AGU 100 ADVANCING EARTH AND SPACE SCIENCE FALL MEETING Washington, D.C. | 10–14 Dec 2018

PP23E-1540: Depositional processes on the Eastern Ross Sea slope and outer shelf (Antarctica): structures on the present seabed and current interactions.

Tuesday, 11 December 2018
13:40 - 18:00
Walter E Washington Convention Center - Hall A-C (Poster Hall)

The southeastern Ross Sea outer shelf and slope are key areas to study the interaction between oceanographic and glacial dynamics on a high latitude continental margin.

We present a multidisciplinary study with the integration of geological, geophysical and oceanographic dataset, collected in 2 campaigns (PNRA2017 and NBP1502B) on the continental shelf and slope off Houtz and Hayes banks and Whales Deep Basin. The aim is to reconstruct the depositional evolution of this sector of Eastern Ross Sea, directly influenced by West Antarctic Ice Sheet dynamics, Antarctic Slope Current and Ross Sea Bottom Water flow.

Multibeam, single-channel seismic reflection and sub bottom profiles reveal different type of structures including sediment wedges, ridges, gullies and canyons, related to ice grounding-zone deposition, ice meltwater discharge and bottom water overflow and downslope flow.

The analysis and the correlation of seismic units from the shelf to the slope constrained by the DSDP 271 information, suggest that the continental margin underwent at least 4 main episodes of ice sheet advance and retreat, since 0.65 Ma. These episodes are marked by erosional surfaces, bounding units characterized by opaque lenses and chaotic facies with diffractions, small incisions and channel-like features on both shelf and slope. In some cases are observed foreset beds wedges, prograding up to the shelf edge. Massive failure can be detected in at least 2 seismic units. Thickness, character and distribution of these units varies, suggesting a depocenter shift across the area and different depositional mechanism.

The present shelf edge shows a lobate shape in front of Whales Deep Basin where the thickness of the most recent slope seismic unit is maximum and the multibeam shows a smooth surface. A concave profile characterizes the upper slope off the area between basin and banks. Here the thickness of the most recent slope seismic unit is minimum, and the multibeam shows sea bed erosional features and well developed gullies cutting the shelf edge.

This geomorphological setting can be expression of massive glacial deposit in front of the ice stream flowing over the basin. Erosion by meltwater outflow discharge dominated on the margins of the basin and along slope canyons. These areas are preferential route for modern Ross Sea cold water outflow.

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