RV *Investigator* Voyage Scientific Highlights

Voyage #:	**IN2017_V03**		
Voyage title:	Sampling the Abyss		
Mobilisation:	Hobart, Wednesday, 4 May 2017		
Depart:	Bell Bay, 21:05 Monday, 15 May 2017		
Return:	Brisbane, 10:00 Friday, 16 June 2017		
Demobilisation:	Brisbane, Saturday, 17 June 2017		
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The Chief Scientist

Tim O'Hara has been a marine biologist with Museums Victoria since 2001. He uses museum collections to answer large-scale questions about the distribution of seafloor animals around the globe. This research includes aspects of biogeography, ecology, evolution, and dispersal. His taxonomic speciality is the Ophiuroidea (brittle-stars), a class of echinoderms that are a dominant component of the seafloor fauna.

Dr Tim O'Hara on RV *Investigator*.

Photo: Asher Flatt

Title

Sampling the abyss: latitudinal biodiversity patterns along the base of Australia's eastern continental margin.

Purpose

The purpose of the voyage was to investigate the deep-sea fauna off the eastern coast of Australia for the first time. The 'Investigator' is the first Australian research vessel with the capacity to sample the abyssal environment below 4,000 m deep. Our goal was to describe seafloor life at these depths and understand how it is distributed from eastern Tasmania to southern Queensland. We achieved this by using a variety of towed sampling equipment and cameras to collect and photograph representative fauna from fish to microbes. The project had a particular focus on the Commonwealth Marine Reserves (CMRs) which include large areas of unexplored deep-sea habitat. As these areas are fundamentally inaccessible to most people, our final aim was to communicate the fascinating world of the abyss to Australia's public for the first time.

Contribution to the nation

Once the scientific analyses are completed, the resulting contribution to the nation will be:

- The first description of eastern Australia's abyssal seafloor communities, including seven Commonwealth Marine Reserves.
- An understanding of which environmental factors drive patterns of diversity across this region.
- An understanding of the origin, evolution and conservation status of the abyssal fauna.
- The description of new species and provision of identification tools for Australia's abyssal fauna.

- The communication of images, video and descriptions of an important and vast natural habitat to the Australian Public.

As a result of this voyage

1. We have a better understanding of how and why Australian deep-sea animals are distributed the way they are across the seafloor, in particular we have a good understanding of what animals live in the Commonwealth Marine Reserves.
2. We have found that the continental margin off the eastern coast of Australia is a very rugged landscape of canyons, ridges, crags and knolls. There is a lot of diversity in deep-sea habitats. The animals on the upper-slope (1000 m), mid-slope (2500 m) and abyssal plain (4000 m) are completely different from each other.
3. We have mapped much of the continental margin from Tasmania to Southern Queensland, including extensive areas of seven Commonwealth Marine Reserves.
4. We have commenced a program of describing the deep-sea fauna; using DNA to investigate its origins, relationships and conservation status.