



## Voyage ss2012\_v03

### Integrated Marine Observing System (IMOS) observations for climate and carbon cycle studies southwest of Tasmania (47°S, 140°E).

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

This project lies within the national priority of An Environmentally Sustainable Australia: Responding to climate change and variability. The Southern Ocean is important to global and regional climate and carbon cycling, because of its highly energetic interactions with the atmosphere, its deep mixing, and its role in connecting all the basins in the global ocean. Direct measurements are very rare, and automated observatories are required to measure air-sea exchanges in these waters to quantify ocean control of atmospheric CO<sub>2</sub>, and physical mechanisms responsible for climate variability and change. This is because ship-based observations cannot capture the variations which occur on timescales from daily, to monthly, to annually and include strong events driven by weather.

Data from these systems are provided via the Australian Ocean Data Network and the Integrated Marine Observing System archive to Australian and international researchers. The SOTS moorings are a core component of the international OceanSITES program ([www.OceanSites.org](http://www.OceanSites.org)).

This year we focus our reporting on the synergies achieved between the moored observations achieved over the previous year and shipboard work carried out during voyage SS2012\_V03, with two examples –from air-sea heat flux, and biological carbon cycling estimated from upper ocean oxygen fluxes. As a result of this work we have determined first estimates of the annual cycle of heat flux and the annual cycle of net community production for the Subantarctic Southern Ocean. We

observed a small net ocean heat loss of -10 Wm<sup>-2</sup>, with seasonal extrema of 139 Wm<sup>-2</sup> in January and -79 Wm<sup>-2</sup> in July. Net community production, estimated from dissolved oxygen and dissolved total gas sensors, averaged 280 mg m<sup>-2</sup> day<sup>-1</sup> driven by several strong production events in spring.

#### Itinerary

Departed Hobart 0800

Thursday 12 July 2012

Arrived Hobart 0800

Wednesday 25 July 2012

#### > Voyage track ss2012\_v03

