



## **Neogene Contourite Drift Development in the Norwegian – Greenland Sea Area; Paleoceanographic Implications**

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For the evolution of the Cenozoic high northern latitude paleo-climate, the development of the North Atlantic – Arctic Ocean interactions including its southern (Faeroe – Shetland channel) and northern (Fram Strait) gateways were vital. In this paper we review the timing of inflow of paleo-Atlantic water into the Norwegian – Greenland Sea and the Arctic Ocean using the development of ocean current controlled contourite drift deposition as a proxy. In the early Miocene, drift growth accelerated in the Rockall Trough and in the Faeroe-Shetland Channel interpreted to be related to the opening of the Faeroe – Shetland channel and establish a deep-water passage across the Greenland – Shetland Ridge. To the north, offshore Norway, growth of the Lofoten Drift has been estimated from mid-Miocene although age control is sparse in this area. No drift development has been reported from the SW Barents Sea continental slope while offshore the NW part of the Barents Sea slope, drift growth seems to have come in later, at  $\sim 1.3$  Ma. North of the Fram Strait gateway, drift growth has been inferred from at least mid-Miocene ( $\sim 11$  Ma). Studies from the central Arctic Ocean shows ventilated surface water conditions from  $\sim 17.5$  Ma ascribed to the opening of the Fram Strait which was a narrow oceanic corridor during early Miocene (20 – 15 Ma) and where the onset of sea floor spreading and the establishment of a deep-water corridor has been suggested to start from late Miocene ( $\sim 10$  Ma). Other, more recent studies have, however, reported evidence for the development of an initial deep-water gateway through the Fram Strait from around 17 Ma.

To summarize:

- A circulation system similar to the present was probably established in the southern Norwegian – Greenland Sea before the Fram Strait became a deep-water gateway and before the establishments of the major ice sheets in this area (the first occurred in SE Greenland from  $\sim 7$  Ma).
- Uncertainties still relates to the timing of the development of ocean circulation in the northern Norwegian – Greenland Sea including the Fram Strait gateway where drift onset has been estimated to at least 11 Ma.
- The onset of drift growth at 1.3 Ma slightly south of the Fram Strait occurred after the onset of deep-water circulation through the Fram Strait and it is inferred to be related to the glacial expansion recorded in the area.