

Australian Mesophotic Coral Examination

30-day Post Cruise Report

**Ship name**: Falkor

**Cruise Dates - Day Departed**: 04/09/2021 **Day Returned**: 04/27/2021

**Cruise Number**: FK210409

**Departure Port**: Darwin, Australia **Arrival Port**: Darwin, Australia

**Participating Organizations, Institutions, Foundations, Government Agencies, etc.:**

Australian Institute of Marine Science, Western Australian Museum, University of Western Australia, Curtin University

**Funding Sources:** Australian Institute of Marine Science, Western Australian Museum, University of Western Australia, Curtin University, Parks Australia

**Name of Chief Scientist**: Karen Miller

**Organization**: Australian Institute of Marine Science

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**Name of Co - Chief Scientist**: Nerida Wilson

**Organization**: Western Australian Museum

**Country**: Australia

**Geographical area(s) where the science occurred and why working in this location was important or impactful:**

Ashmore Reef; The work is important because the mesophotic zone is so poorly understood on the NW Shelf and because Ashmore Reef is a marine park and the data will inform management of natural values of the park.

**Cruise Objectives**:

The primary goal of the voyage was to learn more about the mesophotic reefs of Australia's northwest shelf. The specific objectives of the voyage were to collect data to underpin: Seabed mapping in the mesophotic zone, Quantitative assessment of mesophotic benthic community composition, Improved understanding of the biodiversity and biology of mesophotic reefs, Testing of new methods for effectively and efficiently monitoring the health of mesophotic coral ecosystems, An understanding of connectivity among mesophotic coral populations.

**Impact of the Research:**
The research will help us understand the diversity and importance of mesophotic reef communities on Australia's NW Shelf. These areas are poorly understood as they are difficult to study without technology such as ROVs. All the data we collected will help inform the management and protection of the Ashmore Reef Marine Park.

**Relevance to managers and the local communities**

The work was partially supported by Parks Australia and all results will be reported directly to them. Results will also be made publicly available through open-access publication, dissemination through online portals (e.g. Marine Parks Science Atlas, Northwest Atlas) as well as online data resources (AIMS Data Centre, Western Australian Museum, AODN, AusSeabed).

**Summary of Operations and Data Collection**

Data collection was primarily by ROV Subastian (imagery, water samples, biological specimens), with 148hrs of dives completed during the voyage. We also completed multibeam mapping of the mesophotic zone at Ashmore Reef using the R/V *Falkor* systems, as well as CTD casts to assess PAR through the water column.

**Did you collect Measurements or Samples, including biological specimens?** Yes

**Is there any suspected or confirmed new species discovered during the cruise?**  Yes

Several new species records for Western Australia including the great spotted cowrie (*Perissersoa* guttata). These will need to be confirmed back in the laboratory.

**Did you deploy and/or recover any Moorings, Bottom Mounted Gear, or Drifting Systems?** No

**Equipment Used**: Research focused on using the ROV Subastian to collect detailed data on benthic communities in the mesophotic zone. We trialed the use of hyperspectral imagery to assess the health of mesophotic communities as well as to assist in identification of mesophotic species.

**Total number of CTD casts completed during the cruise:** Two successful CTD casts, 21 water samples collected for eDNA analysis using ROV Subastian

**Total number of AUV dives completed during the cruise:** 0

**Total number of ROV hours completed during the cruise:** 148 hours

**Total number of ROV samples collected during the cruise:** Over 600 specimens collected

**Total number of Unmanned Aerial Vehicle (UAV) or other vehicle deployments during the cruise:** 0

**Total amount of data collected during the cruise:** 24 TB

**Other interesting things about the cruise**

Rediscovered the lost sea snakes of Ashmore Reef with over 50 sightings of sea snakes across the duration of the trip, including one as deep as 145m. Our observations of the mesophotic reefs showed the mesophotic zone at Ashmore to be diverse, vibrant and healthy; we found no evidence of coral damage, showing the marine park is helping to preserve this special ecosystem.