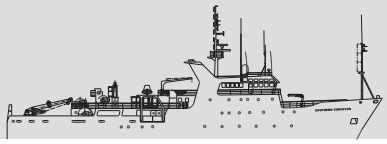

MARINE
NATIONAL FACILITY

2010 program

RV *Southern Surveyor*

voyageplan
SS02-2010

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

Begin loading equipment Hobart 0800hrs, Monday 15 March, 2010, or earlier during port period if possible.

Depart Hobart as soon as possible following loading, and within constraints of crew and weather. Arrive Hobart 0800hrs, Wednesday 24 March, 2010 and demobilise

Principal Investigator

Associate Professor Tom Trull (Chief Scientist) CMAR-UTAS-ACECRC PB 80, Hobart, 7001
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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 deploy for the first time the Southern Ocean Flux Station (SOFS-1) mooring to obtain in-air and in-sea measurements to better understand the exchange of heat, moisture, and gases between the ocean and atmosphere. It will also recover the Pulse-6 mooring that has been making measurements of temperature, salinity, mixed layer depth, photosynthetically available radiation, oxygen, total dissolved gases, and phytoplankton fluorescence and backscatter. The Pulse-6 mooring also collects 24 paired water samples, approximately weekly, for later measurement of dissolved nitrate, silicate, inorganic carbon, and total alkalinity.

Voyage Objectives

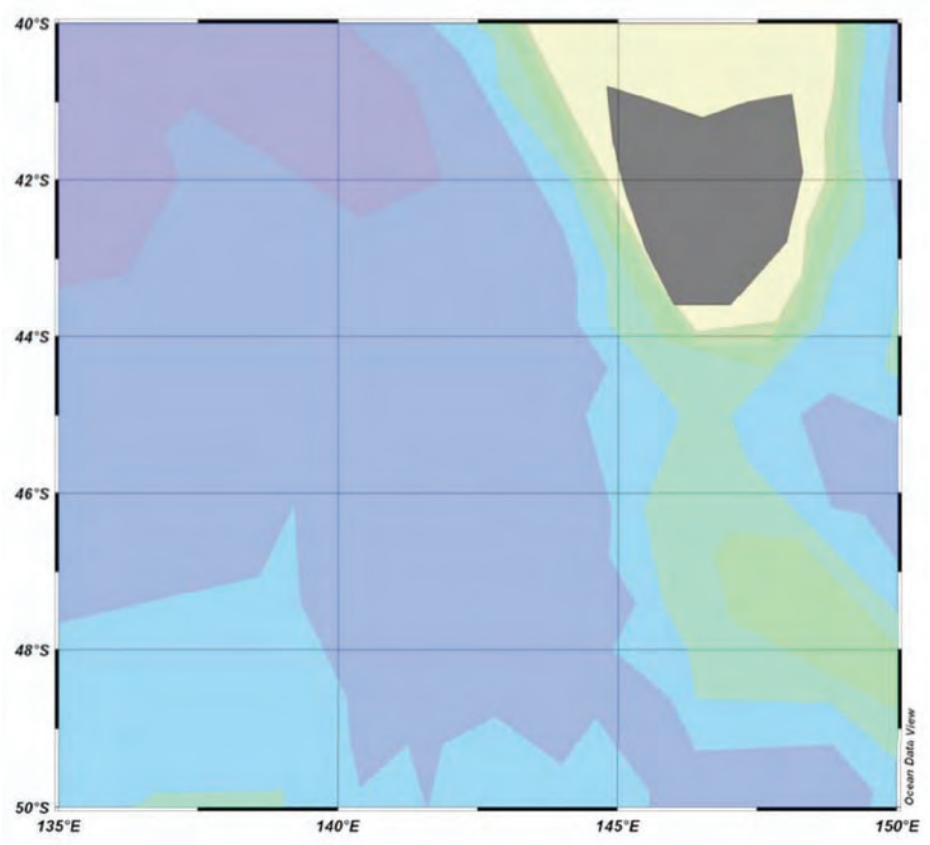
Sequential list of tasks to achieve the overall objectives:

1. test A-frame and winch hydraulics in port
2. do test CTD cast, and lower acoustic releases for in-water test, in Storm Bay
3. transit to SOFS-1 deployment site
4. deploy SOFS-1 mooring, triangulate final position
5. obtain ship-based meteorological measurements near SOFS-1 mooring, by holding ship head-to- weather near mooring for up to 24 hours (schedule permitting)
6. do CTD cast to 1000m at SOFS-1 site (with O2, PAR, transmissometer sensors) and sample for salinity, nutrients, alkalinity, DIC.
7. transit to Pulse-6 mooring site
8. recover Pulse-6 mooring
9. do CTD cast to 1000m at Pulse-6 site (with O2, PAR, transmissometer sensors) and sample for salinity, nutrients, alkalinity, DIC.
10. near SOFS-1 or Pulse-6 site, deploy one or two ARGO floats
11. sample underway clean seawater supply
12. Piggy-back project from C.I. - near SOFS-1 or Pulse 6 site, deploy ANFOG ocean glider to obtain similar measurements to those made by Pulse mooring, to provide spatial context for moored observations. Tentative plan is to deploy from crane or stern A-frame using release hook. Little (~1 hr) ship-time and no additional personnel required.

Priority Ranking:

1. Deploy SOFS-1 mooring
2. Recover Pulse-6 mooring
3. Deploy floats and glider
4. CTD casts
5. underway measurements

Voyage Track



Locations

Deployment of SOFS-1
46° 47.925' S
141° 53.027' E
4550m bottom depth

Recovery of Pulse-6
46° 19.344' S
140° 40.653' E
4267m bottom depth

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	147.35				
Storm Bay	43.33	147.350	27.62	27.62	2.51	2.51
SOFS-1	46.80	141.884	311.50	339.12	28.32	30.83
Pulse-6	46.3224	140.67755	57.43	396.54	5.22	36.05
Hobart	42.87	147.35	352.44	748.98	32.04	68.09

Work time estimates (total 2 days)

1. Deploy SOFS-1 + triangulate: . . . . . 12+4 hours
2. Communicate with and recover Pulse-6 . . . . . .4+12 hours of daylight
3. Deploy floats and glider . . . . . .4 hours
4. Two CTD casts to 1000m + 1 test cast . . . . . 8+2 hours
5. Lower acoustic releases to test . . . . . .2 hours

Tentative Calendar (highly weather dependent, with earlier start preferred if possible)

Day 1: leave Hobart at 08:00 for CTD test (2 hours) in Storm Bay, transit overnight and through next day to SOFS-1 Site.

Day 2: at 11 knots, arrive at SOFS-1 site at 21:00 at 11 knots, but not until 10:00 on Day 3 at 8 knots General plan is to target mooring deployment after breakfast on day 3., do CTD if arrive well before then.

Day 3: deploy SOFS-1, shipboard meteorology measurements, CTD to 1000m, deploy float and/or glider; slow overnight transit to Pulse-6 site while team rests.

Day 4: acoustic communication with mooring at dawn, release, and recovery after breakfast and through day; CTD to 1000m late in day or early evening, deploy float and/or glider; overnight and next day transit to Hobart

Day 5: transiting to Hobart

Day 6. arrive Hobart

Southern Surveyor Equipment

1. stern-ramp cover fitted.

2. rosette with 12 Niskin bottles and CTD with working O2, PAR, and fitted with MNF or user- supplied transmissometer.

4. working echosounder and recorder

5. MNF/CMAR to supply two working acoustic deck units and two working hydrophones

User Equipment (draft plan for on-deck storage is included as appendix to this document)

1. ~10 cage pallets on trawl deck (and O1 deck if required) for storage of mooring components for

SOFS-1 before deployment and Pulse-6 after recovery.

2. SOFS-1 anchor – tripod-style, 3.5 tonne, and possibly a spare, both on trawl deck within lifting range of A-frame

3. SOFS-1 surface buoy, 4.3m high, 2.5 tonne, stored on starboard trawl deck in position ready for lifting overboard with crane, with mooring wire pre-led around and through stern A-frame.

Special Requests

1. In port, spool on as much of the SOFS-1 mooring as possible and install giant deck cleats and H- cleats on trawl deck, and wide check block on stern A-frame. Test all hydraulics.

2. In port, install antenna on monkey island for GONIO communication with Pulse-6

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	Scientist 10/11
3. Mark Rosenberg	ACE CRC	moorings and CTD	Scientist 8/9
4. Dan McLaughlin	CMAR	moorings	Scientist 6/7
5. Eric Schulz	BOM	moorings	Scientist 4/5
6. Jeff Lord	WHOI	moorings	Scientist 2/3
7. TBA-1	ACE-UTAS	General assistance	Scientist 1
8. Lisa Woodward	CMAR	MNF Voyage Manager	Crew/Sci 4
9. Anoosh Sarraf	CMAR	MNF Computing Support	Crew/Sci 3
10. Karl Forcey	CMAR	MNF Electronics Support	Crew/Sci 2

- 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.

Thomas W. Trull
Chief Scientist
9 Dec 2009

SOFFTS deck plan ...version 1