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Quaternary evolution of the northern North Sea margin

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At the start of the Quaternary, the bathymetry of the northern North Sea was dominated by the north-south orientated North Sea Basin. The Norwegian Channel Ice Stream of the Fennoscandian Ice Sheet (FIS) extended to the shelf break during several mid- and late Quaternary full-glacial periods. As a consequence of mid- and late Quaternary ice-stream erosion, comparatively little is known about the nature of sedimentation and the configuration of the south-western margin of the FIS in the northern North Sea during the early Quaternary.
We use 2D and 3D seismic-reflection data to investigate changing sediment volumes and sources in the northern North Sea through the Quaternary. Our data show that the northern North Sea Basin was infilled during the early Quaternary by intercalated glacigenic debris-flows derived from the FIS during full-glacial periods and contourites deposited by along-slope currents during periods of reduced glaciation and active thermohaline circulation. The infilling of the northern North Sea Basin may have encouraged initiation of the Norwegian Channel Ice Stream by increasing the palaeo-shelf width and reducing water depth. The southward-flowing Norwegian Sea Bottom Water current was directed into the partially filled northern North Sea Basin during the early Quaternary, and deflected progressively northwards as the basin became infilled.