



Integrated geophysical, geological and oceanographic study of the Holocene paleoclimatic record offshore the western margin of the Barents Sea Ice Sheet

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IPY Activity N. 367 focusing on Neogene ice streams and sedimentary processes on high-latitude continental margins (NICE-STREAMS) led to the acquisition of geophysical, geological and oceanographic data during a series of coordinated research cruises in the NW Barents Sea, just south of the Fram Strait where significant water mass exchanges impact the Arctic climate. This research included the geophysical survey of the adjacent Storfjorden and Kveithola trough-mouth fans located south of Svalbard in the NW Barents Sea, which led to the identification of various sedimentary deposits that recorded, at millennial resolution, the paleoclimatic evolution in this sector of the Barents Sea since the Last Glacial Maximum (LGM).

On the continental shelf a series of E-W trending mega-scale glacial lineations (MSGL) record a fast flowing ice stream draining the Svalbard/Barents Sea Ice Sheet (SBIS) during the LGM. MSGL are overprinted by grounding-zone wedges (GZW) formed by deposition of unconsolidated, saturated subglacial till deposited during episodic ice stream retreat. About 15 m of glaciomarine sediments deposited since the onset of deglaciation covering the LGM morphology. The glaciomarine deposits are in turn overlain by the 30 m thick Kveithola sediment drift located in the inner Kveithola Trough that deposited under the control of brine-enriched shelf water since the last 13 cal. ka B.P.

On the western Svalbard continental slope, two sediment drifts located at about 1450 m depth formed beneath the lower core of the West Spitsbergen Current that has an average northward velocity of about 9 cm/s. These sediment drifts have grown under the effect of the Norwegian Sea Deep Water episodically ventilated by relatively dense and turbid shelf waters forming in the shelf area since about 1.3 Ma (Early Pleistocene glacial expansion recorded in the area).