

Mid-Eocene Arctic Sediments

Arctic Coring - IODP Expedition 302

The first scientific drilling expedition to the central Arctic Ocean was operated by ECORD in August-September 2004. Expedition 302 Arctic Coring (ACEX), recovered sediment cores up to 428 metres beneath seafloor in water depth of about 1300 m, 250 km from the North Pole.

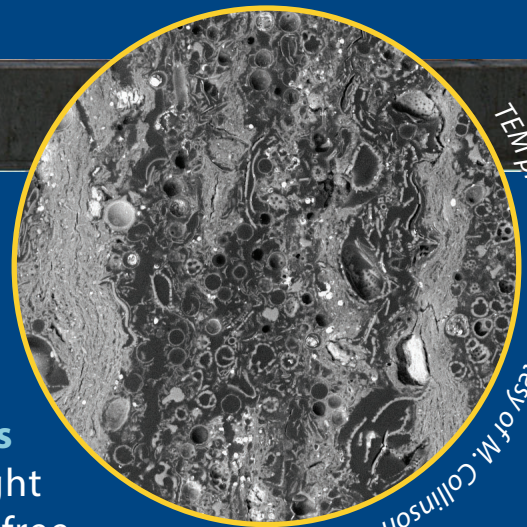
Top

300.8 m below seafloor



Organic-rich biosiliceous sediment

Around lower/middle Eocene boundary sediment records are composed of micro-laminae of organic-rich biosilica and organic-rich remains. Microscopy indicates **siliceous plankton** (e.g. **ebadians**) are concentrated in the light layers alternating with dark layers of **Azolla**, a fresh water free-floating fern.



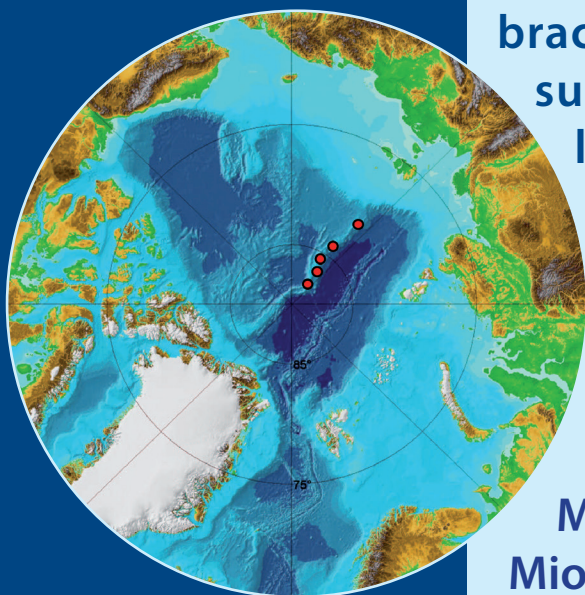
TEM photograph, courtesy of M. Collinson

The laminae may possibly reflect alternations of early spring brackish phytoplankton blooms followed by a late spring to summer precipitation increase resulting in a freshwater surface layer allowing rapid Azolla growth.

Expedition results include the discovery of sub-tropical temperatures in Paleocene-Eocene Thermal Maximum, the freshwater episode marked by the Azolla event at early/middle Eocene boundary, the onset of seasonal sea ice in the middle Eocene, the oxygenation of the deep Arctic Basin in the early Miocene and the onset on perennial sea ice during the middle Miocene.

References: Moran K et al, 2006. Nature - doi: 10.1038/nature04800

Backman J, Moran K, McInroy DB, Mayer LA et al, 2006. Proc. IODP, 302 - doi:10.2204/iodp.proc.302.2006



Expedition 302 drillsites, are located on a submarine high, the Lomonosov Ridge.

The biggest challenge during Expedition 302 was to maintain the drillship's location while drilling and coring in 2-4 m thick sea ice that moved at speeds approaching 0.5 kt.

Drilling vessel *Vidar Viking* was supported by two icebreakers while drilling.

