



## Voyage ss2012\_v07

### Tasmantid Seamounts: volcanic, tectonic, and carbonate history

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#### Contribution to Australia's national benefit:

The Tasmantid seamounts are a chain of underwater extinct volcanoes rising over 4000 m above the surrounding seafloor, only 150-600 km east of Australia. These hotspot-derived edifices extend more than 2000 km from north to south, and potentially span >40 million years of eruptive activity. We therefore targeted these volcanoes in order to track their record of Australian plate velocity, mantle reservoirs, melting, and magma diversification. 123 igneous subgroups were recovered, enabling detailed shore-based chronologic and chemical studies of the volcanism. This information is complimented by shipboard gravity and magnetic data, which will shed light on the regional lithospheric structure and tectonic history. Furthermore, the seamounts are variably capped by fossil reefs, modern coral reefs, and other biota. This material was also sampled, providing a key biologic and climatic record of the seas east of Australia. Knowledge of the present-day biota on these seamounts is also important, as the north-south orientation of the chain means that the seamounts may act as biological migration 'stepping stones' during times of environmental stress.

#### As a result of this voyage:

1. We have a better understanding of the volcanism that occurred off eastern Australia from as early as 40 million years ago, as well as the ancient and modern biota that occur on these seamounts.
2. We have found the edifices are highly varied in both construction and erosion. Substrates include volcanic cones, craters, lava flows, debris slopes, canyons, modern coral reefs, and drowned coral reefs.
3. We mapped 16,000 km<sup>2</sup> of Australia's EEZ, including within the Coral Sea and Temperate East Commonwealth Marine Reserves, and Great Barrier Reef Marine Park. Such maps are critical for management of these highly biodiverse marine regions.
4. We have commenced programs of detailed chemical and chronologic investigations of volcanic and biological samples, to better understand the magma generation sources, Australia's tectonic evolution, and climatic record of the Coral and Tasman Seas.

#### Itinerary

Departed Brisbane, 16:00,  
Friday 23 November 2012

Arrived Brisbane, 11:00,  
Wednesday 19 December 2012

#### > Voyage track ss2012\_v07

