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# Sedimentary processes on the Storfjorden trough-mouth fan during last deglaciation phase: the role of subglacial meltwater plumes on continental margin sedimentation

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The continental margin of the Southern Storfjorden trough-mouth fan was investigated within the SVAIS project (BIO Hesperides cruise, August 2007) as a Spanish contribution to IPY Activity N. 367 (Neogene ice streams and sedimentary processes on high- latitude continental margins – NICE STREAMS). The objectives were to investigate the glacially-dominated late-Neogene-Quaternary sedimentary architecture of the NW Barents Sea continental margin and reconstruct its sedimentary system in response to natural climate change. The paleo-ice streams in Storfjorden had a small catchment area draining ice from the southern Spitsbergen and Bear Island. The short distance from the ice source to the calving front produced a short residence time of ice, and therefore a rapid response to climatic changes.

Here ground truthing recovered the last few thousands years sedimentary sequence thought to represent last deglaciation phase. Detailed palaeostratigraphic investigations together with paleomagnetic and rock magnetic analyses and AMS dating define the constraints for high-resolution inter-core correlation and dating. Most of the cores contain at the base gravity-mass deposits including debris flows and over-consolidated glacigenic diamicton. Mass deposits are overlain by an oxidized interval originated at the release and sink of fresh, cold and oxygenated melt-waters at the inception of the deglaciation phase.
On the upper slope the oxidized interval is overlain by several meters of finely-stratified sediments composed of sandy-silt layers cyclically recurring within finer-grained laminated silty-clay sediments. Textural and compositional analyses suggest preferential deposition by settling from meltwater sediment-laden plumes (plumites) occurred during deglaciation with coarser layers representing episodes of subglacial meltwater discharge (glacial hyperpycnal flows) accompanying the ice streams retreat. The laminated sequence is truncated at uppermost part by a more recent gravity-mass deposit that possibly removed part of the younger sequence.
In the deeper part of the slope the plumites consist of crudely laminated, terrigenous and almost barren sediments. Here the sedimentary sequence is topped by intensively bioturbated, bioclasts-bearing silty-clays representing the most recent interglacial sedimentation.
On the continental shelf, the upper sedimentary sequence contains dispersed cm-thick bivalve's shells suggesting an oxygenated and nutrient-rich environment (interglacial) overlaying an interval of terrigenous, barren sediments (deglaciation). Here the short core's length suggests the presence of stiffer/coarser sediments at the base that could not be sampled.

The seismic stratigraphy indicates that the slope is formed by alternating debris flow deposits and layered sediments corresponding into our cores to the fast-deposited, low-density, terrigenous plumites. Bathymetric and seismic data revealed the presence of widespread submarine landslides restricted to the southernmost part of Storfjorden continental slope. Geotechnical investigation are in progress in order to understand if such layered deposits can act on the slope as a possible preferential weak horizon favoring sediment failure.