036 m cored in sedimentary hard rocks, gas hydrates, gravel, sand, till and hemipelagic mud using wire-line drilling techniques
- 1570 m core recovered (77%)
- Spectrum Gamma Ray bore hole logging since 2010
- In-situ temperature probe since 2012
- 4 CORK-deployments in 2012

Drilling in different geological types



MeBo Highlights

2012-2014:

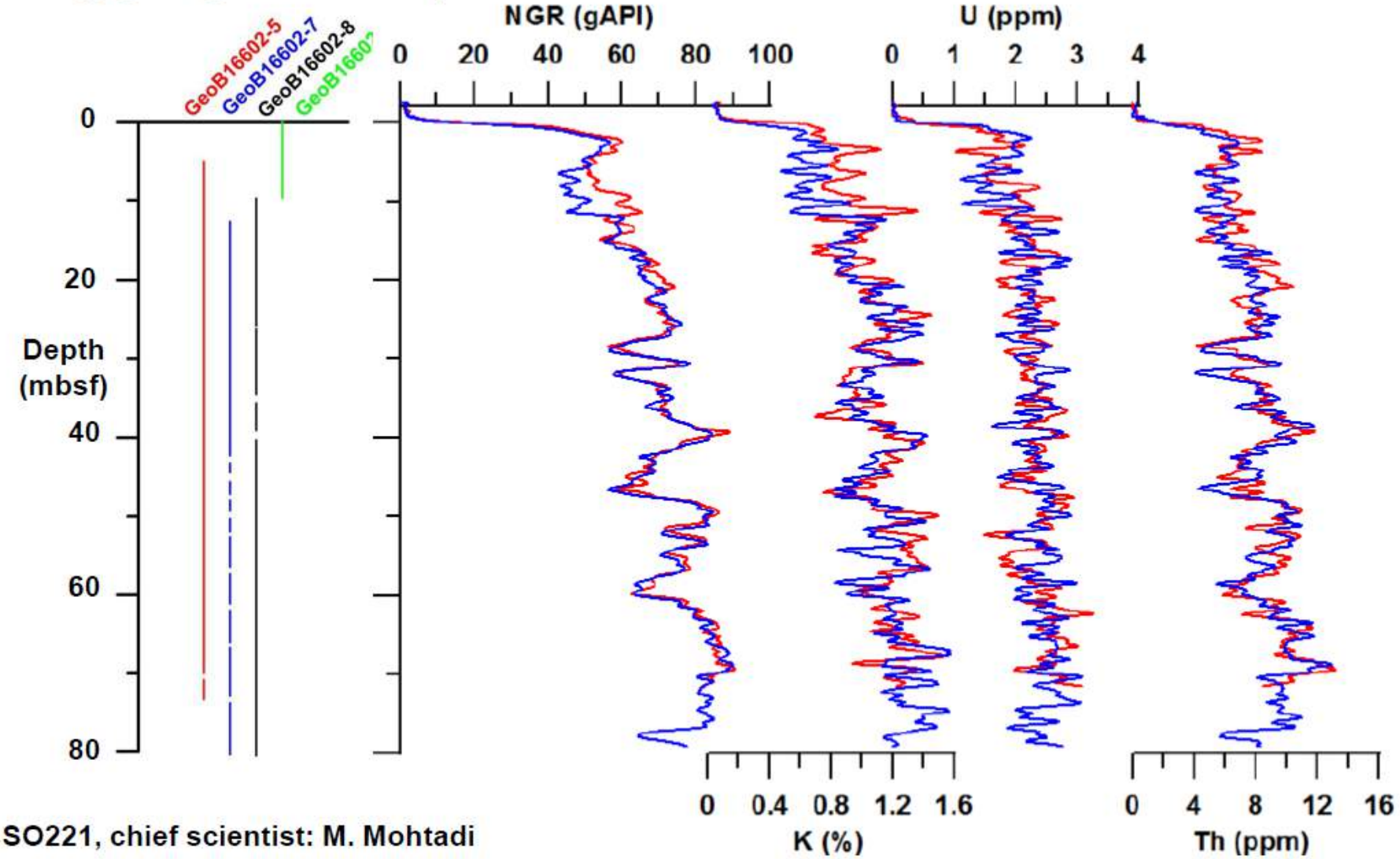
Tripple hole drilling and borehole logging down to 80 mbsf

MeBo-CORK on mud volcanoes in 2000 m water depth

Drilling in the Arctic

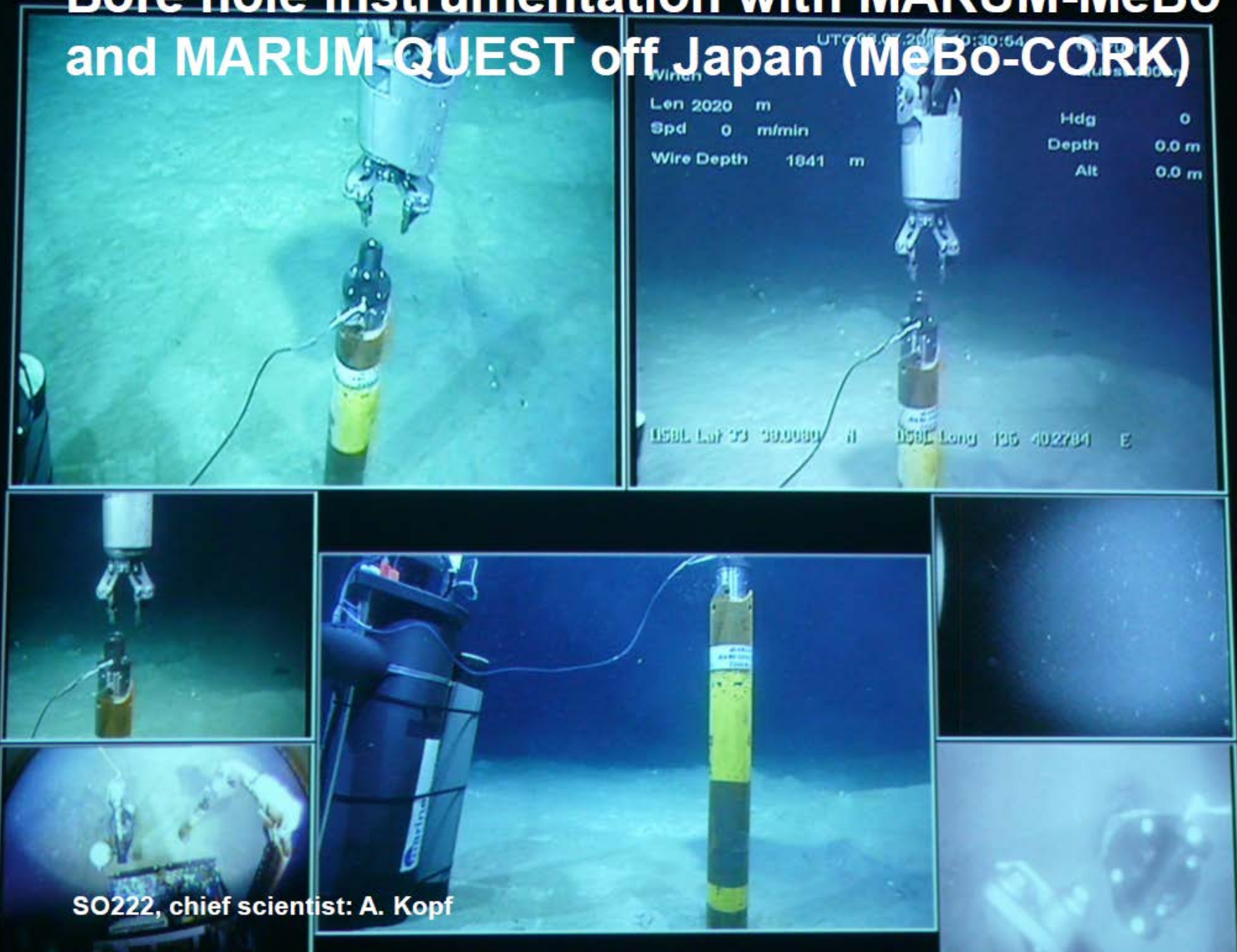
Drilling cold water corals

Triple hole drilling down to 80 m and borehole logging at two parallel holes in the S China Sea



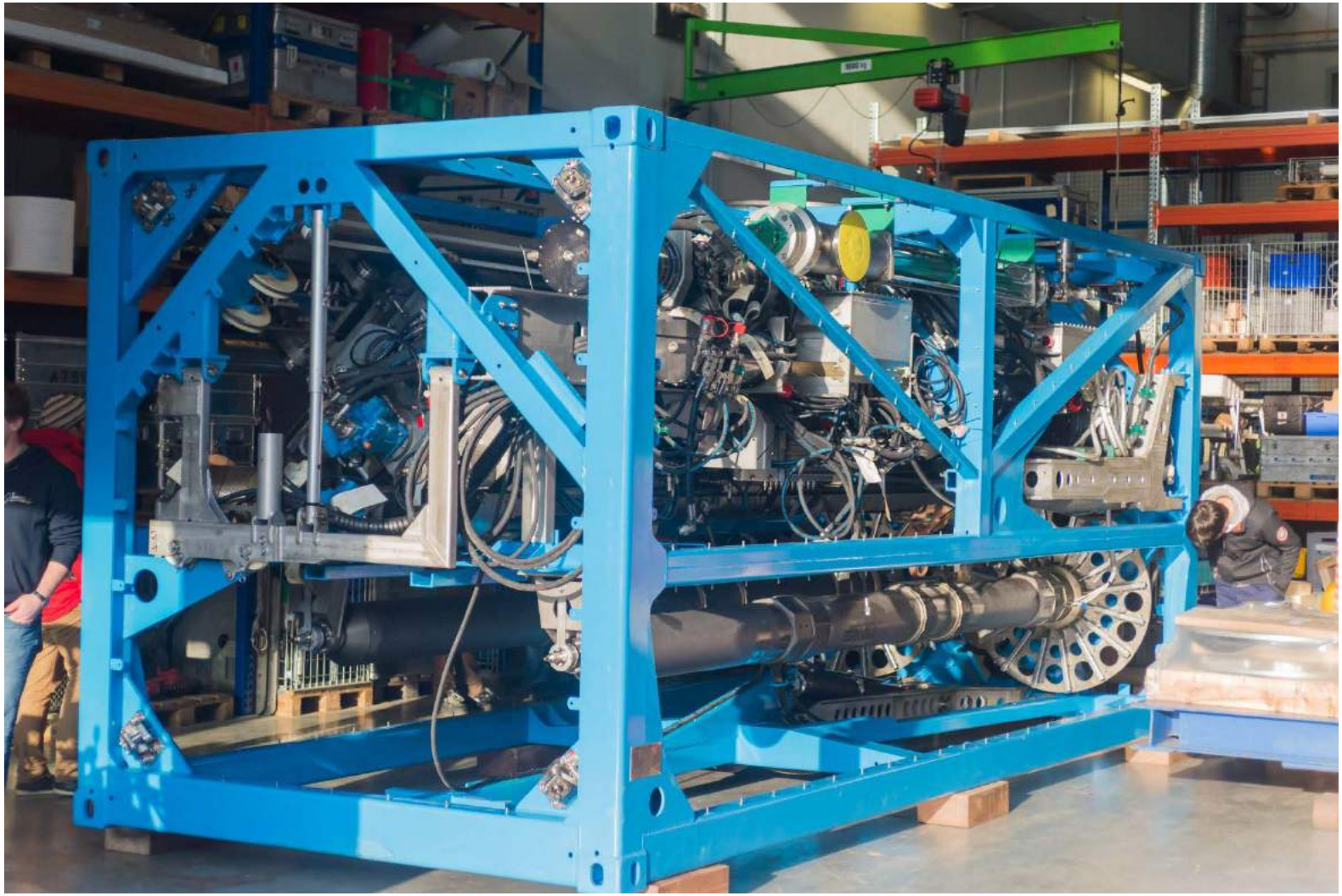
SO221, chief scientist: M. Mohtadi

Bore hole instrumentation with MARUM-MeBo and MARUM-QUEST off Japan (MeBo-CORK)

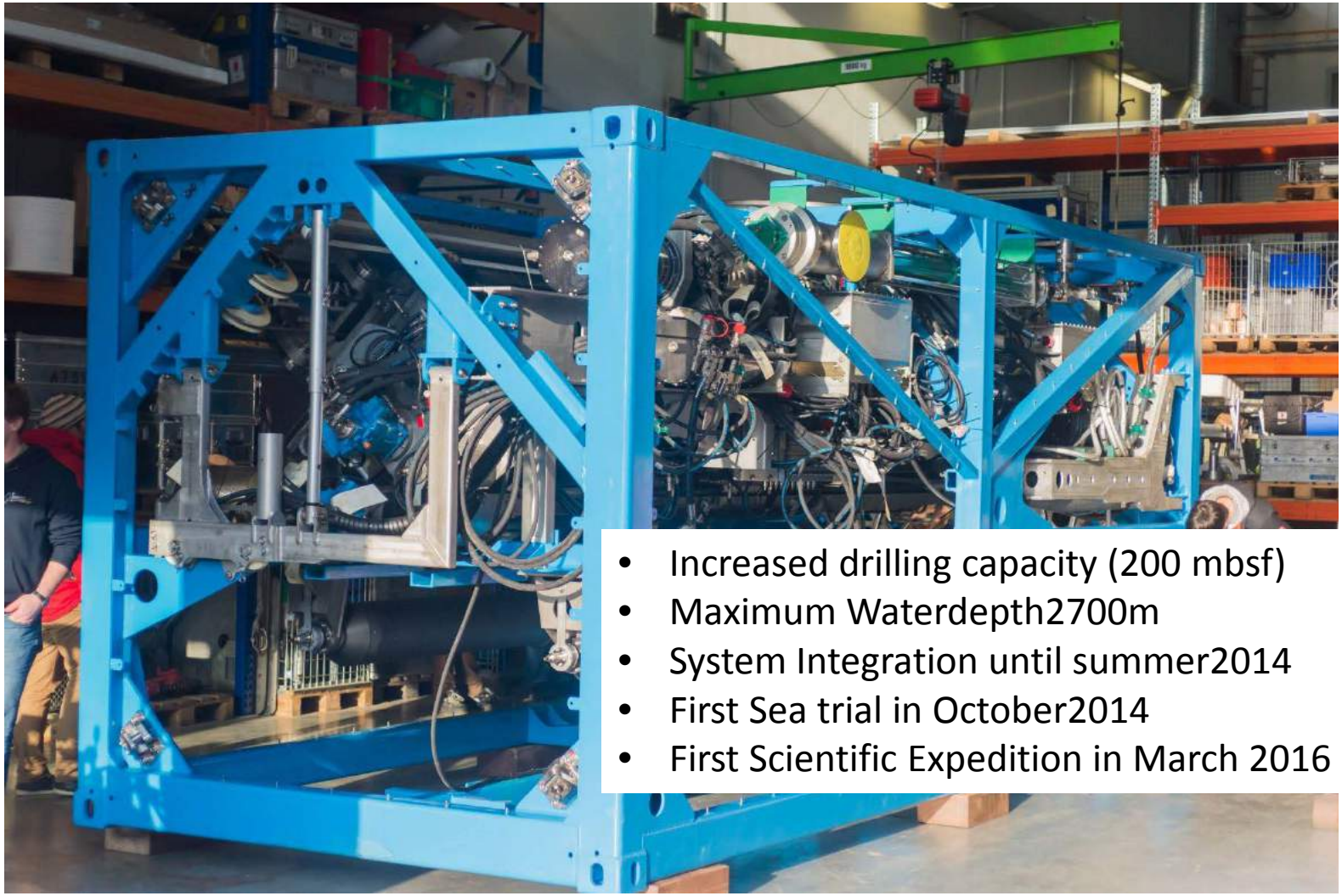


SO222, chief scientist: A. Kopf

MeBo200 (developed in cooperation with Bauer Maschinen GmbH)



MeBo200 (developed in cooperation with Bauer Maschinen GmbH)



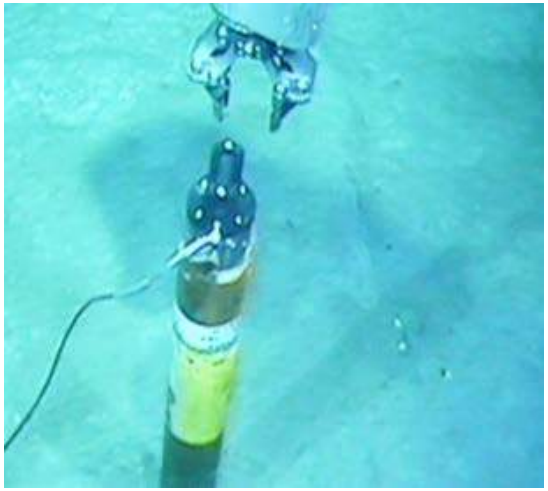
- Increased drilling capacity (200 mbsf)
- Maximum Waterdepth2700m
- System Integration until summer2014
- First Sea trial in October2014
- First Scientific Expedition in March 2016

IODP Exp 357 Atlantic Massif using RD2 & MeBo on RRS James Cook

Developments required for Project

Different downhole logging tools (memory)

- Dual Induction
- Magnetic Sus



To be able cap/seal the hole

- In hard rock