



Voyage SS05-2008

PULSE: Mooring-based measurement of subantarctic seasonal biogeochemical cycles affecting ocean uptake of carbon dioxide

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This voyage completed the recovery of the Test-5 version of the PULSE mooring, which had been deployed from RSV *Aurora Australis* at a test site close to Tasmania in December 2007 with support from the Australian Antarctic Science program.

The long-term goal of the PULSE mooring is to provide automated observations of surface ocean biogeochemical processes in the remote subantarctic ocean southwest of Tasmania (near 47°S, 140°E). This information is required to understand the links between surface water stratification, primary production, and ocean uptake of CO₂. These processes vary strongly on seasonal cycles and in response to weather events in ways that can not be measured from infrequent ship-based studies. The PULSE mooring is one of the several automated observing platforms being developed as part of the Integrated Marine Observing Systems Facility 3 Southern Ocean Automated Time Series Observations.

The PULSE mooring design attempts to minimise risk by using a small surface float that suspends a subsurface package of instruments from an elastic tether. The PULSE-Test-5 mooring was deployed in December 2007 and reported its position via Iridium satellite telemetry until 5 March 2008, when transmissions ceased. The recovery voyage found that the surface float had broken away, but the precise cause remains unknown. Two refined designs (5H and 5L) have been prepared for further testing in 2008-9.

As a result of this voyage:

1. We have a better understanding of the dynamics of slack-tether elastic link moorings under high wind, wave and current conditions.
2. We have achieved success with Iridium satellite telemetry of open ocean buoy data.
3. We have extended and accelerated our program of engineering development, to include two simultaneous deployments of modified designs in 2008-9.

Addressing National Research Priorities:

An Environmentally Sustainable Australia

- Goal 7: Responding to climate change and variability

Frontier Technologies for Building and Transforming Australian Industries

- Goal 4: Smart information use

Safeguarding Australia

- Goal 1: Critical infrastructure
- Goal 5: Transformational defence technologies

Itinerary

Departed Hobart 0800 hrs
Saturday 5 April 2008

Arrived Hobart 1000 hrs
Monday 7 April 2008

> Voyage track SS05-2008

