



## Voyage ss2012\_v04

### Observations of remarkable eastward flows and eddies in the Southeast Indian Ocean

Dr Helen Phillips, Chief Scientist, Institute for Marine and Antarctic Studies, University of Tasmania

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

The Indian Ocean drives much of the variability of Australian weather and rainfall and is also evolving rapidly. It strongly influences global climate, contributing to the storage of carbon dioxide and heat through the sinking of surface waters beneath the eastward currents. Marine industries located off Western Australia (e.g. fisheries and gas exploration) are important sources of economic wealth. Productivity of west coast fisheries is closely linked to variability in the Leeuwin Current, which is in turn influenced by the eastward flows. The Leeuwin Current and its eddies are swift and variable and test the integrity of offshore structures. The work we are undertaking will improve our understanding of the principal physical, chemical and biological oceanographic processes controlling the eastward flows and Leeuwin Current system. Our results will contribute to improved predictions of Australian climate variability and change through enhanced understanding of the role of the Indian Ocean in the climate system.

#### As a result of this voyage

1. Australia has joined a multi-national effort to provide data in real-time for climate research and forecasting through deployment of an air-sea interaction mooring in the southeast Indian Ocean.
2. We have used exciting new tools and methods to make the first measurements of nitrogen uptake in the Indian Ocean, measure turbulent mixing in the upper ocean, and to monitor the evolution of Leeuwin Current eddies with in-situ, autonomous sampling.
3. We have mapped the physical and biogeochemical structure of eastward currents along 105E in a region where their character is not known.
4. We have commenced studies to determine (i) the characteristics of the eastward flows and Leeuwin Current eddies, (ii) the penetration of subtropical surface waters into the deep ocean, and (iii) a nitrogen budget for eastern Indian Ocean surface waters.

#### Itinerary

Departed Fremantle 14:00

Saturday 11 August 2012

Arrived Fremantle 07:30

Thursday 6 September 2012

#### > Voyage track ss2012\_v04

