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Quaternary evolution of the northern North Sea

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The North Sea has arguably the most extensive geophysical data coverage of any glacier-influenced sedimentary regime on Earth, enabling detailed investigation of the thick (up to 1 km) sequence of Quaternary sediments that is preserved within the North Sea Basin. At the start of the Quaternary, the bathymetry of the northern North Sea was dominated by a deep depression that provided accommodation for sediment input from the Norwegian mainland and the East Shetland Platform. Here we use an extensive database of 2D and 3D seismic data to investigate the geological development of the northern North Sea through the Quaternary.

Three main sedimentary processes were dominant within the northern North Sea during the early Quaternary: 1) the delivery and associated basinward transfer of glacier-derived sediments from an ice mass centred over mainland Norway; 2) the delivery of fluvio-deltaic sediments from the East Shetland Platform; and 3) contourite deposition and the reworking of sediments by contour currents. The infilling of the North Sea Basin during the early Quaternary increased the width and reduced the water depth of the continental shelf, facilitating the initiation of the Norwegian Channel Ice Stream.