IV ROSS SEA CONFERENCE 2023

Università degli Studi di Napoli "Parthenope"
Via Amm. F. Acton, 38 - 80133 Napoli, ITALY
3-7 July 2023, Via Acton 38, Naples-Italy

Topic: Marine geology and geophyisics.

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ABSTRACT Subject :

New offshore geological and geophysical investigations at the Pennell Coast of North Victoria Land (PNRA_BOOST Project)

Abstract 27/02/2023 23:50:23

The PNRA_BOOST project (Bridging Onshore-Offshore STructures at the Pacific Coast of North Victoria Land, Antarctica: an integrated approach) is addressed to the study of the Pacific side of the North Victoria Land (NVL), i.e. Oates and Pennell Coasts, an un- and under-explored key area located in a critical position at the boundary region between East and West Antarctica. The interplay between the West Antarctic Rift System and the Australian-Antarctic plate divergence has played a crucial role in shaping the structure of the Antarctic lithosphere, growth of the cryosphere, formation of sub-ice topography, and uplift of the Transantarctic Mountains. At present, there still remain open questions and lack of data on rift-related structures and their Eocene to Recent geodynamic history. Brake and Anderson (1983) have already highlighted that the continental margin of NVL exhibits a complex bathymetry due to tectonic, glacial and marine processes; they hypothesize that the rugged geometry of the continental shelf is linked to the extension of the Balleny fracture zone and that the bathymetry is largely controlled by tectonics. Moreover, geomorphic analysis of onshore valley systems revealed that the fluvial basin evolution at the Pacific side of NVL is controlled by and adapted on the tectonic structure of the bedrock at least until the Eo-Oligocene boundary, and anomalies are compatible with the recent tectonic evolution. Our main aims are: to develop a morphotectonic model that correlates on- and offshore tectonic structures in order to link Cenozoic geodynamics to ice sheet evolution and to provide new answers to still open questions regarding Dynamic Earth and Antarctic Ice Sheet evolution and "boost" future international collaboration. To achieve our aim, we use a multimethodological approach including acquisition of new geological and geophysical data on land and at sea. Here, we present new data collected over a 5000 km2 area crossing the continental shelf and the ice grounding-zone during the XXXVIII Italian PNRA scientific expedition onboard of the R/V Laura Bassi in Feb 2023. These data include multichannel seismic reflection (MCS) measurements along a ca. 350 km profile carried out in parallel with magnetic and sub-bottom TOPAS measurement, and multibeam morphobathymetry and magnetic measurements. Three multicores and three gravity cores collected on the shelf integrate the geophysical dataset. Preliminary results will also serve for the design of a high-resolution aeromagnetic survey planned for the next Antarctic season within the frame of BOOST and the BGR GANOVEX research programme.