

VOYAGE SUMMARY ss2011_v07

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

Voyage period:

22/11/2011 to 27/11/2011

Port of departure:

Hobart, Australia

Port of return:

Hobart, Australia

Responsible laboratory:

Australian Bureau of Meteorology

L6, 700 Collins Street,
Docklands VIC 3008

GPO Box 1289 Melbourne VIC 3001

Chief Scientist(s)

Dr. Eric Schulz
Bureau of Meteorology

Scientific Objectives

The overall scientific objective is to obtain frequent measurements of surface and deep ocean properties that control the transfer of heat, mass and CO₂ from the atmosphere to the upper ocean. The flux of heat and mass is a measure of the ocean-atmosphere interaction that controls climate variability and water mass formation on a range of scales. CO₂ is transported from the surface waters down to the ocean interior in the form of sinking particles. This “biological pump” drives carbon sequestration from the atmosphere, and writes the sedimentary record. The controls on its intensity are complex and involve processes that vary on daily, weekly, seasonal, and interannual timescales. Obtaining observations with the necessary frequency is not possible from ships. For this reason the NCRIS IMOS Southern Ocean Time Series Facility seeks to obtain this information using automated sensor measurements and sample collections.

This voyage will deploy the Southern Ocean Flux Station (SOFS-2) mooring to obtain in-air and in-sea measurements to better understand the exchange of heat, moisture, and gases between the ocean and atmosphere.

Voyage Objectives

and results in italics

1. Perform test CTD cast in Storm Bay
This was not performed due to change in planning prior to departure.
2. Transit to SOFS-2 mooring site
Achieved
3. Deploy SOFS-2
Achieved
4. Perform CTD cast to 1000m at SOFS-2 site (with O₂, PAR, transmissometer sensors) and sample for salinity, nutrients, alkalinity, DIC.
Achieved. In addition a shallow CTD was performed near the Pulse-8 site.
5. Obtain ship-based meteorological measurements near SOFS-2 mooring, by holding ship head-to-weather near mooring for up to 24 hours
Achieved.
6. Near SOFS-2 site, deploy two autonomous profilers
This was cancelled. There is a model type issue with the oxygen sensors not performing to specification and further investigation if being undertaken before being deployed on a future voyage.
7. Near SOFS-2, attempt recovery of ANFOG ocean glider
This was cancelled. The last known position was on the 10th November and 100Nm south of the SOFS site. Without a current position the chances of finding the glider are almost zero.

Voyage Narrative

(All times are local.)

Monday was spent loading the ship and practicing the movement of the anchor on the back deck.

The mooring float was loaded on Tuesday morning and the vessel departed 1300. Choppy conditions were encountered on the shelf as we transited at 8 past Maatsuyker Island.

Wednesday was spent in transit at around 8 knots with wind and sea from the Southwest.

We arrived at the site at 0830 on Thursday. Conditions were favourable with moderate winds (20-30kts) and seas (~3m) all from the West, and 0.5kt current to the Northeast. Set-up commenced 0830 and took 1 hour. The surface float was deployed at midday about 8.5 Nm to the East of anchor drop target. The deployment was completed at 6pm with the anchor dropped ½ mile short of target over good bathymetry in 4534m depth. The deployment went smoothly with only one minor issue with a jammed release on the final anchor deployment. This introduced up to a 20-minute delay in the deployment.

Anchor drop is: 46 46.185'S, 141 58.613'E
Provisional anchor landing is:
46 46.312'S 141 59.212'E
Provisional fall back is 795m,
or 18% of water depth

Ship-buoy meteorological comparisons, consisting of repeated slow 1-hour upwind legs approaching the buoy commenced 1850 and continued through the night.

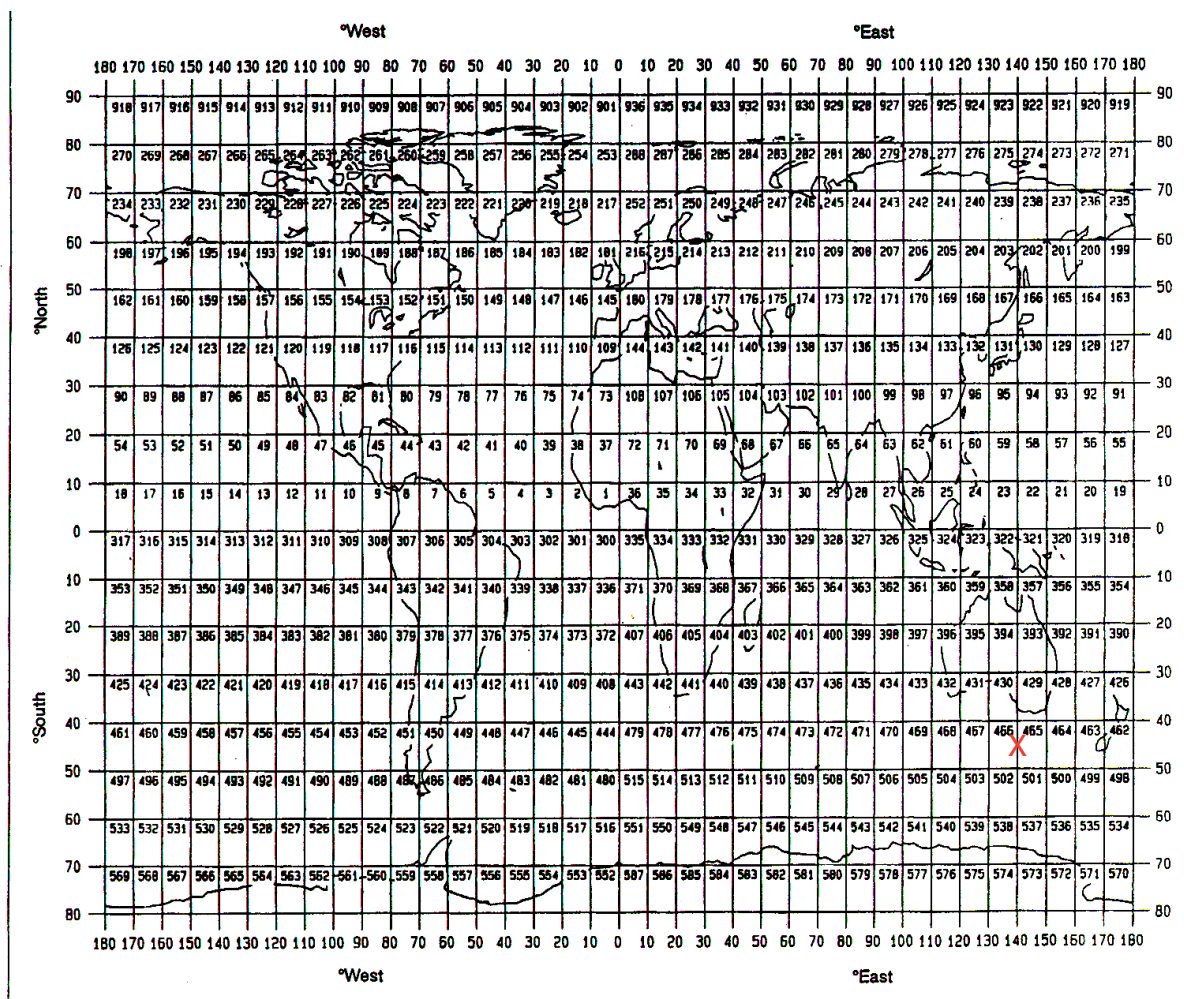
Friday morning was devoted to performing a CTD to 1000m near the SOFS-2 mooring. After lunch the SOFS-2 anchor position was triangulated, before transiting to the Pulse8 site (10Nm away) to perform a shallow 200m depth CTD. At 1730 we commenced a swath map survey for additional Pulse and SOFS sites (for future deployments). At 2300 we commenced transiting to Hobart.

Saturday was spent transiting to Hobart.

We arrived back in Hobart at 1300 on Sunday

Marsden Squares

A red "x" indicates where data was collected.



Project

Project name

Australian Bluewater Observing System
Southern Ocean Time Series

Coordinating body

Australian Integrated Marine Observing System

Principal Investigators

A. Eric Schulz, BOM-CAWCR, E.Schulz@bom.gov.au

B. Tom Trull, ACE CRC – UTAS – CMAR-CAWCR,
Tom.Trull@utas.edu.au

MOORINGS, BOTTOM MOUNTED GEAR AND DRIFTING SYSTEMS

ITEM NO	PI SEE PAGE ABOVE	APPROXIMATE POSITION						DATA TYPE ENTER CODES FROM LIST ON LAST PAGE	DESCRIPTION
		DEG	LATITUDE		LONGITUDE		E/W		
			MIN	N/S	DEG	MIN			
1	A	46	46.2	S	141	58.2	E	M02, M06, M90, H71, D01, H90, H17, H21	SOF5-2 anchored meteorological mooring with large surface tower buoy. Surface buoy moves within a 'watch circle' of 2.1 nmile and has a light that flashes every 6 seconds

SUMMARY OF MEASUREMENTS AND SAMPLES TAKEN

ITEM NO.	PI	NO	UNITS	DATA TYPE	DESCRIPTION
1	B	1	cast	H10	1 CTD cast to 1000m, sampled at 12 depths for analyses of nutrients, salinity, DIC, alkalinity
2	A	700	miles	H71	Continuous monitoring of underway seawater supply for temperature, salinity for study of physical heat and mass flux
3	A	700	miles	M02	Continuous monitoring of incoming short and long-wave radiation for heat fluxes
4	A	700	miles	M06	Continuous monitoring of routine meteorological observations (wind, ait temperature, humidity and pressure) for heat, mass and momentum fluxes
5	A	700	miles	M90	Continuous monitoring of precipitation for mass fluxes

CURATION REPORT

ITEM NO.	DESCRIPTION
1	Water samples collected from the CTD and underway system are returned to CSIRO Marine and Atmospheric Research for gas and salinity measurements and then discarded following quarantine protocols.

Personnel list

Scientific Participants

Eric Schulz	BOM	Chief Scientist
Mark Rosenberg	UTAS	Moorings, CTD
Dave Cherry	CMAR	Moorings
Peter Jansen	UTAS	Moorings, electronics
Drew Mills	CMAR	MNF Voyage Manager
Brett Muir	CMAR	MNF Electronics Support
Hiski Kippo	CMAR	MNF Computing Support
Tara Martin	CMAR	MNF Swath Mapping Support
Rick Smith	CMAR	MNF Swath Mapping Support
Peter Hughes	CMAR	MNF Hydrochemistry Support

Marine Crew

Name	Role
Michael Watson	Master
John Boyes	1st Mate
Simon Smeaton	2nd Mate
Fred Rostrom	Chief Engineer
Mike Yorke-Barber	1st Engineer
Graeme Perkins	2nd Engineer
Stuart Mills	Chief Cook
Mick O'Connor	Chief Steward
Aaron Buckleton	2nd Cook
Tony Hearne	CIR
Rod Langham	Integrated Rating
Nathan Arahanga	Integrated Rating
Gareth Gunn	Integrated Rating
Peter Taylor	Integrated Rating

Acknowledgements

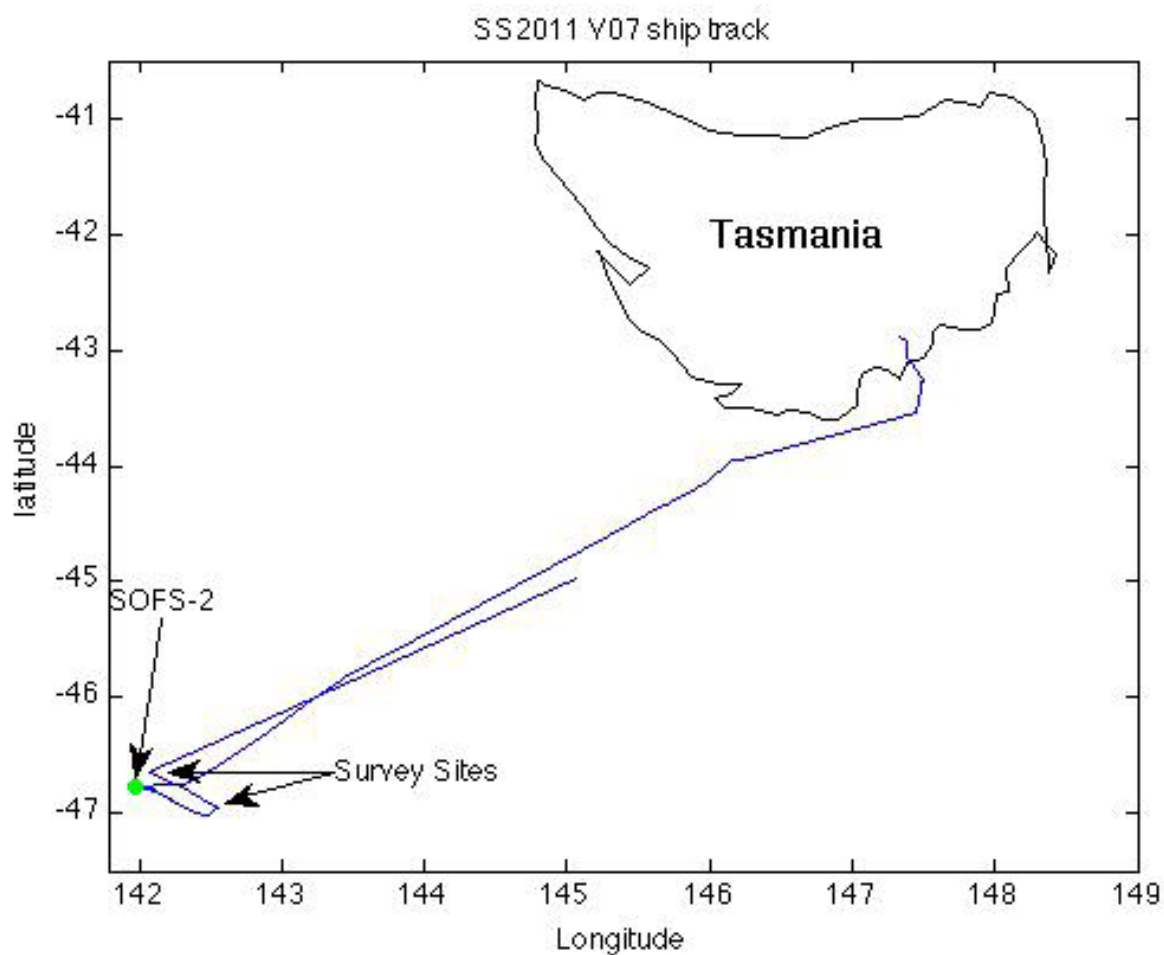
Thanks to the Master, Crew, MNF staff, and the onboard Science Team the voyage went very smoothly which is a testament to the skill and professionalism of all aboard.



Eric Schulz
Chief Scientist

26 November 2011

Ship Track for ss2011_v07



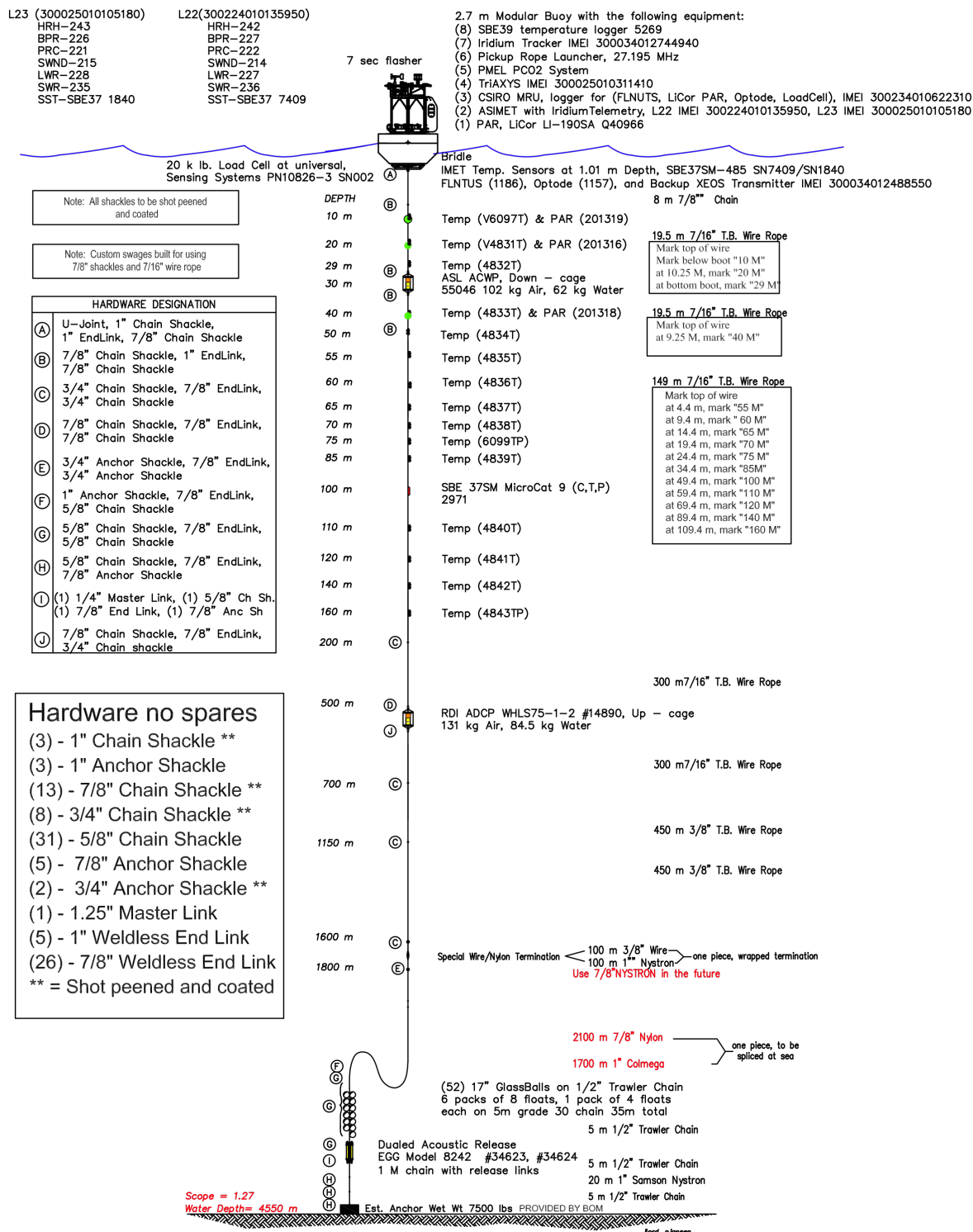
General Ocean Area(S)

Southern Ocean – Indian Sector

Specific Areas

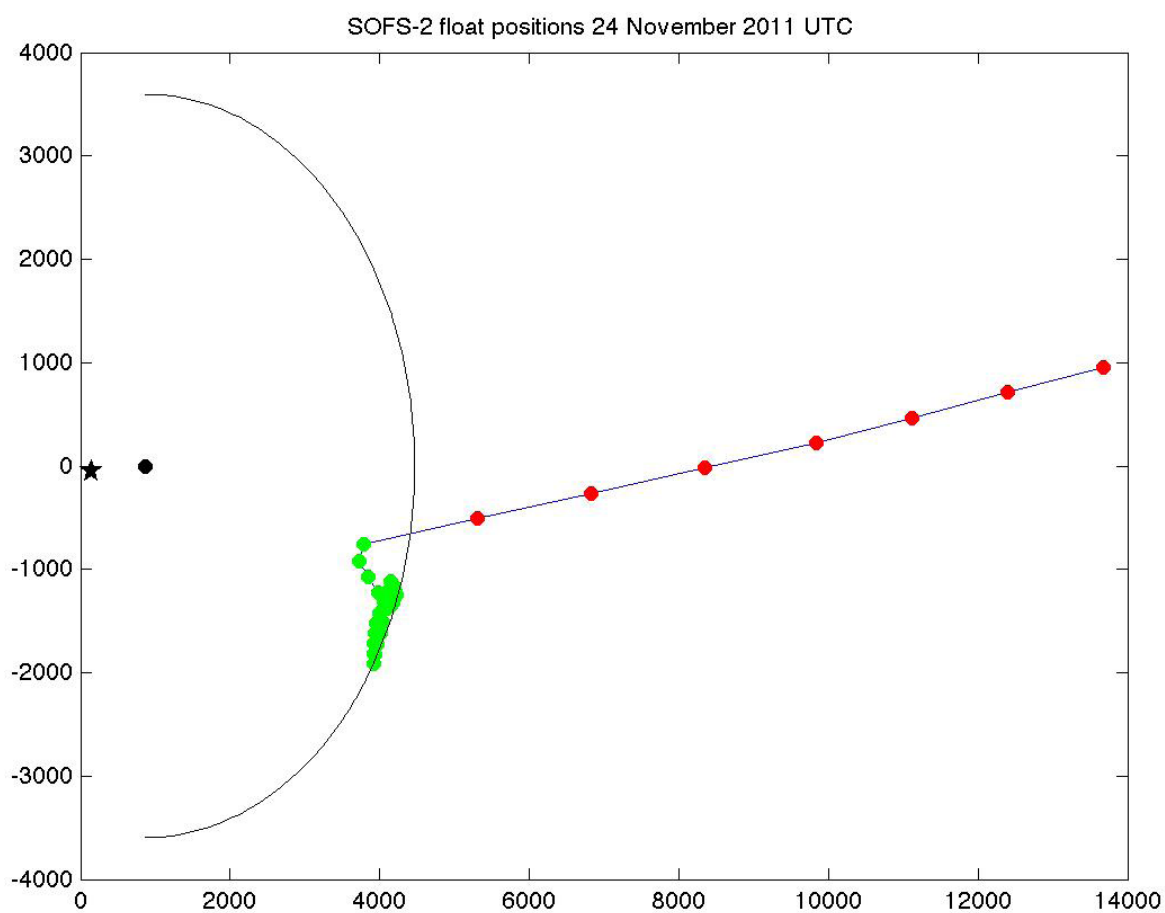
Subantarctic Zone southwest of Tasmania

SOFS-2 Mooring diagram



Southern Ocean Flux Station #2

V4 2011-11-14



SOFS-2 buoy positions from 0200 24 November – 0800 25 November 2011 UTC. Circles indicate surface float position relative to anchor drop position. Red is while being deployed. Green is after anchor dropped. Star is anchor drop position. The arc is the expected buoy watch circle with centre at the black dot. The centre position was selected to match the buoy locations