

MARINE
NATIONAL FACILITY

2007 program

RV *Southern Surveyor*

voyageplan
SS TRANSIT 02-2007

The record of the ancient Lake Baudin located on the Lacepede Shelf offshore South Australia

Itinerary

Depart: Port Lincoln 1000hrs, Sunday 18 March 2007
Arrive: Hobart 0800hrs, Friday 23 March 2007

Principal Investigators

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Mr Peter Hill – Visiting Fellow, The Australian National University

Prof. Chris von der Borch – Visiting Fellow, The Australian National University

CSIRO

Scientific Objectives

During voyage SS02/2006, using the sub-bottom profiler, we successfully located several ancient courses of the River Murray, but also determined the position of 2 extensive lacustrine deposits on the Lacepede Shelf. (See Figure 1 for examples of the horizontally layered lake deposits and the ancient river courses clearly visible below). Despite many attempts at coring the sea floor using a gravity corer, we failed to penetrate a sandy layer that is overlapping the 'ancient lakes' deposits. One site is located offshore the Murray mouth at a depth of about 40m below the sea surface, and the other occurs in the central part of the Shelf at approximately 60 m below the sea surface.

The recovery of lake sediments located on the Lacepede Shelf could provide much information on past climatic events for a period of time that lasted 20,000 years when sea level was lower than 60m. This lacustrine phase ought to be synchronous with the wet phase recorded at Lake Mungo that saw many lakes being filled in the Willandra Lakes region coinciding with Marine Isotope Stage 3. Because of the poor preservation of pollen and microfossils at Lake Mungo, the Palaeo-lake Baudin may yield vital information on palaeoenvironments and palaeoclimates preceding the onset? of the Last Glacial Phase that culminated around 20,000 years BP.

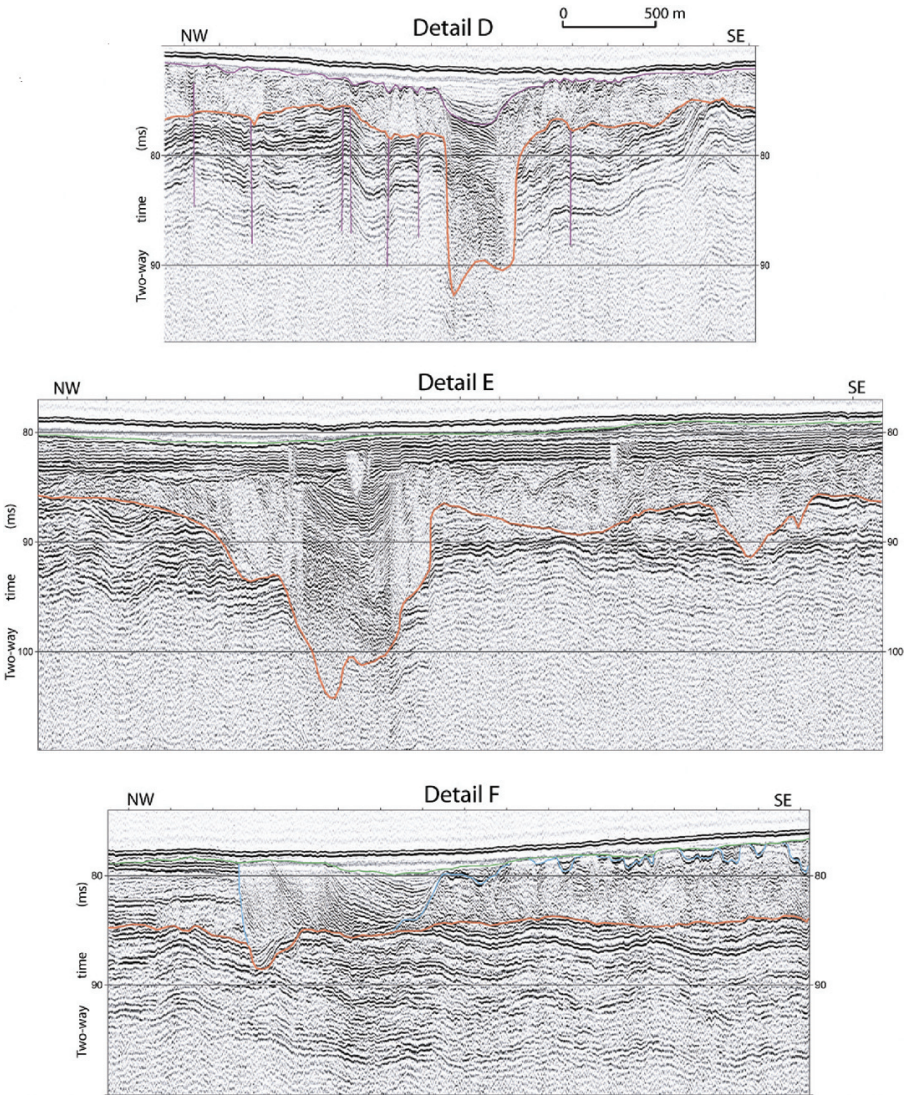
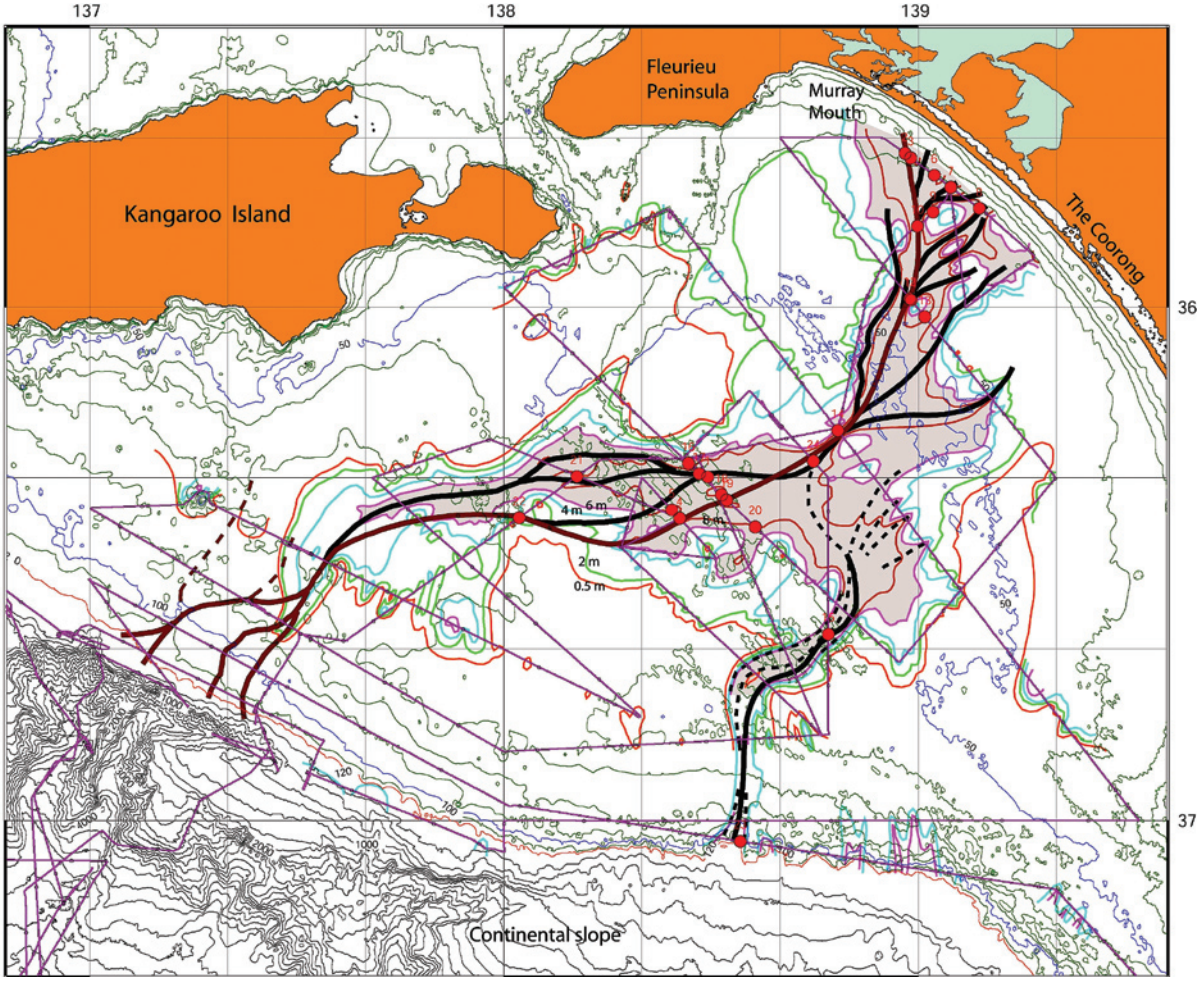


Figure 1 showing seismic profiles obtained along selected transects obtained during voyage SS02/2006. Note the horizontal layers near the top of the profiles representing lacustrine deposits and the dissected profiles caused by river entrenching older marine sediments.

Voyage Objectives

There are 2 main objectives: the first one is to obtain cores from the ancient lake deposits, and the second one is to obtain additional information on the sea floor near the coast lines offshore Portland adjacent to the Glenelg River and offshore western Tasmania.

Figure 2 below, prepared by Mr Peter Hill, shows the extent of Palaeo-lake Baudin reconstructed from the interpretation of seismic lines obtained during voyage SS02/2006. The red dots show the proposed sites for vibrocoring over a 2 to 2.5 day program.



Voyage Track

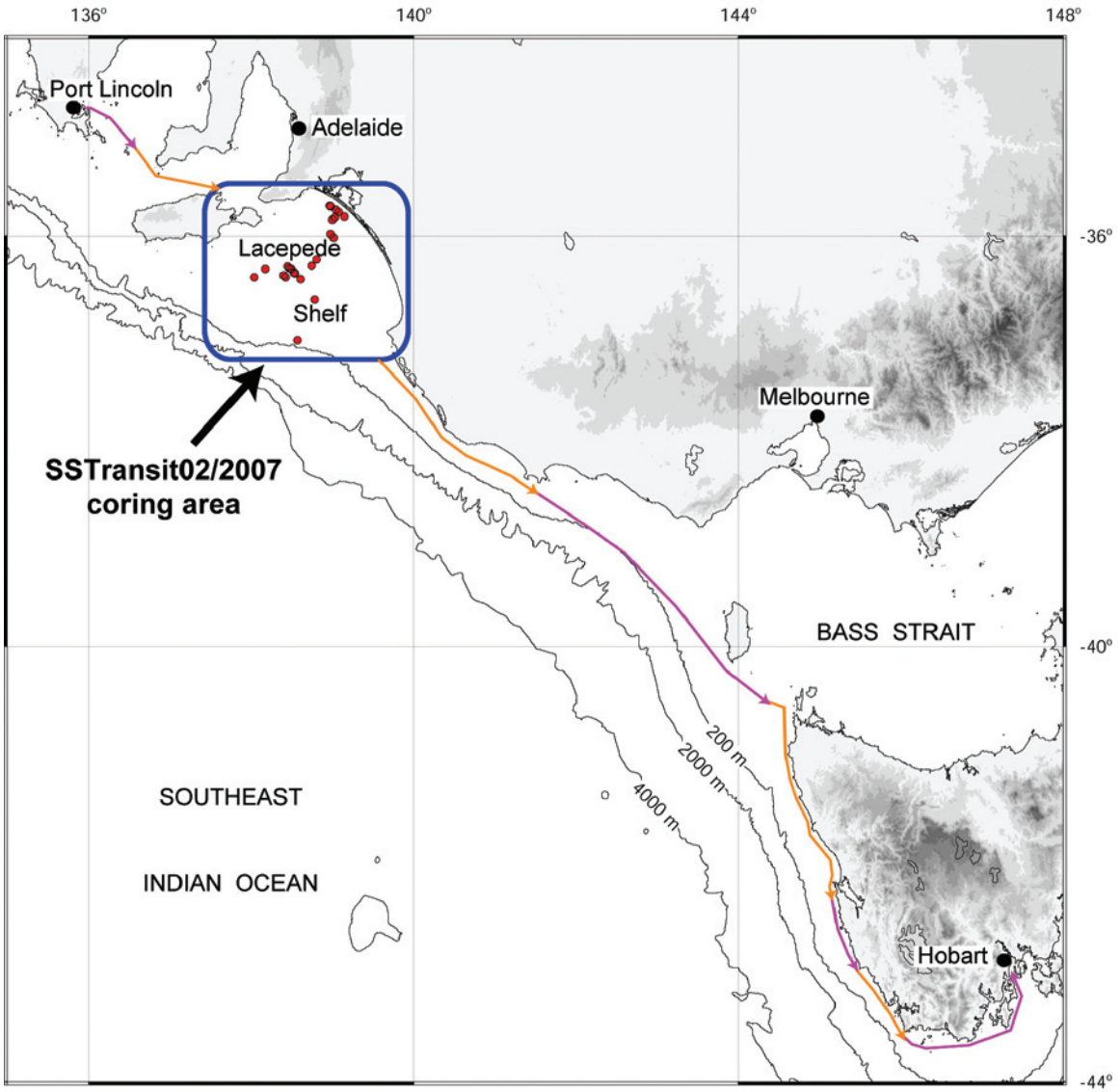


Figure 3 shows the proposed voyage track and the insert shows the location where vibrocoring is proposed to occur. Note on the voyage plan map that the orange segments of the transit lines are suggested TOPAS sub-bottom profiles which we wish to follow to complete some investigations on the shelf offshore Portland and western Tasmania in order to link with other profiles obtained on previous voyages, including SS06/02, that are relevant to our understanding on how deep-sea canyons form.

Table 1 below shows the proposed location for the vibrocoring on the Lacepede Shelf

SSTransit02/2007 proposed core stations, Lacepede Shelf

Core Stn	Latitude (deg/min)		Longitude (deg/min)	
1	-36	19.91	138	29.57
2	-35	41.85	138	58.08
3	-35	42.36	138	58.92
4	-36	24.73	138	25.47
5	-36	23.76	138	24.34
6	-35	44.42	139	02.34
7	-35	45.85	139	04.72
8	-35	48.34	139	08.89
9	-35	48.77	139	02.18
10	-35	50.43	138	59.93
11	-35	59.09	138	58.98
12	-35	58.96	138	58.85
13	-36	01.10	139	01.00
14	-36	14.45	138	48.40
15	-36	38.28	138	47.00
16	-36	18.33	138	26.75
17	-36	19.52	138	28.27
18	-36	22.00	138	31.50
19	-36	22.61	138	32.31
20	-36	25.74	138	36.40
21	-36	19.84	138	10.62
22	-36	24.68	138	02.24
23	-37	02.40	138	34.29
24	-36	18.05	138	44.83

Time Estimates

Each vibrocore site will take approximately 1 – 1.5 hours.

Piggy-back Projects

We wish to have both the swath mapper and Topas equipment turned on while on the Lacepede Shelf offshore Portland in the Glenelg Canyons areas and also offshore western Tasmania while in transit along the orange lines shown in Figure 3.

RV Southern Surveyor Equipment

- Smith-McIntyre sediment grab
- Seapath Seatex 200 – for accurate heading, pitch and roll and heave
- Simrad EK500 sounder for biological research (12, 38 and 120 kHz)
- Simrad EA500 sounder for bottom detection (12kHz)
- ADCP – measures current vectors beneath the vessel
- General purpose laboratory (includes fume hoods, fridge, freezer)
- Wet laboratory/CTD room
- Coring winch with 7,000m of 19mm wire
- Stern A-frame (SWL 15 tonnes)
- ADCP: standard data provided as 20 minute averages. Vertical resolution, range and data quality to be discussed during voyage planning
- Ship attitude – heave, pitch, roll and heading
- Bridge log (photocopy)
- Acoustic Pinger – used for monitoring the altitude of underwater packages
- 12kHz Acoustic Receive Transducer (low power, wide beam)
- General Purpose Depth Sensor – used for monitoring depth of underwater packages attached to the vessel's cables
- Echograms from the Simrad EK500 sounder – readable with Sonardata Echoview software
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- Swath bathymetry
- Swath seabed reflectance
- Swath water column data
- Swath bathymetry
- Swath seabed reflectance

User Equipment

- The Geoscience Australia vibrocoring equipment

Personnel List

Patrick De Deckker	ANU	Chief Scientist
Peter Hill	ANU	Principal Investigator
Chris von der Borch	ANU	Principal Investigator
Nigel Craddy	ANU	Technician
Sofie Bretherton	ANU	PhD student
John Rogers	ANU	PhD student
Graham Nash	ANU	Undergraduate student
Louise Soroka	ANU	Undergraduate student
Craig Wintle	GA	Technician
Andrew Hislop	GA	Technician
Michele Spinoccia	GA	Swath Technician
Bernadette Heaney	CMAR	Computing Support/SST
Peter Dunn	CMAR	Electronics Support/SST
Fred Stein	CMAR	OHS&E Auditor/SST
Rohanne Young	CMAR	OHS&E Auditor

ANU – Australian National University
GA – Geoscience Australia
CMAR – CSIRO Marine and Atmospheric Research
SST – Systems Support Technician

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

Patrick De Deckker
Chief Scientist