



## Voyage SS02-2008

The role of submarine canyons in upwelling, sediment transport, and productivity hotspots off the Bonney Coast and Kangaroo Island, South Australia

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### Contribution to Australia's national benefit:

Submarine canyons provide a source for upwelling through their influence on currents, nutrient flux and sediment transport. Numerous canyons exist off the Bonney Coast-Kangaroo Island and together with wind-forced upwelling near the coast they may provide nutrient and sediment paths between the deep ocean slope and coast. The Bonney Coast canyons are of particular importance because they are located within an area being explored for hydrocarbons. It is imperative that the importance of canyons to regional productivity is understood before a need arises to manage hydrocarbon extraction. This voyage investigated the oceanography, biology and sedimentology of two deepwater canyons that periodically exhibit upwelling.

Data collected during the voyage will be integrated into numerical models to address four research questions:

1. What are the roles of meso-scale eddies and the Flinders Current in driving upwelling?
2. Does upwelling lead to nutrient (and tar-ball) fluxes from the deep-slope to the coast?
3. Do canyons focus upwelling onto the Bonney Coast, forming discrete hotspots of pelagic productivity?

4. Are the sediments, benthic community structure and diversity different beneath hotspots of pelagic productivity?

### As a result of this voyage:

1. We have a better understanding of current flow around canyons during one of the most intense upwelling events on record.
2. We have quantified nutrients, phytoplankton productivity, sediment composition and benthic biodiversity (fish and invertebrates) in relation to canyon topography.
3. We have mapped the seafloor of the du Couedic and Bonney canyons in greater detail than in any previous study (including potential hydrocarbon seepage sites).
4. We have commenced a program of physical and biological modelling to assess the impact of circulation on hotspots of productivity and benthic community structure. The development of a predictive skill in this area will be of considerable assistance to future management, particularly as the Bonney Coast-Kangaroo Island canyons are adjacent to, and are likely to influence productivity and biodiversity in, two recently established Commonwealth Marine Reserves (i.e. Murray and Nelson).

### Addressing National Research Priorities:

#### An Environmentally Sustainable Australia

- Goal 5: Sustainable use of Australia's biodiversity

### Itinerary

Departed Hobart 1600 hrs  
Monday 4 February 2008

Arrived Port Adelaide 0800 hrs  
Tuesday 26 February 2008

### > Voyage track SS02-2008

