

Late Cenozoic depositional environment of the eastern Arctic Basin

JÖRN THIEDE



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Jörn Thiede, GEOMAR, Forschungszentrum für Marine Geowissenschaften an der Christian-Albrechts-Universität, Wischhofstrasse 1-3, Gebäude 4, D-2300 Kiel, F.R.G.

The Late Cenozoic depositional environment of the Arctic Ocean has been studied intensively over the past 20 years after the successful recovery of numerous sediment cores from the ice-island station T-3 in the central Arctic. The eastern Arctic Basin has been visited by expeditions only since the late 70s; successful attempts to recover sediment cores have been carried out from the Norwegian polar vessel RV 'Polarsirkel', from the Swedish icebreaker 'Ymer', from the German icebreaker 'Polarstern' and from the two ice-island stations (organized mainly by the US and Norway) 'Fram I' and 'Fram IV'. The distribution of coring stations presently available from the eastern Arctic Basin (except the 'Polarstern' cores which have been taken 1983–1986 in the Fram Strait) is shown in Fig. 1.

The eastern Arctic deep-sea floors of the Fram and Nansen basins are covered by highly oxidized orange reddish, fine-grained, dominantly terrigenous muds which consist of alter-

nating layers enriched in calcareous (planktonic foraminifers, coccoliths) fossil material and coarse, probably ice-rafted terrigenous debris (Fig. 2). The short sediment cores from the Fram Basin contained planktonic foraminifers throughout the sampled sequence; it has been possible to establish O-isotope curves and to correlate their stratigraphic sequence to the well known O-isotope stratigraphies of the North Atlantic. The boundaries between major isotopic shifts coincide with sediment layers enriched in coarse ice-rafted clasts, documenting vigorous advection of sediment loaded icebergs to the Arctic ice cover. The radiocarbon-dated stratigraphies of these cores suggest that sedimentation rates are 2–4 cm/1,000 yrs in the Fram Basin (Markussen 1986). This is 1–2 orders of magnitude higher than in the central Arctic.

Close to the Svalbard and Greenland continental margins and in the Fram Strait between Svalbard and Greenland sediment

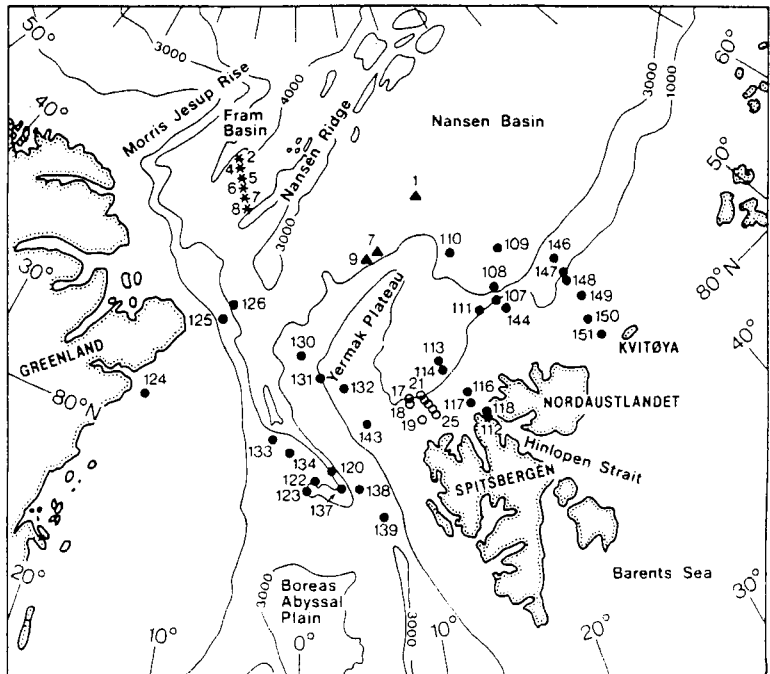


Fig. 1. Positions of cores taken from RV 'Polarsirkel' (○), 'Ymer-80' (●), 'Fram I' (*) and 'Fram-IV' (▲).

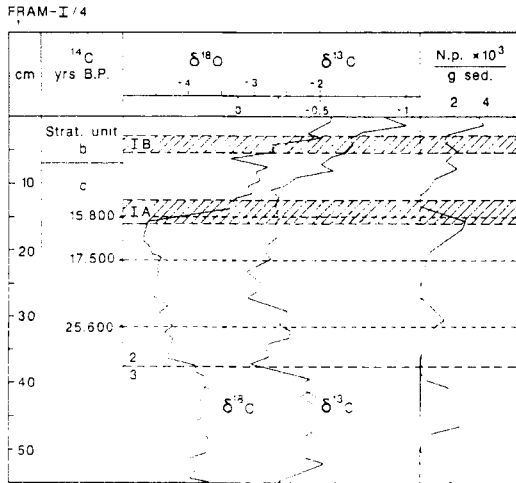


Fig. 2. Stratigraphy of sediment core from the Fram Basin (from Markussen 1986).

colors change due to higher content of organic material and take the appearance of grayish to greenish hues. The available stratigraphies seem to suggest sedimentation rates of centimeters to decimeters per thousand years, although the scarcity of fossil material complicates establishment of a detailed stratigraphic record (Thiede et al. 1988). The cores from the Fram Strait clearly reveal the response of sedimentation to the glacial-interglacial Late Quaternary climatic cycles.

References

- Markussen, B. 1986: *Late Quaternary Sedimentation and Paleooceanography in the Eastern Arctic Basin*. Ph.D. thesis, Univ. Oslo. 175 pp.
- Thiede, J., Clark, D. L. & Herman, Y. 1988: Late Mesozoic and Cenozoic Paleooceanography of Northern Polar Oceans. In Grantz, A., Johnson, L. & Sweeney, J. F. (eds.): *The Arctic Ocean, Vol. 1, Decade of North American Geology*. Geol. Soc. Amer., Boulder.