



Voyage ss2012_t02

Great Barrier Reef phase shift: Gardner Bank to Gardner Reef

Dr Robin Beaman (Chief Scientist), James Cook University

Contribution to Australia's national benefit:

This project fulfils the Priority Goal of the 'Sustainable use of Australia's biodiversity' by contributing new high-resolution maps, and information about the seabed geomorphology, surficial sediment distribution, and sub-seafloor character of the southern Queensland continental shelf. These high-resolution maps will provide vital baseline data for future environmental surveys that will groundtruth the area for associated benthic marine life. The data collected by this voyage also fulfils the Priority Goal of 'Responding to climate change and variability', which will be used to investigate the extent, structure and morphology of this potentially important site lying within the tropical/temperate marine climate zone. With the observed shift of average marine climate zones south by >200 km since 1950, could potentially result in the Great Barrier Reef extending south, causing an algal to coral phase shift as coral settlement follows the changing environmental gradient. Additionally, the continuous multibeam data acquired between Australia and Fiji contributes to understanding the shape and sub-surface nature of the deep seafloor, thereby fulfilling the Priority Goal 'Developing deep earth resources'.

As a result of this voyage:

1. We have a better understanding of the geomorphic extent and substrate that comprise the Fraser shelf area. This information will help us to understand the substrate limitations that would largely control any future extension of the southern Great Barrier Reef, such as a phase shift from an algal to coral-dominated environment.
2. We have found an extensive area of hard substrate on the Fraser shelf, with a seabed surface covered in small pinnacles. We have also found the detailed geomorphology, or shape, of the North Recorder Seamount, in addition to numerous small volcanoes on the seafloor between Australia and Fiji.
3. We have mapped an extensive area of the Fraser continental shelf comprising the shallow Gardner Bank and surrounding hard substrate seafloor. Additional mapping was conducted over the North Recorder Seamount in the Tasman Basin, and then continuously over mostly unmapped seafloor between Australia and Fiji.
4. We have commenced a program of marine geophysical data analysis that will generate 3D bathymetry and sub-surface models of the Fraser continental shelf in the vicinity of Gardner Bank. The models will be used to fine-tune a detailed sediment facies map for the area, which can be used in future surveys.

> Voyage track ss2012_t02

