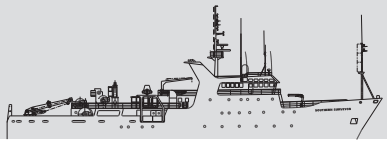

MARINE
NATIONAL FACILITY

2012 program

RV Southern Surveyor

voyageplan
ss2012_v03

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

Itinerary

Loading Hobart 0800hrs,
Wednesday 11 July, 2012

Depart as soon as possible within
constraints of crew and weather.

Arrive Hobart 1000hrs,
Wednesday 27 July, 2012 and demobilise

Principal Investigators

Professor Tom Trull (Chief Scientist)
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CSIRO

Scientific Objectives

The overall scientific objective is to obtain frequent measurements of surface and deep ocean properties that control the transfer of CO_2 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:

1. deploy the SOFS-3 mooring to make meteorological and upper ocean measurements of physical and chemical properties important to air-sea exchange of heat, water, momentum, and dissolved gases (oxygen and CO_2).
2. deploy the Pulse-9 mooring to make upper ocean measurements of properties that control carbon uptake and export to the ocean interior, including temperature, salinity, mixed layer depth, light, oxygen, total dissolved gases, phytoplankton fluorescence, particle backscatter, and dissolved nitrate, and collect 24 paired water samples later study of nutrients and phytoplankton identification.
3. deploy the SAZ-15 deep ocean sediment trap mooring that collects samples in the deep sea (below 1000m) to quantify the transfer of particulate carbon and other materials to the ocean interior.
4. recover the SAZ-14 mooring
5. recover the Pulse-8 mooring
6. recover the SOFS-2 mooring
7. carry out underway and CTD measurements for comparison to the moored instruments.
8. undertake swath mapping of the mooring site to inform ongoing deployments
9. deploy a Continuous Plankton Recorder (CPR) during the out and back transit legs, and a drop net at the mooring site to 100m depth for comparison to the CPR results.
10. deploy the CSIRO DAR011 SST radiometer for validation of the VIIRS satellite data
11. possibly deploy autonomous profiling floats and an ocean glider to obtain spatially distributed measurements of T,S, O_2, phytoplankton fluorescence and particle backscatter in the vicinity of the moorings, depending on their availability.

Voyage Objectives

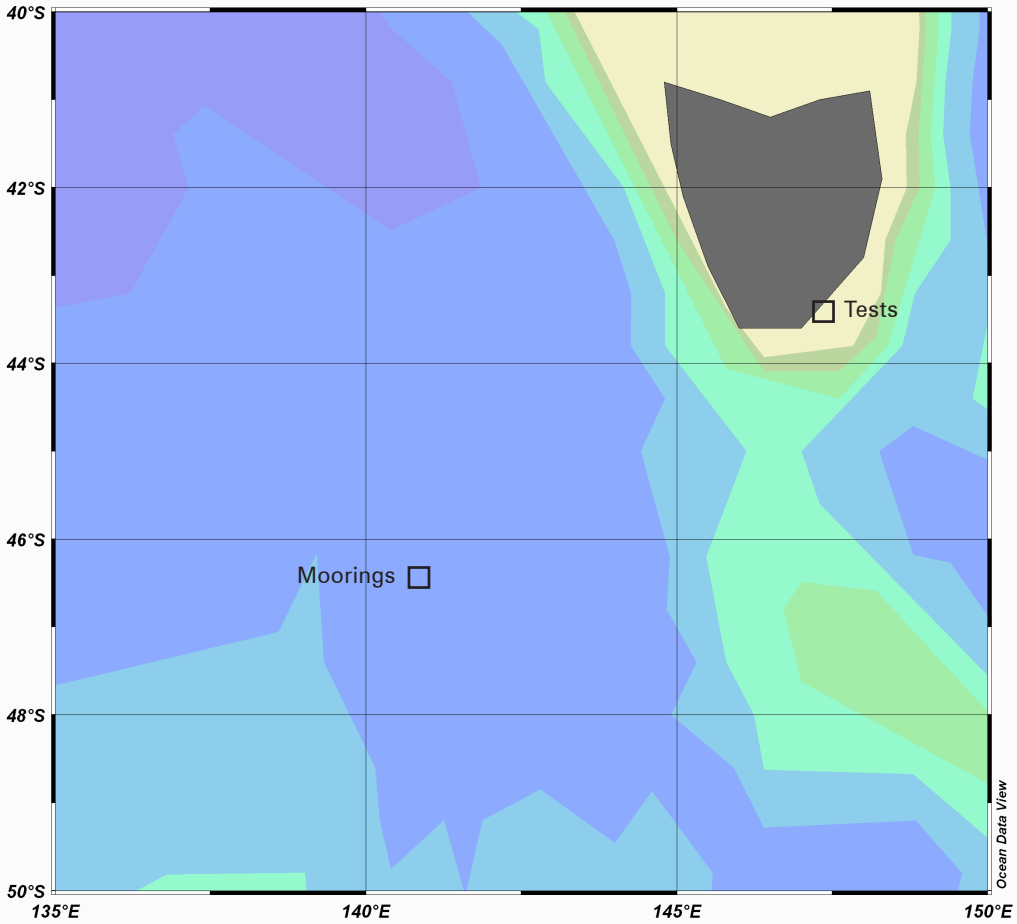
Priority-ranked list of tasks to achieve the overall objectives:

1. In Port:

   test A-frames and winch hydraulics
   spool on SAZ-15 mooring
   spool on Pulse-9 mooring
   spool on SOFS-3 mooring
   mount half-height open container on mezzanine deck for equipment storage
   load mooring equipment in half-height, additional cage pallets, and on deck
   load 3 anchors on deck
   have crew practice moving anchors 200 mm above deck using dual-lift
   Mount the Radio Direction Finder antenna and potentially the DAR radiometer on the monkey island

2. On first day in Storm Bay do CTD and in-water acoustic release tests
3. Transit to SOTS mooring area, towing CPR
4. Deploy SOFS-3, triangulate
5. Deploy Pulse-9, triangulate
6. Deploy SAZ-15, triangulate
7. Recover SAZ-14
8. Recover Pulse-8
9. Recover SOFS-2
10. Do two CTD casts to 1000m (with O_2, PAR, transmissometer sensors) and sample for salinity, nutrients, alkalinity, DIC. (one near Pulse-9, one near SAZ-15). Run seawater through CTD O_2 sensor and Pulse O_2 sensors for direct comparison. Record CTD fluorometer and Pulse fluorometer signals for direct comparison. Collect shipboard meteorology data near SOFS mooring. Deploy the drop net to 100m, twice.
11. Possibly deploy one or two ARGO-BGC floats, if available
12. Possibly deploy ANFOG ocean glider, if available
13. Return to Hobart, towing CPR

Voyage Track



Deployment Locations (Lat, Lon, Bottom Depth):

SOFS-3	46° 39.865'S	142° 03.767'E	4650 m
Pulse-9	46° 51.303'S	142° 22.328'E	4350 m
SAZ-15	46° 50'S	141° 39'E	4600 m

Recovery Locations (Lat, Lon, Bottom Depth):

SAZ-14	46° 47.623	141° 48.962	4489 m
Pulse-8	46° 55.773'S	142° 12.880'E	4399 m
SOFS-2	46° 46.312'S	141° 59.212'E	4570 m

Time Estimates

Transit times at 11 knots (total 3 days)

	Decimal Latitiude	Decimal Longitude	Distance (nm)	Total Distance (nm)	Steaming time (hrs)	Total Steam (hrs)
Hobart	42.87	147.350				
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	147.350	352.44	748.98	32.04	68.09

Tentative Calendar (highly weather dependent)

2012-07-12: 0900 Meeting with Master, Voyage Manager and Chief Scientist. Leave Hobart at 16:00, do CTD and acoustic release test casts south of Hobart

2012-07-13: transit to SOTS mooring site towing CPR, do underway sensor comparisons

2012-07-14: weather day

2012-07-15: deploy SOFS-3, triangulate

2012-07-16: deploy Pulse-9, triangulate

2012-07-16: deploy SAZ-15, triangulate

2012-07-17: swath mapping of mooring sites and mooring team fatigue management day

2012-07-18: recover SAZ-14

2012-07-19: recover Pulse-8

2012-07-20: spool off SAZ-14 and Pulse-8

2012-07-21: recover SOFS-2

2012-07-22: CTD(s) to 1000m, shipboard meteorology measurements, deploy drop net

2012-07-23: CTD(s) to 1000m, sensor comparisons, possibly deploy floats and glider

2012-07-24: weather day

2012-07-25: transit to Hobart, towing CPR

2012-07-26: arrive Hobart, demobilise

Southern Surveyor Equipment

1. stern-ramp cover fitted.
2. rosette with 12 Niskin bottles and CTD with MNF O_2, PAR, fluorometer, and transmissometer.
3. working echosounder and recorder
4. connections for hull-mounted hydrophone to acoustic release deck unit
5. Deployments and recoveries will require operating with the trawl ramp in fill, without pound boards, and with the ramp gates open.

User Equipment

1. ~20 cage pallets on trawl deck (and O1 deck if required) of mooring components
2. ½ height container on O1 deck for mooring components
3. SAZ Sediment traps lashed to exterior of half-height on 01 deck
4. 2x acoustic release deck units and 2x hand-held hydrophones
5. Grappling canon and other mooring recovery equipment
6. RDF set for finding SAZ14 fitted to bridge.

Special Requests

1. In port, if possible have access ahead of voyage for several days to spool on SAZ 15, Pulse-9, and SOFS-3 moorings to net drum and coring winches. Use non-elastic working line on net drum, and separate moorings with planks and jackstraps. Install wide cheek 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-14/15 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	Watch	Cabin
Tom Trull	CMAR-UTAS-ACE	Chief Scientist	*	Chief Scientist
Stephen Bray	ACE CRC	Moorings, sediment traps		
Mark Rosenberg	ACE CRC	Moorings, CTD, glider, floats		
Peter Jansen	ACE CRC	Moorings, electronics		
Eric Schulz	BOM	Moorings, meteorology		
David Cherry	CMAR	Moorings		
James LaDuke	CMAR	Moorings		
Ben Weeding	UTAS	Oxygen sensors		
Jaqui Doran	UWA	CTDs/sensors/traps		
Hiski Kippo	CMAR	MNF Computing support		
Brett Muir	CMAR	MNF Electronics support		
Bruce Barker	CMAR	Voyage manager		
Sascha Frydman	CMAR	MNF Swath Mapping support		
Sue Reynolds	CMAR	MNF Hydrochemistry Support		
possible TBA Student	UTAS	Sensor records		

- 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.