



Events of enhanced terrigenous input to the Sophia Basin, Arctic Ocean

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Periods of enhanced terrigenous input to the ocean's basins of the North Atlantic have been reported for the last glacial period. We present a set of new sediment cores recovered from the Sophia Basin north of Svalbard which exhibit wide spread layers of enhanced terrigenous input throughout the last ~ 200 kyr. BP.

They are IRD layers with characteristic sedimentological, physical and geochemical properties. Showing high sedimentation rates, low or no carbonate and peak TOC concentrations, they are further characterised by peak C/N and Zr/Ca ratios. Due to their higher contrasts in acoustic impedance and surface-character they generate excellent reflectors for sediment penetrating acoustic devices and, thus, prominent acoustic layers in the imagery of sedimentary structures.

Their consistent stratigraphic position, sedimentological, physical and geochemical characteristic identify them as synchronously deposited layers that we term terrigenous input events (TIEs). TIEs can be used for regional (including acoustic) stratigraphy.

Each of the events is related to major glacial activity on Svalbard. Based on our geochemical characterisation (C/N, Zr/Ca), we can identify several sources of the terrigenous sediment. Non-synchronous timing of western and northern sources on Svalbard points against sea-level induced iceberg discharge events. The northern source activity post-dates western sources. This likely reflect different susceptibilities for glacial inception. The Early Weichselian glaciation is not recorded as a typical TIE and, in agreement with other work, might not have occurred on Svalbard as a major glacial advance to the shelf break.

The TIEs would not have been properly discovered by conventional methods describing IRD (e.g. grain size approaches). Our multi-proxy approach provides a new assessment of this problematic.