



2006 RV *Southern Surveyor* program

voyageplan

SS02/2006

AUSCAN 2006 and PALAEO-MURRAYS: Geological and biological investigations of the Murray Canyons Group.

Itinerary

Depart: Port Lincoln, 1000hrs, Wednesday 1 March, 2006

Arrive: Hobart 0800, Wednesday 15 March, 2006.

Principal Investigator

Professor Patrick De Deckker (Chief Scientist) – Department of Earth and Marine Sciences, The Australian National University, Canberra ACT 0200
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Scientific Objectives

There are 2 principal objectives, plus 2 minor ones [one being listed as a piggy-back project].

The first objective is to study large holes that have been found during the AUSCAN 2003 cruise offshore the Murray Canyons Group offshore Kangaroo Island. These holes occur along possible tectonic lineaments from depths between 4,500 and 5,500 m. Water samples [for water chemistry and microbiology] and short cores will be taken in some of the holes in an attempt to determine their mode of formation.



The second objective is to determine, by means of swath mapping and sub-bottom profiling, the location of several of the ancient meanders of the River Murray that would have been formed during periods of low sea level on the very broad Lacepede Shelf. An attempt will be made to link the meanders with the heads of the various canyons of the Murray Canyons Group, and determine if 'erosion' is currently active at those locations. Short cores will be taken on the Lacepede Shelf in an attempt to find a high-resolution Holocene record of fluvial outwash of the Murray. CTD measurements will be taken along some of the meanders to determine whether they act as conduits of continental, fresh waters.

A minor objective is to follow and map in several places the low sea-level stand that occurred 20,000 years ago and dredge wherever possible suitable material for dating and geochemical analysis.

Voyage Objectives

During the first part of the voyage, from Port Lincoln to station 10, we will track ancient river meanders in the southern end of both Spencer Gulf and Gulf St Vincent [Investigator Strait] as well as follow the 120-125 m contour line to identify the nature of the last glacial maximum low-sea level stand.

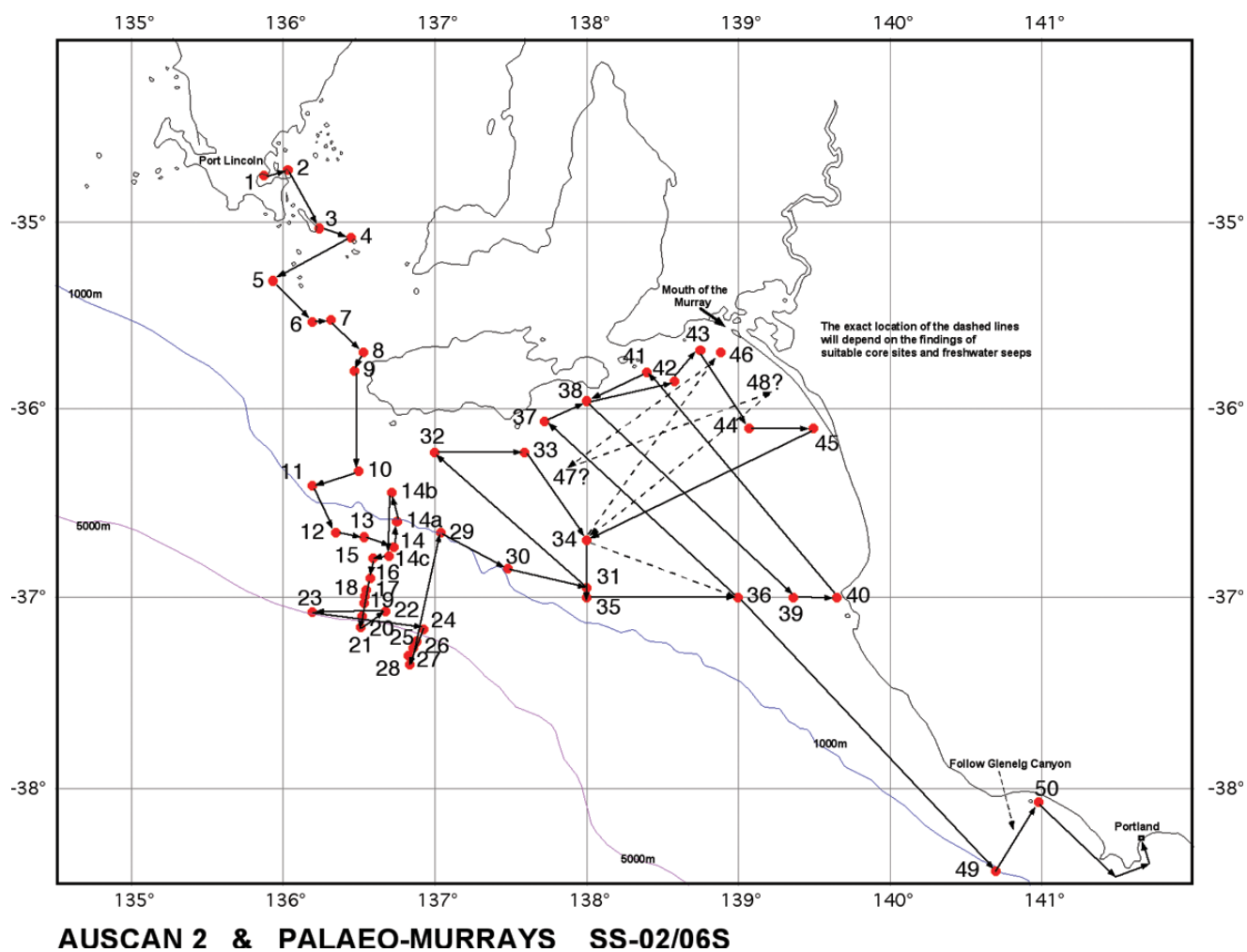
After that we will travel over the du Couëdic Canyon, starting at this 'head' down to the abyss, and the same is planned for the Sprigg Canyon. Once the deeply-located holes have been swath-mapped in parallel with data on their sub-bottom profiles, water samples and short cores will be taken in 4 selected holes. These investigations will be performed between stations 11 and 29. A core is to be taken at the site [MD2611] where a core was taken in 2003 during the AUSAN cruise.

During the rest of the voyage, the Lacepede Shelf will be mapped using principally the sub-bottom profiling system and partially the swath mapper to determine the location of ancient meanders of the River Murray [stations 30 to 45] and the Onkaparinga River [between stations 38 and 43]. Once this is achieved, the locations of transects 34 to 46 [located near the mouth of the River Murray] to 47 to 48 back to 36 will be decided and it is during this period that shallow cores, grab and CTD samples will be taken.

Following from these investigations, transfer between stations 36 and 49 will attempt to follow the 125m contour line and pass over several heads of canyons, including the Bridgeport Canyon. At station 49, located at 1000m, we are to track the possible canyon that ought to occur offshore the Glenelg River, which is thought to have been an ancient course of the River Murray. Upon reaching the 50m contour line, the ship is to then steam to Hobart where the voyage is to end.

Voyage Track

Figure 1: Detailed itinerary of Voyage SS02/2006



Piggy-back Projects

Title: the geochemical and biological nature of aerosols offshore South Australia.

We will filter air during the entire voyage to determine the nature of aerosols by placing an air-filtering pump at the front of the ship. The filtered samples will be studied for their mineral, geochemical and microbiological contents. The air will be continuously filtered and this is not to affect any of the ship's activities. P. De Deckker is the investigator for this project.

Title: the collection of plankton and surface waters at sporadic times during the cruise.

We will collect samples of plankton at selected sites during the voyage, mostly when the ship is stopped for coring or other activities, by towing a net below the sea surface for approximately 10 minutes at a speed of 1 knot. The total amount of time spent for those tows is estimated to total 2 hours. Chemical analyses of water samples taken at the same time are to be performed by the CSIRO hydrochemist. P. De Deckker and S. M. Eggins are the investigators for this project.

Southern Surveyor Equipment

CTD (Seabird SBE 911 plus)	Silicate Analysis
Rosette (24 bottles 10 litres)	Phosphate Analysis
Fluorometer	Milli-Q water supply
Sea Surface Temperature and Salinity	Small Epibenthic Sled
Salinity Analysis	Smith-McIntyre sediment grab
Oxygen Analysis	Swath mapper
Nitrate Analysis	Sub-bottom profiler

User Equipment

6m Gravity Core and deployment system
All the necessary consumables to be used with the gravity corer
All equipment necessary for water plankton collection, including plankton net

Personnel List

Patrick De Deckker	ANU	Chief Scientist
Chris von der Borch	Flinders University	Sedimentologist
Peter Hill	ANU	Sedimentologist
TBC		Sedimentologist
Stephen Eggins	ANU	Geochemist
John Rodgers	ANU	Micropalaeontologist, PhD student
Sarah Tynan	ANU	Sedimentologist, PhD student
Daniel Wilkins	ANU	Sedimentologist, PhD student
Doreen Rössler	LIOW	Sedimentologist, PhD student
Nigel Craddy	ANU	Technician
Michele Spinoccia	GA	Swath mapping support
Don McKenzie	CMAR	MNF Voyage Manager
Mark Rayner	CMAR	MNF Hydrochemistry support (SST)
Lindsay MacDonald	CMAR	MNF Electronics support (SST)
Bernadette Heaney	CMAR	MNF Computing support (SST)

ANU – Australian National University; LIOW - Leibniz Institut für Ostseeforschung Warnemünde; GA – Geoscience Australia; CMAR – CSIRO Marine and Atmospheric; MNF – Marine National Facility; 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