Voyage SS10-2008

Biological oceanography of coastal cold-core eddies and of salps in the continental shelf waters off the Stockton Bight of eastern Australia.

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Contribution to Australia's national benefit:

More than 50% of Australians live beside the East Australian Current and are largely unaware of its influence on our climate, fisheries and marine tourism. The current is accelerating, warming Tasmanian waters by more than two degrees in less than a century – the fastest rate of increase in the world. The current is characterised by forming eddies – more than any other comparable current – causing variability in ocean forecasts especially off south eastern Australia. Until now there has been no study of the clockwise, coastal eddies off eastern Australia (biologically important) in comparison to around fifty studies of large, anticlockwise oceanic eddies (which are climatically important).

For more information about this feature voyage, see page 19.

As a result of this voyage:

1. We have observed stronger currents and more jelly-like zooplankton – consistent with climate change predictions. We found significantly increased abundance of salps, when compared to similar surveys 70 years ago. Salps are the fastest growing multicellular animals on the planet with rapidly sinking faeces and a comparatively large size, which play a major role in the ocean's carbon flux. Salps feed on marine bacteria, short-circuiting classic ecological models of feeding. We estimate the average abundance was up to 10 fold more than observed with an identical net during 1938-1942. This increased abundance is being seen worldwide where gelatinous zooplankton, such as salps and jellyfish, are beginning to displace other more nutritious zooplankton species such as copepods and krill.

2. We compared a nearshore and offshore eddy to assess the significance of the source waters. The nearshore water had entrained coastal water from just south of the major upwelling zone of NSW. It appeared to be enriched compared to the offshore eddy, which forms the basis of two on-going Australian Research Council funded projects. Our samples will indicate the level of enhanced production from these eddies and their influence on eastern fisheries. It is likely that with climate change the occurrence of such eddies will increase, with benefits to the fishing industry.

Addressing National Research Priorities

An Environmentally Sustainable Australia

- Goal 5: Sustainable use of Australia's biodiversity
- Goal 7: Responding to climate change and variability

Itinerary

Departed Sydney 10 October 2008
Arrived Newcastle 20 October 2008

> Voyage track SS10-2008