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Preliminary results from a bathymetric and seismo-stratigraphic survey in the Kongsfjorden, Svalbard Islands

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During September 2010, an instrumented oceanographic array was deployed by CNR-ISMAR in the Kongsfjorden, a narrow fjord of the Svalbard archipelago. The Kongsfjorden is 20 km long and 4-10 km wide, elongated in SE–NW direction and the exchanges with the Arctic Ocean occur at the northwestern mouth along the western coast of the Spitsbergen island. This fjord is particularly suitable for exploring the possible impact of climate changes, because it is affected by Atlantic water influx (the northern branch of Gulf stream and the Arctic-type coastal water) and melting of tidal glaciers (Kongsvegen, Kronebreen, Bløms trandbreen), both being linked to global climate variability.

A seismic survey was performed in the inner part of the fjord and over 130 miles of Chirp subbottom profiles were acquired, with the purpose to describe the morpho-bathymetrical features and surficial seismo-stratigraphy. The bottom of the fjord is dominated by a widespread outcrop of bedrock. Several structures were detected, mainly related to relict sub-glacial and ice-scoured topography produced during the glacial re-advances of the Weichselian (20 ky BP) and again during the last major Holocene re-advance of the Little Ice Age. These features are several tens meter high above the sea bottom level, and in the southeastern part emerges as small islands separating the inner fjord into two parts.

The area located at the inner part of the fjord, close to the calving line, is characterized by the maximum sediment accumulation, and a thin ($<$10m) of coarse-grained sediment thickness can be observed, probably due to the interaction of the 3 proximal ice-tongues. The high-resolution seismic dataset allowed us to select the optimal site for the mooring deployment. In summer 2011, twelve short sediment cores were collected to investigate: (i) nature, transport and fate of terrestrial organic matter by increasing runoff and glacier retreats; (ii) lateral advection of marine organic matter, nutrients and pollutants by intrusion of oceanic water. Chronology of modern sediment are obtained by short-lived radionuclide measurements (^{137}Cs and ^{210}Pb).