

**MARINE  
NATIONAL FACILITY**

**voyageplan**  
ss2011\_v03

**2011** *RV Southern Surveyor*  
**program**

**Integrated Marine Observing System (IMOS) Facility 3.  
Southern Ocean Time Series (SOTS) moorings for  
climate and carbon cycle studies southwest of Tasmania  
(47°S, 140°E).**

**Itinerary**

Mobilisation Hobart 0800hrs, Monday 1 August, 2011,  
(or earlier during port period if possible)

Depart Hobart( as soon as possible following loading, and within constraints  
of crew and weather) preferably 1600hrs Monday 1 August 2011.

Arrive Hobart 1600 Wednesday 10 August, 2011

Demobilise Hobart Thursday 11 August, 2011.

**Principal Investigators**

Professor Tom Trull (Chief Scientist)

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## Scientific Objectives

The overall scientific objective is to obtain frequent measurements of surface and deep ocean properties that control the transfer of CO<sub>2</sub> from the atmosphere to the upper ocean, and then onwards 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:

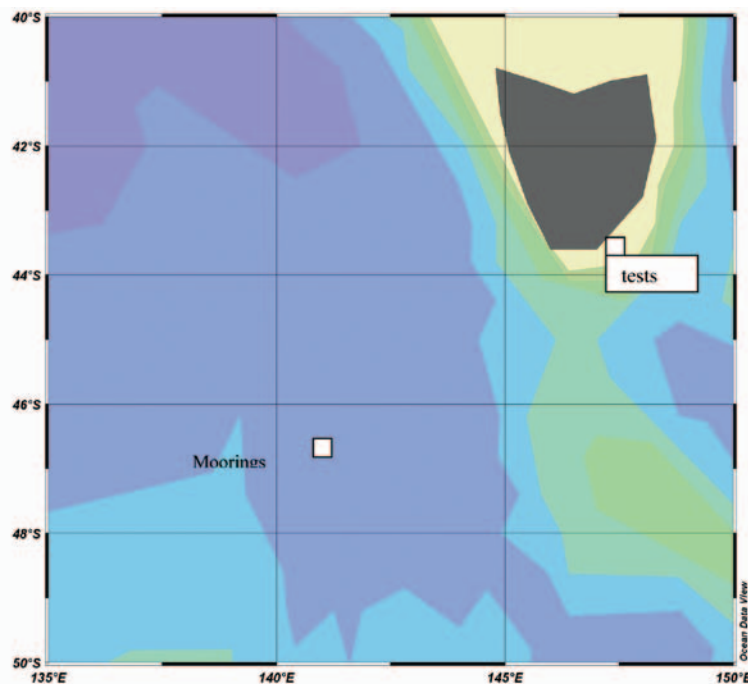
- i) deploy the Pulse-8 mooring to make measurements of temperature, salinity, mixed layer depth, photosynthetically available radiation, oxygen, total dissolved gases, phytoplankton fluorescence and backscatter, and dissolved nitrate. The Pulse-8 mooring will also collect 24 paired water samples, approximately weekly, for later measurement of dissolved nitrate, silicate, inorganic carbon, and total alkalinity.
- ii) deploy the SAZ-14 deep ocean sediment trap mooring that collects samples to quantify the transfer of particulate carbon and other materials to the ocean interior
- iii) recover the SAZ-13
- iv) carry out underway and CTD based measurements of water column stratification for comparison to the moored instruments.
- v) deploy autonomous profiling floats and an ocean glider to obtain spatially distributed measurements of temperature, salinity, oxygen, phytoplankton fluorescence and particle backscatter in the vicinity of the moorings.

## Voyage Objectives

Sequential and priority-ranked list of tasks to achieve the overall objectives:

1. In Port:
  - test A-frames and winch hydraulics
  - spool on SAZ-14 mooring
  - spool on Pulse-8 mooring, and set up trawl deck for mooring work
  - On mobilisation day, have crew trained in moving package across deck using A - frame and net drum winch, 200 mm above deck
  - Load SAZ mooring service van.
  - Load 2 anchors, cage pallets and Mooring gear
2. On first day in Storm Bay or off shelf at a convenient site and time:
  - do test CTD cast and lower SAZ-14 acoustic releases for in-water test,
3. Deploy Pulse-8 at this site, triangulate
4. Deploy SAZ-14 mooring, triangulate final position
5. Recover SAZ-13 mooring
6. Do two CTD casts to 1000m (with O<sub>2</sub>, PAR, transmissometer sensors) and sample for salinity, nutrients, alkalinity, DIC. (one near Pulse-7, one near SAZ-12).
7. Deploy one or two ARGO floats
8. Deploy ANFOG ocean glider
9. Sample underway clean seawater supply – using transmissometer set-up in Controlled Temperature Lab, and POC filtration.

## Voyage track



## Locations

Target Deployment Location for Pulse-8  
Attention: Pulse-8 surface buoy moves in a 'watch-circle' of ~1.1 mile radius  
46° 55.8'S  
142° 15.0'E  
4300 m bottom depth

Deployment of SAZ-14 at  
46° 47.4'S 141° 49.5'E  
Depth at the target is 4530 m

Recovery of SAZ-13 (bottom anchor triangulated location)  
46° 49.824'S  
141° 38.981'E  
4599 m bottom depth

## Time Estimates

Transit times at 11 knots (total 3 days)

	Decimal Latitude	Decimal Longitude	Distance (nm)	Total Distance (nm)	Steaming time (hrs)	Total Steam (hrs)
Hobart	42.87	147.35				
Storm Bay	43.33	147.350	27.62	27.62	2.51	2.51
Moorings	46.80	141.884	311.50	339.12	28.32	30.83
Hobart	42.87	147.35	352.44	748.98	32.04	68.09

## Tentative Calendar (highly weather dependent)

2011-08-01: 0900 Meeting with Master, Voyage Manager and Chief Scientist.

Leave Hobart at 16:00, do CTD and acoustic release test casts south of Hobart when convenient

2011-08-02: transit to Pulse 8 site

2011-08-03: deploy Pulse-8, triangulate, CTD to 1000m (or proceed directly to deployment SAZ-14 depending on weather outlook)

2011-08-04: Deploy SAZ-14, and triangulate

2011-08-05: acoustic communication with SAZ-13 mooring at dawn, release, and recovery after breakfast and through day; CTD to 1000m late in day or early evening,

2011-08-06: CTD to 1000m if not yet completed, shipboard meteorology measurements, deploy ARGO floats and glider

2011-08-07: Weather day

2011-08-08,09: transit

2011-08-10: arrive Hobart,

2011-08-11: unload, unspool SAZ mooring wire

## Southern Surveyor Equipment

1. Stern-ramp cover fitted.
2. Rosette with 12 Niskin bottles and CTD with working O<sub>2</sub>, PAR, and fitted with MNF or user-supplied transmissometer.
3. Working echosounder and recorder
4. Connections for hull-mounted hydrophone too acoustic release deck unit
5. Deployment and recovery will require operating with the trawl ramp in fill, and without pound boards.
6. Operations will require the working with the ramp gates open.

## User Equipment

1. ~20 cage pallets on trawl deck (and O1 deck if required) for Pulse-8 & SAZ14 mooring components
2. ½ height container on O1 deck for SAZ sediment traps
3. 2x acoustic release deck units and 2x hand-held hydrophones
4. Grappling canon and other mooring recovery equipment
5. RDF set for finding SAZ13 fitted to bridge.

## Special Requests

1. In port, spool on SAZ 14 and Pulse-8 mooring starting with non-elastic working line to net drum. Install wide check block on stern A-frame. Test all hydraulics.
2. In port, install mast with antennas on Monkey Island for RDF and ARGOS communication with SAZ-13/14 mooring
3. Closely coordinate the CTD casts with ship operations – specifically to avoid releasing grey water or other wastes at this time.

## Personnel List

Person	Employer	Role	Cabin
1. Tom Trull	CMAR-UTAS-ACE	Chief Scientist	Chief Scientist
2. Stephen Bray	ACE CRC	Moorings, sediment traps	
3. Mark Rosenberg	ACE CRC	Moorings, CTD, glider, floats	
4. Peter Jansen	ACE CRC	Moorings, electronics	
5. Eric Schulz	BOM	Moorings, meteorology	
6. David Cherry	CMAR	Moorings	
7. Rex Keen	CSIRO L&W	Ocean Colour Cal.	
8. Bruce Barker	CMAR	MNF Voyage manager	
9. Rod Palmer	CMAR	MNF Electronics support	
10. Anoosh Sarraf.	CMAR	MNF Computing support	
11. Tara Martin	CMAR	MNF Swath Support	
12 Sascha Frydman	CMAR	MNF Swath Support Trainee	

- all participants will be on watch on an as-needed basis.
- cabin assignments are tentative, subject to discussions with MNF and ship staff.

This voyage plan is in accordance with the directions of the Marine National Facility Steering Committee for the Research Vessel *Southern Surveyor*.