

VOYAGE PLAN ss2013_t01

Oceanographic Methods training unit

(part of the Master of Marine and Antarctic Science degree program- IMAS, University of Tasmania)

Itinerary

Depart Sydney 0800hrs,
Wednesday 27 February 2013

Arrive Hobart 1100hrs,
Sunday 3 March 2013

Principal Investigators

Dr Zanna Chase (Chief Scientist)

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Scientific Objectives

This voyage will provide students with experience at sea and training in standard methods in chemical and biological oceanography

The main objectives are to have students (after completing this voyage) able to:

- ♦ plan a scientific voyage at sea
- ♦ describe how different scientific instruments work, their area of use, limitations, and nature of collected data
- ♦ analyze, interpret and present data from a subset of oceanic instrumentation
- ♦ write a scientific report
- ♦ understand the working routines onboard a research vessel such as the Southern Surveyor

Voyage Objectives

The primary objective of the voyage is to expose students to oceanographic methods at sea, and to train them in the collection, analysis and interpretation of standard oceanographic data. The primary focus is methods of chemical and biological oceanography.

Scientific objectives include:

- ♦ Identification of the biological and chemical characteristics of eddies and different water masses along the southern extension of the EAC.
- ♦ Using paired XBT-CTD deployments to determine XBT fall rates for improved accuracy, as part of an ongoing CSIRO project
- ♦ Collecting carbon chemistry and nutrient data from a depth transect near the Maria Island national reference station in order to place the mooring data into a regional context
- ♦ Deploying the continuous plankton recorder to collect information on zooplankton abundance and diversity
- ♦ Deploying 4 ARGO floats

We will also be conducting a number of comparative studies of different analytical methods, for example:

- ♦ Discrete nutrient analyses and UV nitrate (ISUS)
- ♦ CPR colour index and extracted chlorophyll
- ♦ In-situ fluorescence and extracted chlorophyll

Voyage track

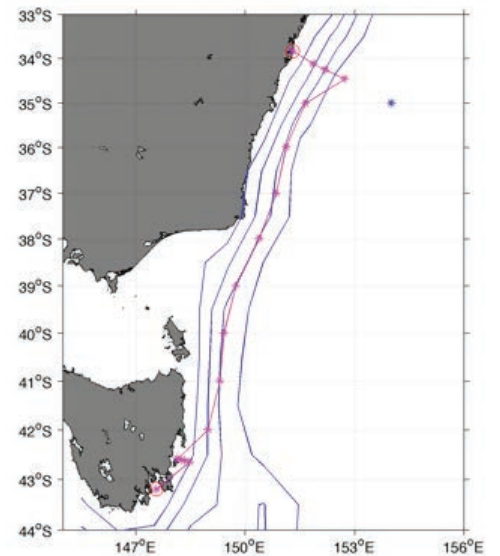


Figure 1: Proposed voyage track. Exact station locations will be determined based on altimetry data immediately prior to the voyage

Time Estimates

Our proposed voyage track (Figure 1) will see us head offshore from Sydney towards a warm core eddy (blue dot in Fig 1). We will then follow the 3000 m contour towards Hobart, with a station roughly every degree latitude. We will conduct a cross-shelf transect passing through the Maria Island mooring site. Total voyage time is 98 hours, with 33 hours 'extra' on top of the transit time, assuming 10 knots. We anticipate most stations will take 3.5 hours to complete (to 1000 m), and plan to visit 15 stations along the transit, including the Maria Island transect. The Maria Island transect is a priority, so if time is short stations to the north will be cut.

27/02/13: 3 stations @ ~ 11:30, 15:30 and 21:00. Toolboxes and science meetings completed prior to first station. CTD operation and sampling instruction; net tow instruction and zooplankton ID

28/02/13: 3 stations @ ~ 5:30, 13:30 and 22:00. Chlorophyll extraction instruction (2 sessions); crew session on knots?

01/03/13: 3 stations @ ~ 6:00, 15:00 and 13:00. Swath mapping and ecosounder instruction (2 sessions each);

02/03/13: 4 stations @ ~ 7:00, 15:30, 22:30 and 23:30. Nutrient analysis instruction (2 sessions); navigation session with crew?

03/03/13: 2 stations @ ~ 1:00 and 2:00. Steam to Hobart

Each station will consist of a CTD, followed by a net tow. Most CTD casts will be to 1000m (the depth tolerance of the ISUS) but we would like to do a few deep casts if time permits.

At most stations we will conduct XBT/CTD comparison tests. This will consist of launching 3 XBTs while the CTD is in the water at the surface, and then 3 XBTs while the CTD is descending.

We will deploy 4 Argo floats on the voyage, at roughly 34.25, 35.25, 36.25 and 37.25 °S.

We will be deploying the CPR, and bringing it on deck at each station.

During underway transit students will sample the uncontaminated seawater stream at regular intervals (~ every quarter degree of latitude) for chlorophyll and nutrient samples.

During the voyage we will meet with the students as a group mid morning for lecture and discussion, and will rotate the students through a number of instructional 'stations' with the lecturers and with MNF staff, including hydrochemistry, swath mapping, ecosounder and crew members if they are interested. Students will also spend time analysing and plotting data.

Nutrient sample budget:

145 from CTDs (max of 12 depths per station)
24 from underway
= 169 total

Chlorophyll sample budget:

115 from CTD (only upper 400m at most)
24 from underway
= 139 total

Standard depths (more may be added in the upper water column if features are observed in CTD trace):

5, 20, 50, 75, 100, 150, 200, 300, 400, 600, 800, 1000

We anticipate splitting the students into 2 groups, one working 5:00 - 13:00, and the other 13:00 - 23:00

Southern Surveyor Equipment

- ◆ Underway thermosalinograph and fluorometer
- ◆ MNF hydrochemistry support staff to provide analysis of: Salinity, Oxygen, Nitrate, Silicate, Phosphate and Nitrite
- ◆ -20C freezer
- ◆ CTD (Seabird SBE 911 plus) + Dissolved oxygen sensor, PAR, fluorometer, transmissometer and ISUS nitrate sensor
- ◆ Rosette 24 bottles up to 10 litres
- ◆ underway pCO2 system if available
- ◆ Simrad EK 500 sounder (38 and 120 KHz)
- ◆ Simrad EA 500 sounder (12 kHz)
- ◆ ADCP
- ◆ small ring net (300 um)
- ◆ XBTs
- ◆ dissecting microscope

User Equipment

- ◆ Filtration apparatus, including vacuum pump
- ◆ 1 light microscope
- ◆ Bench-top Turner fluorometer for discrete chlorophyll analysis

Personnel List

Dr Zanna Chase	IMAS, University of Tasmania	Chief Scientist
Dr Patti Virtue	IMAS	PI
Tamara Jane Bartholomew	IMAS	Masters Student
Cassandra Price	IMAS	Masters Student
Stacy Deppele	IMAS	Masters Student
Robert Polmear	IMAS	Masters Student
Emily Panietz	IMAS	Masters Student
Sara Keltie	IMAS	Masters Student
Thomas Coad	IMAS	Masters Student
Russell Ayers	IMAS	Masters Student
Amelia Travers	IMAS	Masters Student
Dave Terhell	CMAR	MNF Voyage Manager/Hydrochemistry Support
Jeff Cordell	CMAR	MNF Electronics Support
Pamela Brodie	CMAR	MNF Computing Support
Rick Smith	CMAR	MNF Swath / TOPAS Support

As per AMSA requirements for additional berths on Southern Surveyor, the following personnel are designated as System Support Technicians and are required to carry their original AMSA medical and AMSA Certificate of Safety Training on the voyage:

Name	AMSA Certificate of Safety Training No.
Dave Terhell	ASO2843
Jeff Cordell	ASO2398
Pamela Brodie	ASO2447
Rick Smith	N/A

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

Dr Zanna Chase
Chief Scientist