



THE GREAT AUSTRALIAN DEEP-SEA CORAL AND CANYON ADVENTURE



#DeepCoralAdventure

1/26/2020 - 2/25/2020
Albany, Australia
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Museum

Expedition Objectives



ROV Expedition

Using high-resolution video imaging from the ROV SuBastian, deep-sea animals and their habitats were documented, as well as the biodiversity and distribution patterns of previously unexplored ecosystems in the Bremer canyon systems, north of the Leeuwin Canyon, and new sites in the Perth Canyon.



Strategic Sample Collection

The ROV strategically sampled the benthos, specifically collecting both live and fossil coral samples. These will underpin post-cruise geochemical analyses of their skeletons, being a key goal of the cruise proposal. They also represent a unique reference collection for futures studies in this region.



Physical & Chemical Environment Characterization

Comprehensive physical and chemical measurements of canyon waters will provide a present-day 'baseline' of environmental conditions. This is essential to calibrate geochemical analyses and enable comparison with past records of environmental change extracted from the coral skeletons, as well as future environmental studies in this region.

All of the data gathered during the cruise is new and provides the first video footage and assessment of these deep-sea environments.

Following the cruise, the skeletons of corals especially will be analysed at University of Western Australia's (UWA) state-of-the-art analytical facilities. The analyses will not only yield important environmental information but also help us understand how these animals exist in such extreme environments.

These analyses will provide recent and long-term environmental records, such as changes in climate, nutrients, ocean acidification, as well as deep-ocean circulation patterns from present day to millennial (glacial-interglacial) timescales.

Quantifying deep-ocean warming and acidification, for example, over recent and long timescales will differentiate natural variability from current anthropogenic changes occurring in these vulnerable ecosystems. They will also help us understand how deep-sea will likely be impacted in a high CO₂ world.



A large array of new deep-sea habitats and ecosystems were documented in Australian waters for the first time.



400
samples
collected



32
days at
sea



17
ROV
dives



18
CTD
casts



159
ROV dive
hours



10,427
km²
mapped

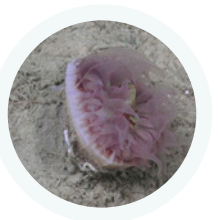
Extensive fossil coral deposits were discovered at the large seamount, Mt. Gabi, north of the Leeuwin Canyon, throughout its entire depth range (~700 to 1000 m), while smaller deposits occurred throughout the Bremer canyon systems. Reconnaissance dating of these corals, together with the coral graveyards previously discovered in the Perth Canyon in 2015, indicate that deep-water corals were widespread and flourished across this region during the Last Glacial period (~30-20 kyr).

The outcomes of the research will also inform the general public, authorities, and researchers about the existence of these unique and never before seen ecosystems, and will provide otherwise unavailable information about changing environmental conditions in the Southern Ocean, which plays a major role in regulating global climate. The immediate data collected during the cruise can be accessed and used by the Commonwealth Marine Park Authority (MPA). When finalised, integrated environmental and habitat data will also be made available to the MPA. This information will be accessible to the public via the MPA's Bremer and Perth Canyon Marine Park websites.



NEW MAPPING OF CANYON DETAILS

Bathymetric maps were created for our three study areas where data was lacking and required greater resolution.



A VARIETY OF NEW SPECIES

Some new species were observed and collected which are awaiting formal identification by various specialist taxonomists.



400 SAMPLES COLLECTED

Biological and geological samples will aid in our understanding of these deep canyon ecosystems.