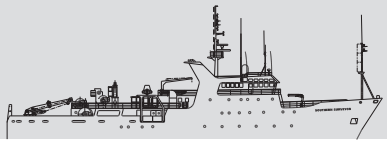

MARINE
NATIONAL FACILITY

2011 program

RV *Southern Surveyor*

voyageplan
ss2011_t01

2,000 years of oceanic history offshore Eastern Australia

Itinerary

Mobilise Hobart 1600hrs, Wednesday 4 May 2011 (if possible)
Depart Hobart 0800hrs, Thursday 5 May 2011
Arrive Brisbane 0900hrs, Thursday 12 May 2011 and demobilise.

Principal Investigators

Prof. Patrick De Deckker (Chief Scientist)
Australian National University
Research School of Earth Sciences, ANU, Canberra ACT 0200

Dr Tony Rathburn, Indiana Sate University, Earth and
Environmental Sciences, Terre Haute, IN 47809. USA

Dr Sabine Schmidt, Université Bordeaux I, UMR CNRS 5805 EPOC,
Avenue des Facultés, 33405 Talence cedex, France.

CSIRO

Scientific Objectives

This project will generate high-resolution records of sea-surface temperature [SST] changes that have occurred in the Tasman Sea over the last two millennia. A variety of innovative proxies will be employed and used for comparison with lake records on land. International collaboration is a feature of this program, linking with the Royal Netherlands Institute for Sea Research [NIOZ] to determine past sea-surface temperatures and wind-induced upwelling conditions using specific organic compounds recovered in deep-sea cores, and with the marine radio-isotope laboratory in Bordeaux, France, to accurately date cores over short time scales.

De Deckker is to collect samples using a multicorer and a student is to go to NIOZ to analyse the samples under the supervision of Dr Schouten. De Deckker will be assisted by both a research assistant and a PhD student at ANU to extract microfossils and date some of them using the radiocarbon technique.

Schmidt is to return to France with some of the samples obtained with the multicorer to date them in her radio-isotope laboratory.

Rathburn is to subsample several of the cores with his postgraduate student to study the live infaunal microbiota that live in the upper few cm of the sea floor.

Voyage Objectives

Priority 1 is to collect up to 8 multicores at 10 stations along the east coast of Australia between Hobart and Brisbane. The location of these stations was chosen for sites which are fairly flat lying, away from the coast [to avoid the transport of material by coastal currents] and close to the 1,000m contour line [to avoid sediments that would have registered biogenic carbonate dissolution if taken at greater depths]. Once retrieved from the sea floor, the sediments cores will be sliced in 1cm sections for analysis in various laboratories.

Priority 2 is to obtain CTD profiles at each coring site and to obtain other chemical parameters, such as nutrients and dissolved oxygen. These are to help interpret the nature of the sediments obtained in the cores. Water samples will be collected at selected depths for chemical analyses at ANU [e.g. trace elements and stable isotopes].

Priority 3 is to collect surface water samples and plankton at the core sites and also in between the core sites at approximately every 100km intervals. These samples again are to gather information of the nature of calcareous micro- and nano-plankton that live in the Tasman Sea. The ecological conditions that control the distribution of these organisms are to help interpret the fossil remains of these organisms to be extracted from the cores.

Voyage Track

See Figure 1 and Table 1 for listing of all stations.

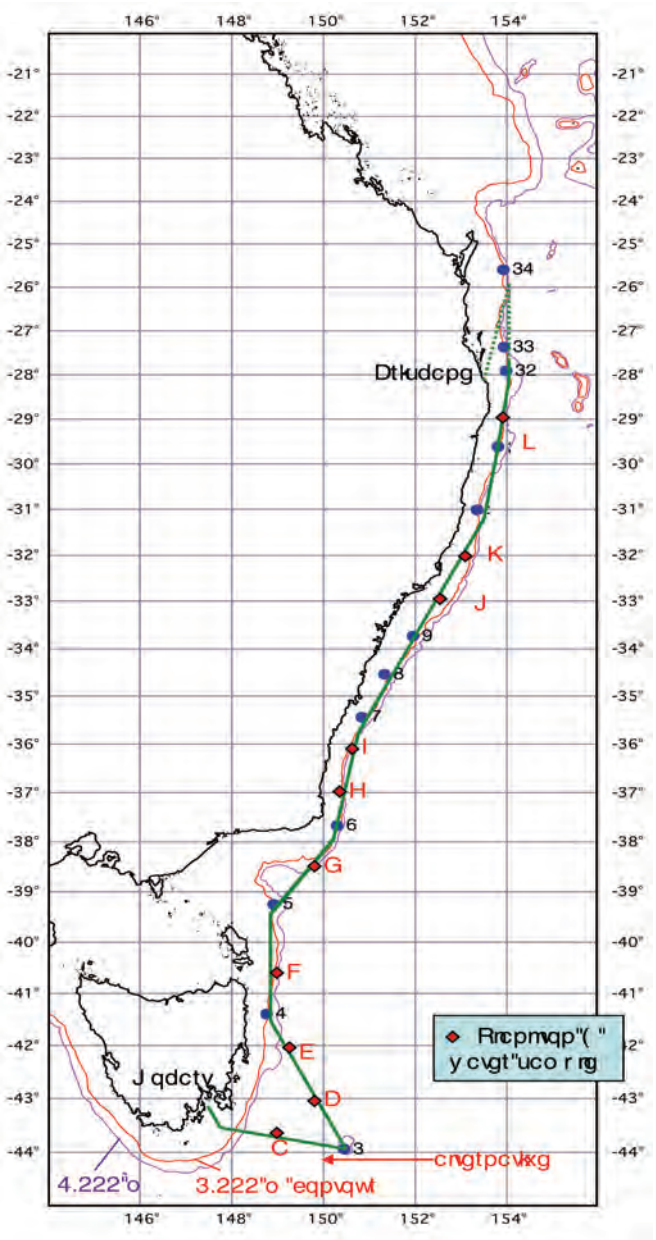

Figure 1: Map showing the voyage plan. Numbers in black refer to multicore stations, and numbers to plankton and water sampling stations. Red diamonds [followed by a letter in red] represent the proposed plankton tows and water sample sites. Blue circles [followed by a number is black] represent the proposed coring sites. Note that sites 11 and 12 are to be considered as additional multicore stations if time becomes available before entering Brisbane harbour on May 12 at 0900 hours.

James Daniell
March 2011

Proposed core sites between Hobart and Brisbane
(for Patrick DeDeckker)

Table 1. Propose Core Sites

Lon	Lat	Depth	No
150.462	-43.953	642	1
148.781	-41.411	1034	2
148.934	-39.262	1313	3
150.307	-37.689	770	4
150.852	-35.453	772	5
151.347	-34.558	836	6
151.967	-33.762	902	7
153.355	-31.026	575	8
153.815	-29.633	842	9
153.999	-27.93	541	10
153.953	-27.389	813	11
153.94	-25.613	829	12

Time Estimates

	distance in km	task to be performed	time (hours)	TOTAL hours
Hobart to A	156		7.1	
Station A		plankton + water	0.3	
A to 1	125		5.7	
Station 1		multicorer + CTD + water & plankton	1.1	
1 to B	113		5.1	
Station B		plankton + water	0.3	
B to C	113		5.1	
Station C		plankton + water	0.3	
C to 2	69		3.1	
Station 2		multicorer + CTD + water & plankton	1.1	
2 to D	88		4.0	
Station D		plankton + water	0.3	
D to 3	138		6.3	
Station 3		multicorer + CTD + water & plankton	1.3	
3 to E	106		4.8	
Station E		plankton + water	0.3	
E to 4	88		4.0	
Station 4		multicorer + CTD + water & plankton	1.4	
4 to F	69		3.1	
Station F		plankton + water	0.3	
F to G	81		3.7	
Station G		plankton + water	0.3	
G to 5	63		2.8	
Station 5		multicorer + CTD + water & plankton	1.4	
5 to 6	94		4.3	
Station 6		multicorer + CTD + water & plankton	1.5	
6 to 7	94		4.3	
Station 7		multicorer + CTD + water & plankton	1.7	
7 to H	88		4.0	
Station H		plankton + water	0.3	
H to I	94		4.3	
Station I		plankton + water	0.3	
I to 8	94		4.3	
Station 8		multicorer + CTD + water & plankton	1.0	
8 to 9	125		5.7	
Station 9		multicorer + CTD + water & plankton	1.5	
9 to J	56		2.6	
Station J		plankton + water	0.3	
J to 10	94		4.3	
Station 10		multicorer + CTD + water & plankton	1.0	
10 to Brisbane			8.0	112.4
BELOW ARE ADDITONAL TASKS: POSSIBITY 1 (2 additional cores)				
10 to 11	50		2.3	
Station 11		multicorer + CTD + water & plankton	1.5	
11 to 12	144		6.5	
Station 12		multicorer + CTD + water & plankton	1.5	
12 to Brisbane	169		13.0	extra hours 24.8 but take 8 h =129.2h
BELOW ARE ADDITONAL TASKS: POSSIBITY 2				
10 to 12	194		8.8	
Station 12		multicorer + CTD + water & plankton	1.5	
12 to Brisbane	169		13.0	extra hours 23.3 but take 8 h =127.7h

Piggy-back Projects

Sampling the airborne microbiota in the Tasman Sea

De Deckker and PhD student from microbiology at ANU, Chris Munday, will deploy an air sampler at the front of the vessel to study the airborne microbiota. This project is not going to require additional ship time. This is the first time such a research project will be undertaken in the area. On SS01-2005, De Deckker already sampled air offshore South Australia and Victoria and these samples have been processed by C. Munday.

Southern Surveyor Equipment

Coring winch with 19mm wire to deploy the multicorer that weights 800 kilos.

CTD/Hydro winches each with 8mm single core conducting cable to obtain CTD profiles and collect water samples, A 12 bottles rosette is required with 10 litre Niskin bottles.

We require the following measurements to be made by the Marine National Facility hydrochemist: salinity, dissolved oxygen [not listed in the original application], nitrate + nitrite, nitrite, reactive silicate, and orthophosphate. Request a dissolved oxygen probe/sensor be connected to the CTD.

We require access to milliQ water, and a balance to measure samples weighing up to 50 grams.

We also require swath bathymetry data and the Topas sub-bottom profiler.

User Equipment

We will bring the multicorer that weights 800 kilos in total. It has to be assembled in Hobart before departure. A crane will be required to load the 4 boxes that contain all the multicorer parts.

We are to bring all the necessary equipment to sub-sample the cores and keep the tubes in a vertical position once the corer is brought back on deck. Access to a laboratory is required to sub-sample the cores. Once the samples are obtained, they are to be stored in a cold room at 4°C. Estimated volume at the end of the coring process will be a crate of 50cm x50cm x100cm.

We will also bring a small plankton net [1m diameter and 2 m long], and water sampling gear [to filter water for nanoplankton].

Storage jars and special plastic bags for storing samples will be brought by us.

We will also bring a vapour shipper to store the air samples. This extremely well sealed metal container contains liquid nitrogen. This container is especially designed to that it does not leak and is entirely safe [e.g. it can be taken on planes and inside cars]. It weighs 14 kilos and its dimensions are: 38 x 38 x 60 cm.

Special Requests

An air sampler is to be deployed in front of the ship on the top deck and is to be connected to 240V power. On previous occasions, De Deckker was able to connect to power below deck by lowering an electric cable via one of the air vents. The air sampler weight 10 kilos and its dimensions are: 40 x 50 x 60 cm.

A pinger attached to the multicorer to determine how close it is to the sea floor.

Personnel List

Patrick De Deckker	ANU	Chief scientist
Tony Rathburn	Indiana State University	Principal Investigator and replacement for De Deckker if necessary
Sabine Schmidt [F]	University of Bordeaux	Principal Investigator
David Heslop	ANU	Postdoctoral Fellow, scientist
Luna Brentegani [F]	ANU	PhD student
Lyndsay Dean [F]	ANU	Honours student
Marita Smith [F]	ANU	Honours student
Ashley Burkett [F]	Indiana State University	Postgraduate student
Chris Munday	ANU	PhD student
Graham Nash	ANU	PhD student
Nathan Coleman	ANU	Undergraduate student
Lindsay Pender	CMAR	MNF Computing Support/Voyage Manager
Lindsay Macdonald	CMAR	MNF Electronics Support
Tara Martin	CMAR	MNF Swath Mapping Support
Dave Terhell	CMAR	MNF Hydrochemistry Support

F = Female

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.**
Lindsay Pender	AS02763
Lindsay Macdonald	AS04157
Tara Martin	
Dave Terhell	AS02843

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

Professor Patrick De Deckker
Australian National University

Appendix 1

Table 1: listing the location sites data and also tasks to be performed at each location.

Multicore station number	Plankton tow & water sample only	longitude	latitude	estimated water depth (m)	CTD + plankton tow + water sample **	Time estimated for each task *	Remarks
	A	149°E	~43.800°S	n/a		20	The exact location is to be dictated by the trajectry towards station 1
1***		150.462°E	43.953°S	642	yes	65	
	B		42°S	n/a		20	longitude dictated by trajectory 1 to 2
	C		43°S	n/a		20	longitude dictated by trajectory 1 to 2
2		148.781°E	41.411°S	1034	yes	105	
	D		40.500°S	n/a		20	longitude dictated by trajectory 2 to 3
3		148.934°E	39.262°S	1313	yes	120	
	E		38.500°S	n/a		20	longitude dictated by trajectory 3 to 4
4		150.307°E	37.689°S	770	yes	85	
	F		37°S	n/a		20	longitude dictated by trajectory 4 to 5
	G		36°S	n/a		20	longitude dictated by trajectory 4 to 5
5		150.852°E	35.453°S	772	yes	85	
6		151.347°E	34.558°S	836	yes	95	
7		151.967°E	33.762°S	902	yes	100	
	H		33°S	n/a		20	longitude dictated by trajectory 7 to 8
	I		32°S	n/a		20	longitude dictated by trajectory 7 to 8
8		153.355°E	31.026°S	575	yes	55	
9		153.815°E	29.633°S	842	yes	95	
	J		29°S	n/a		20	longitude dictated by trajectory 9 to 10
10		153.999°E	27.930°S	541	yes	55	
						1060	TOTAL OF HOURS = ~18 hours
d go to stations 11 and 12. Priority of for station 12							
11		153.953°E	27.389°S	813	yes	90	
12		153.940°E	25.613°S	829	yes	90	

*** time for deploying CTD = 60m per minute; same for multicore + 5 minutes for coring + deployment of equipment 20 minutes**
**** time fo slowing down ship + 5 minutes plankton tow + water bucket sampling and restart ship 20 minutes**

***** If this station is unsuitable (eg gravel on the sea floor) then go to 44°15'S 149°59'E [2,667m depth] where we obtained a suitable core [GC3] during Fr1/94**