

The diatom flora in the Fram Strait. A comparison with the Pleistocene/Holocene boundary flora in the Norwegian Sea

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High abundances of diatoms were recorded near the Pleistocene/Holocene boundary in sediment cores from the Norwegian-Greenland Sea (Stabell 1986 and references therein). Diatom maxima of similar age were recently reported from the northeast Norwegian Sea (Pedersen 1987). Stabell (1986) suggested that the diatom maxima reflect the passage of the Subarctic Convergence (oceanic polar front) which moved from the southern North Atlantic (about 45°N) at about 18,000 B.P. (glacial maximum) to its present position south and east of Greenland (Ruddiman & McIntyre 1981). The northward movement of the polar front resulted in cold Arctic water being replaced by warm, saline Atlantic water of the North Atlantic Current. Mixing of polar and subpolar Atlantic surface water masses was expected by our models to result in more nutrient-enriched surface water and thereby increased diatom productivity.

It is the main objective of this study to investigate the diatom flora in the surface sediments of an area presently affected by the polar front in order to look for a modern analogue to that associated with the Pleistocene/Holocene boundary.

The diatom abundance in the surface sediments of the Fram Strait is generally very low. The highest number of diatom valves per gram dry sediment (up to $68.6 \cdot 10^4$) was recorded under the warm Atlantic water in the southeastern part (Group 5), surrounded by areas with steadily decreasing concentrations (Fig. 1). However, even the maximum in the center is low compared with the numbers found in the diatom maxima in the Skagerrak and Norwegian Sea (up to $230 \cdot 10^4$). In addition, the abundance pattern is subject to local patchiness.

The maxima at the Pleistocene/Holocene boundary in the south consist of two distinct peaks with quite different diatom assemblages (Stabell 1986). The oldest peak is composed of planktonic, cold water species and is characterized by the presence of *Thalassiosira antarctica* which belongs to extreme inshore waters and/or ice (Hasle 1976). The younger peak has a more temperate flora similar to the present flora in that area. In the cores from the northern Norwegian Sea and the Fram Strait (Stabell 1986; Pedersen 1987) a *T. antarctica* peak is not present. *T. antarctica* is a characteristic species at only one station (in Group 4) in the Fram Strait. It is not possible to

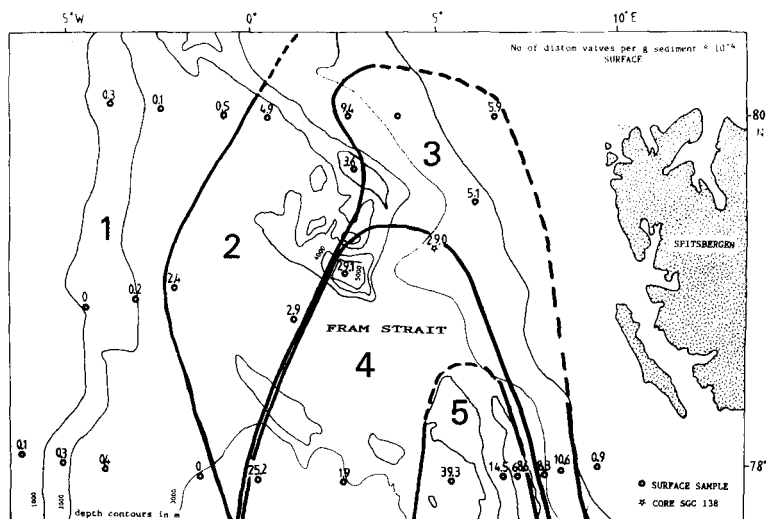


Fig. 1. Distribution pattern for absolute number of diatom valves in the surface sediments of the Fram Strait.

relate the occurrence of *T. antarctica* in the Fram Strait to the polar front. Therefore no connection can be seen between the occurrence of *T. antarctica* in the Fram Strait and its occurrence at the oldest peak of the diatom maximum at the Pleistocene/Holocene boundary.

The number of diatom valves per gram dry sediment in the maxima at the Pleistocene/Holocene boundary decreases northwards (Stabell 1986; Pedersen 1987). It is therefore possible that the productivity decreases northwards and that one should not expect to find the distribution near the polar front in the Fram Strait to be similar to that at the Pleistocene/Holocene boundary.

It can be concluded that a distinct diatom maximum is recorded at the Pleistocene/Holocene boundary, but that the surface sediment distribution in the Fram Strait is not a modern analogue.

References

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