



Morpho-stratigraphic features of the Edisto Inlet, a high sedimentation rate site in western Ross Sea (Antarctica)

D. Morelli (1), E. Colizza (1), N. Corradi (2), **F. Finocchiaro** (1), F. Giglio (3), L. Langone (3) and D. Ridente (3).

(1) DiSGAM, University of Trieste, Italy. (2) DIPTERIS, University of Genoa, Italy (3) ISMAR, CNR, Bologna, Italy (finofu@univ.trieste.it / Fax: +39-040-5582045)

In the site of Cape Hallett the sedimentation characteristics testify a rapid early Holocene climatic change Biogenic muddy laminated sediments, buried beneath sandy sediment, mark a warm episode approximately 10.000 year ago (core CH41; Finocchiaro et al., 2005).

During 2005 cruise we have collected another set of morpho bathymetric and sedimentological data: in the Edisto Inlet area, about 70 nm of SBP and single beam echo sounder profiles were acquired and nine gravity core cores and two box corer were collected.

Based on seismic and bathymetric data, the Edisto Inlet is a narrow seabed depression NNE-SSW elongated, with maximum water depth of 500 m. The deepest inner area is linked to the Ross Sea through a seabed sill at 400 meters depth.

The inner area is characterized by a steep slope down to a depth of 400 meters and by a wide deepest axial sector with a generally flat seabed morphology.

The seismic profiles, in the sill area, show a widespread outcropping bedrock that, proceeding toward the inner trough, is covered with a thin sedimentary cover (10-12 msec. max). These deposits are frequently shaped as mounded sediment ridge, in some places showing evidence for up-dip progradation, in other displays chaotic internal reflection. The seabed morphology and the seismic horizons geometries suggest recent

activity of erosion or not deposition processes for the sill area, and for the area between the sill and the inner trough, the prevailing of bottom current-controlled erosional and depositional processes.

In the inner trough, the acoustic basement, southward dipping, is marked to the top by a strong reflection, characterized by an highly irregular morphology with a set of small highs and depression different in shape.

In the axial area of the inner trough, diffraction hyperbolas envelopes marked the most prominent basement high that is a narrow NNW-SSE elongated ridge, partially outcropping on the seabed. Around the bedrock ridge the seabed flat morphology is justified by a very thick sedimentary cover that generally increase in thickness toward the axial area of the trough (max 80 msec.). The sedimentary cover is characterized by an lower poorly reflective unit (few discontinuous horizons) and a more reflective upper unit (densely stratified reflectors). These different seismic facies is not always reliable, because the diffused seismic blanking related to fluid escape features, to gravity mass movements and to faulting activity.

A core (BAY05-c18) collected near the sill area has sampled the top the lower unit that is a muddy diamicton, 33 kyr in age, delimited to the top by biogenic muddy sediments (11-12 kyr in age; similar to CH41 core). In the inner trough, radiocarbon dating of the sediment of the upper unit shows a very high sedimentation rate up to 4 kyr about 120 cm/kyr; of glacio-marine deposits (core BAY05-c20, length 443 cm).

The seismic data set and core calibration suggest that the deep inner trough and the morphological features of acoustic basement were shaped by erosive processes connected to the last glacial maximum (LGM). In this scenario, the NNW-SSE bedrock ridge can be interpreted as a lateral moraine or a drumlin formed by glacial action. Moreover, the lower and upper seismic units of the sedimentary cover represent, respectively, the upper Pleistocene sub-glacial or glacial-recession deposits and Holocene glacio-marine and marine sedimentation, following the retreat of seaward edge of the grounded ice.

The very expanded holocenic sequence (approximately 40-50 msec. max) inside the inner trough of the Edisto Bay would be a very interesting case study for Holocene paleo-climatic variation