

ABSTRACT BOOK



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MYSTERO: Multidisciplinary Investigation of Enigmatic Submarine Mounds in the Western Ross Sea, Antarctica

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Abstract

Fields of sub-circular submarine mounds, tens of metres high and hundreds of metres wide, occur between 400 and 1200 m depth in the western Ross Sea, offshore southern Victoria Land and Cape Adare. Their origin and environmental significance remain unsolved. To unravel the genesis, formation mechanisms, and environmental role of these features, the project MYSTERO (Multidisciplinary study of enigmatic mounds in East Antarctica offshore) adopts an integrated geological, oceanographic, and biogeochemical approach combining: (i) high-resolution geophysical surveys and sediment analyses to constrain morphology, internal structure, and stratigraphy; (ii) hydrological characterization of near-bottom water masses, focusing on interactions between Circumpolar Deep Water (CDW) and Ross Sea Bottom Water (RSBW); (iii) ecological and microbiological studies of benthic macro-, mega-, and microbial communities; and (iv) geochemical analyses of sediments and near-bottom waters, assessing nutrient and trace element dynamics. During the XLI Italian Antarctic expedition of the Programma Nazionale di Ricerche in Antartide (PNRA), onboard the R/V Laura Bassi, we acquired over 2000 km² of multibeam bathymetry, backscatter, water column data, sub-bottom profiler data, multichannel seismic profiles, sediment grab samples, CTD casts, XBT, near-bottom water samples, and biological specimens. Preliminary results reveal complex mound morphologies, variable internal acoustic facies. Top of features were colonized by stylasterids, bryozoans and sponges along with echinoderms, and other associated fauna, suggesting that these features act as biodiversity hotspots. These findings open new perspectives on the ecological and geochemical role of mounds within the evolving Ross Sea system, and set the stage for metagenomic investigations of microbial communities under ongoing climatic change.

Disciplines and sessions

Geosciences: S10: Antarctic Ice Sheet and Southern Ocean Dynamics: Coupled System Responses to Climate Change and Sea-Level Implications