

**MARINE  
NATIONAL FACILITY**

**voyageplan  
ss2012\_v06**

# 2012 RV Southern Surveyor program

## **Tectonic framework for the easternmost Coral Sea and northern extent of the Lord Howe hotspot**

### **Itinerary**

Mobilise Cairns 0800hrs,  
Friday 26 October, 2012

Depart Cairns 1600hrs,  
Friday 26 October, 2012

Arrive Brisbane 0800hrs,  
Tuesday 20 November, 2012 and demobilise

### **Principal Investigators**

**Dr Maria Seton** (*Chief Scientist*)  
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**Dr Christian Heine**  
University of Sydney  
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**Prof Dietmar Muller** (*not attending voyage*)  
University of Sydney  
Phone: +61 2 9036 6533 Email: dietmar.muller@sydney.edu.au

**Dr Julien Collot**  
Service Géologique de Nouvelle-Calédonie  
Phone: +687 27 17 29 Email: Julien.collot@gouv.nc

**Dr Steven Micklethwaite**  
University of Western Australia  
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**Dr Sebastien Meffre**  
University of Tasmania  
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## Scientific Objectives

The main objectives of this voyage are to investigate:

1. The nature of the crust (continental/volcanic/oceanic) underlying Rennell Island, East Rennell Island Ridge, South Rennell Fracture Zone and d'Entrecasteaux Zone by directly sampling and comparing the basement from each of these submarine plateaus and ridges. This objective relates primarily to Sebastien Meffre, Steven Micklethwaite, Julien Collot and Maria Seton.
2. The age and structure of the Santa Cruz/Torres and d'Entrecasteaux Basins through magnetic profiling and explore whether they share a spatial and temporal relationship. We will also explore whether the basins formed in a back-arc setting related to Cretaceous or Eocene subduction or whether they preserve a piece of oceanic crust from the Panthalassa Ocean. This objective relates primarily to Maria Seton, Dietmar Muller, Christian Heine and Julien Collot.
3. The extension of the Lord Howe hotspot trail into the eastern Coral Sea, north of the Bellona Plateau by directly sampling extinct volcanic edifices and exploring whether the West Torres Plateau is capped by volcanics. This objective relates primarily to Sebastien Meffre and Maria Seton.

## Voyage Objectives

**Objective 1:** A magnetometer will be used to acquire magnetic anomaly data over the Santa Cruz/Torres and d'Entrecasteaux Basins. We plan to collect seven magnetic profiles across the North d'Entrecasteaux Basin, to complement existing magnetic anomaly data and five magnetic anomaly profiles crossing the poorly sampled Santa Cruz/Torres Basin. The tracks are designed to trend perpendicular to the inferred spreading fabric of these basins (NW-SE) and to fill data gaps. A total of 5120 km of magnetic anomaly data will be acquired (Figure 1).

**Objective 2:** A total of 10 dredges are planned to sample Rennell Island and East Rennell Island Ridge, the northernmost Loyalty Ridge and the West Torres and Bellona Plateaus (Figure 1). Over four days of multibeam (swath) and single beam sonar profiles have been allocated to assist with the selection of sampling sites. Between three and six hours (depth dependent) per dredge site has been allocated for dredging activities.

**Objectives 1 and 2** have equal priority, however certain dredge locations have higher priority than others. These have been ranked as either high (1), medium (2) or low (3) in Table 1.

### Voyage Track

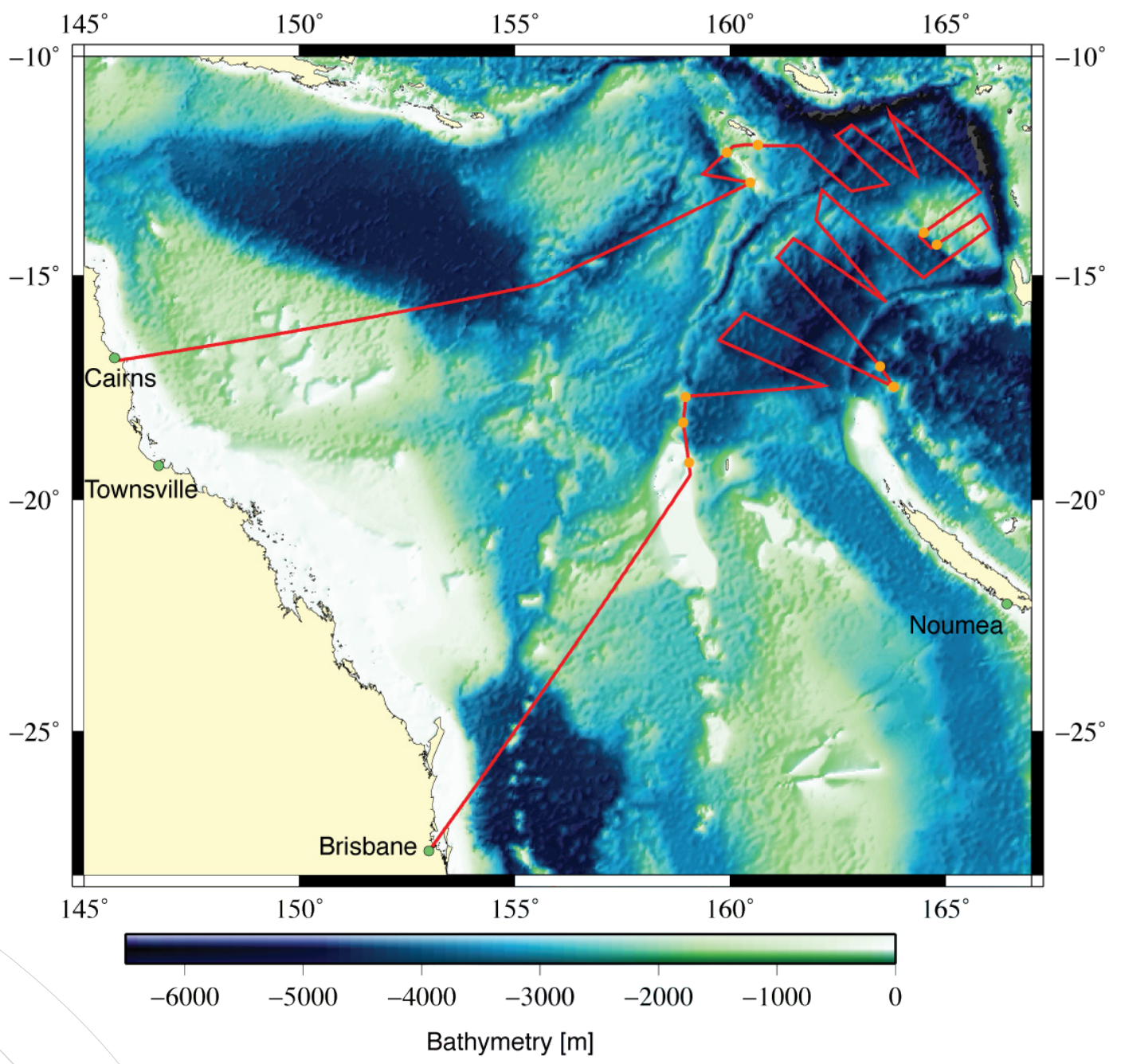


Figure 1: Voyage track for SS2012\_v06. Red denotes ship track, yellow dots are dredge site locations, green dots are the location of major cities.

## Time Estimates

Table 1: Time estimates for SS2012 \_ v06 voyage

	Speed (kn)	Distance (km)	Distance (nM)	Time (hrs)	Time (days)
Transit	10	1654	893	89.31	3.72
Magnetics	10	5120	2765	276.46	11.52
Transit	10	1085	586	58.59	2.44
Total		7859	4244	424.35	17.68

	Dredge Depth (m)	Dredge (hrs)	Swath (hrs)	Dredge and Swath (hrs)	Dredge and Swath (dys)	Priority
Dredge 1	1500	3	9	12.00	0.50	1
Dredge 2	2000	4	10	14.00	0.58	1
Dredge 3	1500	3	9	12.00	0.50	1
Dredge 4	3000	6	12	18.00	0.75	1
Dredge 5	3000	6	12	18.00	0.75	1
Dredge 6	3000	6	12	18.00	0.75	2
Dredge 7	2000	4	10	14.00	0.58	3
Dredge 8	2500	5	11	16.00	0.67	3
Dredge 9	1500	3	9	12.00	0.50	2
Dredge 10	1500	3	9	12.00	0.50	2
Total		43	103	146.00	6.08	
Total Days (Dredge + Profiles)					23.76	

## Waypoints for ss2012\_v06 voyage

Way point	Latitude Decimal degrees	Longitude decimal degrees	Latitude Degrees	Latitude Minute	Latitude Decimal second	Longitude degree	Longitude Minute	Longitude Decimal second	Description
1	-15.205800	155.544600	-15	12	20.880000	155	32	40.560000	Transit 1
2	-12.896400	160.478700	-12	53	47.040000	160	28	43.320000	Dredge 1
3	-12.700275	159.364941	-12	42	0.990000	159	21	53.787600	Mag/Bath 1
4	-12.205114	159.919473	-12	12	18.410400	159	55	10.102800	Dredge 2
5	-12.066164	160.074483	-12	3	58.190400	160	4	28.138800	Mag/Bath 2
6	-12.031526	160.658485	-12	1	53.493600	160	39	30.546000	Dredge 3
7	-12.049302	161.590867	-12	2	57.487200	161	35	27.121200	Mag/Bath 3
8	-13.398737	163.164156	-13	23	55.453200	163	9	50.961600	Mag/Bath 4
9	-12.928084	163.658927	-12	55	41.102400	163	39	32.137200	Mag/Bath 5
10	-11.606673	162.260319	-11	36	24.022800	162	15	37.148400	Mag/Bath 6
11	-11.583664	162.825122	-11	35	1.190400	162	49	30.439200	Mag/Bath 7
12	-12.919955	164.484294	-12	55	11.838000	164	29	3.458400	Mag/Bath 8
13	-11.325297	163.710010	-11	19	31.069200	163	42	36.036000	Mag/Bath 9
14	-13.111516	165.796858	-13	6	41.457600	165	47	48.688800	Mag/Bath 10
15	-14.024578	164.507881	-14	1	28.480800	164	30	28.371600	Dredge 4
16	-14.295354	164.801615	-14	17	43.274400	164	48	5.814000	Dredge 5
17	-13.620956	165.831042	-13	37	15.441600	165	49	51.751200	Mag/Bath 11
18	-13.939965	166.016737	-13	56	23.874000	166	1	0.253200	Mag/Bath 12
19	-15.048265	164.488054	-15	2	53.754000	164	29	16.994400	Mag/Bath 13
20	-13.057268	162.126642	-13	3	26.164800	162	7	35.911200	Mag/Bath 14
21	-13.740599	161.994001	-13	44	26.156400	161	59	38.403600	Mag/Bath 15
22	-15.598388	163.622814	-15	35	54.196800	163	37	22.130400	Mag/Bath 16
23	-14.163843	161.475453	-14	9	49.834800	161	28	31.630800	Mag/Bath 17
24	-14.590051	161.096139	-14	35	24.183600	161	5	46.100400	Mag/Bath 18
25	-16.985042	163.424405	-16	59	6.151200	163	25	27.858000	Dredge 6
26	-17.503489	163.811101	-17	30	12.560400	163	48	39.963600	Dredge 7
27	-15.847591	160.332991	-15	50	51.327600	160	19	58.767600	Mag/Bath 19
28	-16.452663	159.741520	-16	27	9.586800	159	44	29.472000	Mag/Bath 20
29	-17.476958	162.167385	-17	28	37.048800	162	10	2.586000	Mag/Bath 21
30	-17.710753	158.978953	-17	42	38.710800	158	58	44.230800	Dredge 8
31	-18.290137	158.915210	-18	17	24.493200	158	54	54.756000	Dredge 9
32	-19.180897	159.044821	-19	10	51.229200	159	2	41.355600	Dredge 10
33	-27.468000	153.035000	-27	28	4.800000	153	2	6.000000	Transit 2

## Piggy-back Projects

N/A

## Southern Surveyor Equipment

Simrad EA500 sounder for bottom detection (12kHz) - Echograms from the Simrad EA500 sounder

Kongsberg EM300 swath mapper – swath bathymetry, swath seabed reflectance, TOPAS sub-bottom profiler

Laboratory space cleaning, sorting and storing dredge samples

Dredge equipment – winch and rock dredge/s

Underway data

Ship attitude – heave, pitch, roll and heading

Bridge log

## User Equipment

We will be bringing an SEASPY magnetometer and winch (borrowed from GA) onboard.

## Special Requests

We require deck-space, tie down sockets and hydraulic outlets for the SEASPY magnetometer winch. This will be installed and tested by a GA technician in Cairns on mobilization day. The winch is to stay onboard to be used for the Benjamin Cohen voyage (ss2012 \_ v07) that immediately follows our own.

## Personnel List

Dr Maria Seton	University of Sydney	Chief Scientist
Dr Christian Heine	University of Sydney	Tectonics/structural geology scientist
Dr Julien Collot	Geological Survey of New Caledonia	Tectonics/structural geology scientist
Dr Steven Micklethwaite	University of Western Australia	Structural geology scientist
Dr Sebastien Meffre	University of Tasmania	Geochemical/geochronology scientist
Dr Nick Mortimer	GNS	Geochemical/geochronology scientist
Dr Simon Williams	University of Sydney	Tectonics/potential field scientist
Ms Daniela Wolf	University of Hamburg	Tectonics/potential field student
Mr Sabin Zahirovic	University of Sydney	Tectonics student
Mr Jarrod Moore	University of Sydney	Tectonics student
TBA	Geological Survey of New Caledonia	Tectonics/structural geology scientist
Don McKenzie	CMAR	MNF Voyage Manager
Peter Dunn	CMAR	MNF Electronics Support
Hiski Kippo	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.
Don McKenzie	AS02764
Peter Dunn	AS03164
Hiski Kippo	AS02377

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

**Maria Seton**  
Chief Scientist