RV *Investigator* Voyage Summary

Voyage #:	IN2015_C01		
Voyage title:	GAB deep water geological and benthic ecology program		
Mobilisation:	Hobart, 0900 Thursday, 22 October 2015–Sunday, 25 October 2015		
Depart:	Hobart, 1800 Sunday, 25 October 2015		
Return:	Port Lincoln, 0800 Saturday, 28 November 2015		
Demobilisation:	Port Lincoln, 0900-2359 Saturday, 28 November 2015		
Voyage Manager:	Stephen McCullum	**Contact details:**	Stephen.McCullum@csiro.au
Chief Scientist:	Dr Andrew Ross		
Affiliation:	CSIRO Energy	**Contact details:**	Andrew.Ross@csiro.au
Principal Investigators:	Drs Alan Williams and Asrar Talukder		
Project name:	Great Australian Bight Deepwater Marine Program		
Affiliation:	CSIRO	**Contact details:**	08 6436 8790

Objectives and brief narrative of voyage

Scientific objectives

The Great Australian Bight (GAB) represents one of Australia's most prospective frontier hydrocarbon exploration regions. However, the primary Ceduna sedimentary sub-basin – the focus of our work - is characterised by a paucity of data on its deep water geology and almost no knowledge of its benthic biological communities.

The Ceduna sub-basin is the product of rifting followed by the subsequent Southern Ocean seafloor spreading between Australia and Antarctica. The rifting created a narrow seaway between Australia and Antarctica, which was initially filled by two large deltaic super sequences (represented by the Tiger and Hammerhead super sequences respectively). Decreased sediment supply followed this period, during which commencement of fast seafloor spreading led to the initiation of widespread igneous activity and the development of a large number of volcanoes across the basin. Subsequent low sedimentation rates combined with continued subsidence have created the current modern deep water Ceduna sub-basin geomorphology. Key knowledge gaps in the understanding of the fundamental geology of the Ceduna sub-basin include:

1. **Sedimentary facies and source rocks**

Whilst rock dredging has recovered samples from both the Tiger and Hammerhead super sequences, large gaps remain (particularly in the Hammerhead) in our understanding of the facies that describe how these sequences were formed and about the existence or otherwise of organic rich potential source rocks for petroleum systems in the basin. Therefore a scientific research objective of the survey is to sample lithified outcropping rocks from the Hammerhead sequence on the deep water slope and within canyons, to better understand the formation of the deltaic super sequence and identify any potential source rocks for hydrocarbon reserves.

2. **Hydrocarbon seeps**

Geological investigations of the intervals from the few wells drilled in the basin show evidence for hydrocarbon migration, however further evidence is required to define whether active petroleum systems exist or not and to understand their character. To test this, a scientific research objective of the survey is to sample potential areas of hydrocarbon seepage in order to determine if active petroleum systems are present and the nature of their hydrocarbons.

3. **Mid-Eocene Volcanic activity**

Igneous activity that occurred in the middle Eocene is currently defined using seismic data and little is known of the provenance, mechanisms of formation, precise timing and impact on the host sedimentary rocks of this magmatic activity. These attributes are not only important in terms of hydrocarbon potential for the basin, but are also fundamental to the understanding of the breakup between Australia and Antarctica. Therefore, to understand the tectonic history of the basin and the role that igneous activity played in this breakup, a research objective of the survey is to collect samples from volcanic seamounts that will allow us to understand timing, chemistry and mechanisms for emplacement.

4. Basin and benthic biodiversity and distribution

The GAB is a region of high endemism and whilst the majority of seabed terrains across the deep continental slope are thought to be predominantly calcareous oozes, the geological targets described above represent areas of hard substrates with localised current regimes or chemosynthetic energy source in the case of seeps. The objective of this aspect of the study is to describe the composition, abundance and distributions of benthic fauna in these areas to define aspects of diversity community structure, endemism and functional ecology.

Voyage objectives

The voyage objectives are built around three main survey targets:

- Outcrops of sedimentary rocks – to collect samples for sedimentary facies and source rock analysis
- Potential areas of seepage – to determine if hydrocarbon seepage can be identified
- Deepwater seamounts – to identify, sample and investigate the nature of the mid-Eocene volcanics

The voyage objectives linked to each type of target carry equal weight and the proposed voyage plan includes more targets than can be visited within the time allocations for the survey. Each of these target areas will be ranked based on their importance of each target in delivering on the scientific objectives.

The survey will use a hierarchical design comprising seafloor mapping and water column characterisation prior to intensive seafloor sampling.

Seafloor mapping and water column characterisation of target areas will be by:

1. Collection of water column profile data including CTD, chemical sensor readings, LADCP and associated water samples
2. Hull mounted acoustic characterisation of the water column and seafloor over the target areas of interest. This activity will comprise the use of MBES, water column acoustic backscatter, single beam echo sounder, SBP, gravity, magnetics and ADCP to determine processes occurring in the water column and map the seafloor and shallow subsurface geology.
3. Seafloor characterisation from the surface will be complemented with a tow camera to obtain video transects across the target area seafloor and overlying near bottom waters.

Seafloor sampling

A number of sampling operations will be undertaken to describe the seafloor geology and benthic biota. Each sampling operation will differ dependant on sampling target, primarily based on substrate composition. For the soft substrate targets there will be a focus on coring whilst for the harder substrate types the focus will be on dredging. Sampling will be by:

1. Deployment of an integrated coring platform (ICP) with a multicorer to sample the surface sediment infauna, microbiology, hydrocarbon chemistry, redox chemistry and physical properties. In addition ancillary sensor data will also be collected, such as hydrocarbon sensors and turbidity.

2. Use of a beam trawl or Sherman sled to collect samples of benthic megafauna over target areas.
3. Use of 12 m piston cores (or gravity cores where appropriate) to characterise and describe the chemistry and properties of recent sediments.
4. Use of rock dredges to collects lithified sediments and volcanic rocks for description and detailed chemical analysis.

Of the 17 target areas identified, 64% occur in water depths of between 876 –and 3000 m, 24% occur in water depths of 3000-4500 m with the remaining targets (24%) occurring in water depths between 4500 – 5200 m.

Results

- **Outcrops of sedimentary rocks – collect samples for sedimentary facies and source rock analysis**

Achieved: Over 1.13 tons of materials collected from a number of previously unmapped areas with deep water outcrops of identified sequences from probable Late Cretaceous to Palaeocene.

- **Potential areas of seepage – determine if hydrocarbon seepage can be identified**

Partially achieved: Target sites visited and characterised however definitive evidence for natural seepage was not observed at these sites. This was not an unexpected result as it may be that the subsurface flow paths do not lead to hydrocarbon leakage at the selected locations. The lack of good core recoveries was disappointing and would have been helpful to validate the presence or absence of other leakage indicators.

- **Deepwater seamounts – identify, sample and investigate the nature of the mid-Eocene volcanics**

Achieved: The objective to sample seafloor geology and benthic biota was very successful. The voyage identified and characterised a number of previously unknown seamounts in addition to those in the original plan. Sampling of the volcanic seamounts yielded good collections of volcanic materials (169 kg), notably the first volcanic materials recovered from the GAB, and biological assemblages.

Throughout the voyage activities a large and diverse collection of deep water biological taxa were collected (166 kg) which will inform the understanding of the GAB faunal diversity and distribution.

Voyage Narrative

The voyage targeted 26 sites of investigation over the 34 day voyage period (not including the brief mobilisation voyage) within the greater GAB region from 128.5-139° East. During this period, including the transits from Hobart and to Port Lincoln, 6,680 km was covered with 28,922 km^2 of seafloor mapped using multibeam sonar, 10,225 km^2 of which was at high resolution within the primary areas of investigation. Many of these areas previously had limited or no bathymetric data collection, and as a result a number of volcanic seamounts, deep water canyons and possible fluid escape features have been characterised for the first time. In addition the mapping has shown that the deep water geomorphology in the Great Australian Bight is far more complex than previously described or understood.

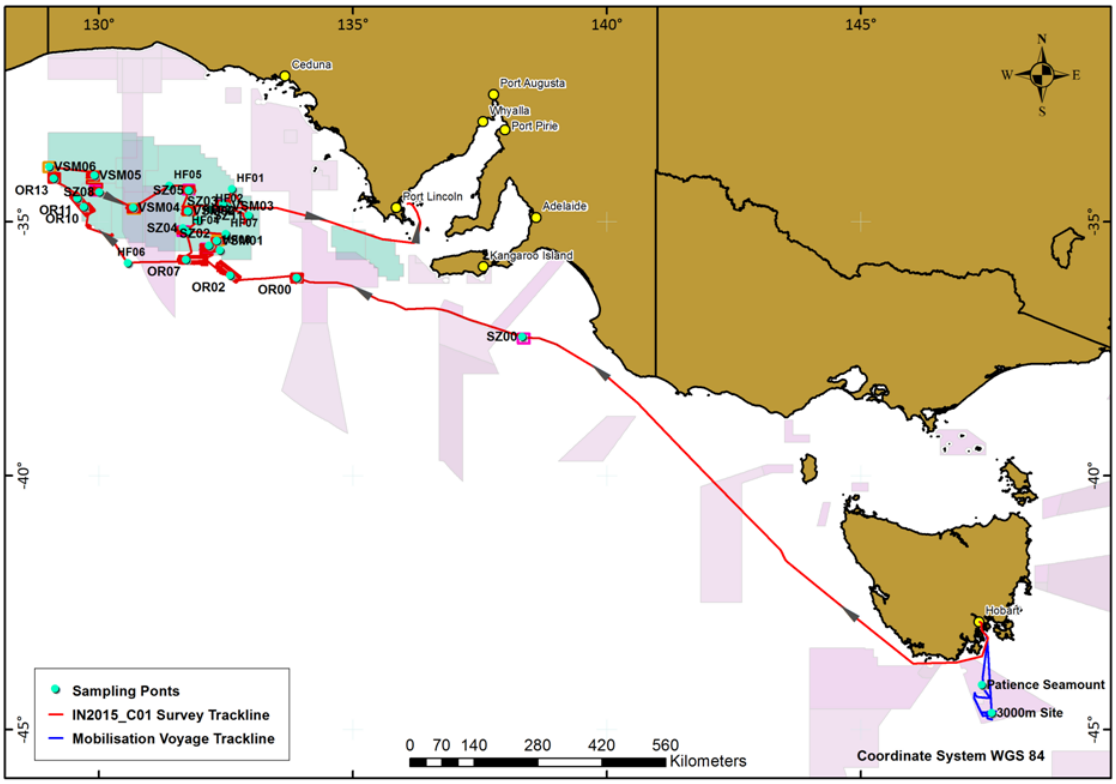
In order to collect samples during the voyage, a diverse and large collection of instrumentation was deployed from the RV Investigator, fully utilising the vessel capabilities to great effect. These equipment included water column profiling instrumentation (Augmented CTD system with additional acoustic and chemical sensors), seafloor sampling instruments (beam trawls, rock dredges, benthic sleds, towed camera) and coring tools (gravity corer, piston corer, multicorer, CSIRO integrated coring platform). Also a 6 m sediment temperature probe was successfully deployed from the Investigator for the first time. The equipment deployments were undertaken in water depths ranging from 700 m to 5437 m and included significantly deeper deployment of some of the equipment than previously undertaken either in Australia or worldwide.

The large scientific crew complement from seven research organisations from across Australia (Australian Museum, Sydney, South Australian Museum, Museum Victoria, Curtin University and the University of Sydney) and Europe (Fielax) was able to process, describe and archive samples on board. In some cases this also included geochemical analyses using analytical instrumentation. Of the 717 analytical samples, 117 were analysed shortly after collection. Over 1.36 tons of rocks and sediments were recovered and 166 kg of biological materials comprising 25,553 specimens were also collected.

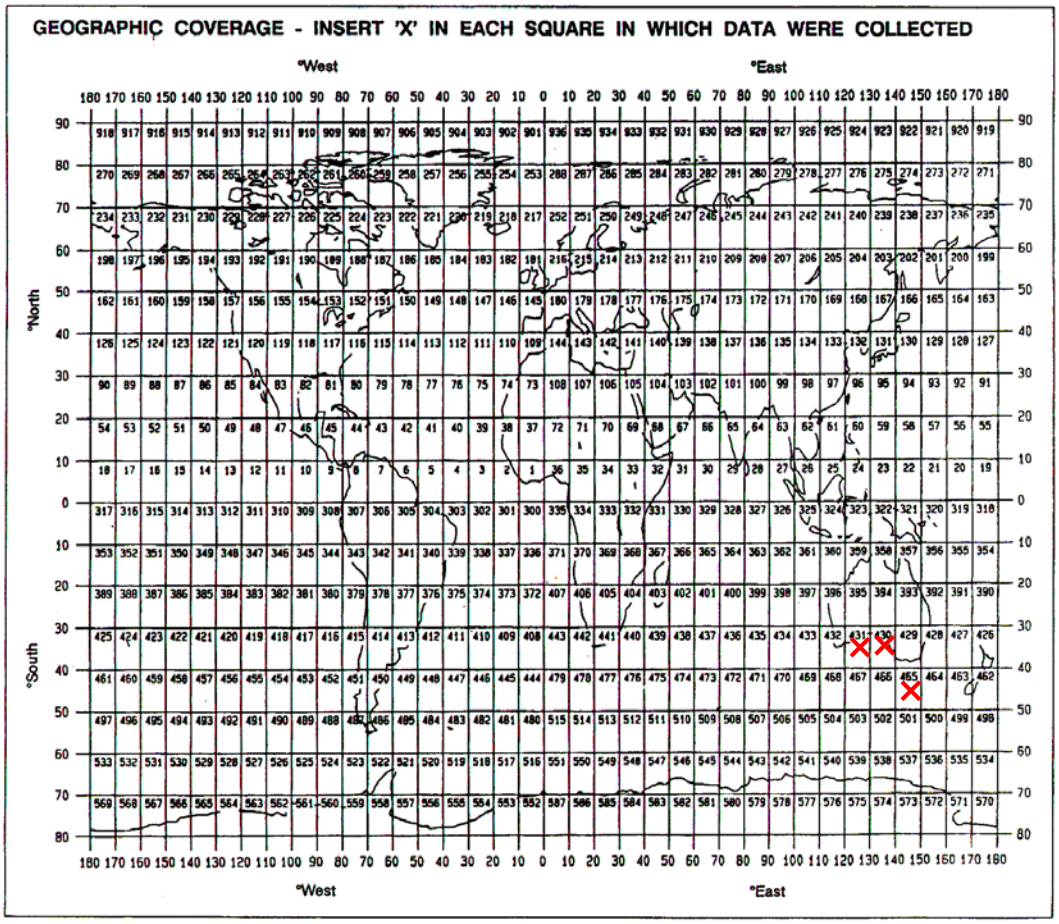
Summary

The data and samples collected from the Great Australian Bight by the IN2015_C01 voyage comprise a very large addition to the scientific understanding of the geological processes that have shaped this deep water environment and the benthic habitat and communities that currently reside there. The voyage was highly successful with the majority of the voyage objectives met. Whilst data and samples continue to be processed and analysed, outcomes from this voyage will become a large publically accessible data set, leading to new insights into the region and scientific publications in high impact journals.

Voyage Track



Marsden Squares



Summary of Measurements and samples taken

CAST_ID	ROCK WEIGHT(KG)	CORE RECOVERY(M)	FISH(G)	INVERTEBRATES(G)	CAST_TYPE	DESCRIPTION
BEAMT_001			4752	1598.5	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_016	0.22			1399.5	Beam Trawl	Collection of biological specimens from towed gear. Analysis planned = HDM for 3 samples
BEAMT_023			2	109	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_026	0.944			1538	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_036			100	600	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_052	12.38		5838	4792.65	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_054	1.22		4556	15429.5	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_060			5	28	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_064			344	2726	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_079	0.23		2154	10207	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_080			3522	4981	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_096			3334	5956	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_098					Beam Trawl	Collection of biological specimens from towed gear
BEAMT_099			7503	3355	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_108			9552	28821	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_110			8977	11883	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_114	5.28		9090	39716	Beam Trawl	Collection of biological specimens from towed gear
BEAMT_117	0.086		16772	1464.63	Beam Trawl	Collection of biological specimens from towed gear. Analysis planned = Foraminifera for 1 samples
BEAMT_123			3564	6740	Beam Trawl	Collection of biological specimens from towed gear
CTD_010					CTD	Vertical profile data. Analysis planned = BTEX / Volatile Organics: HDM: Isotopes: Metals: Nutrients: PAHs, Biomarkers for 19 samples
CTD_017					CTD	Vertical profile data. Analysis planned = BTEX / Volatile Organics: HDM: Isotopes: Metals: Nutrients: PAHs, Biomarkers for 30 samples
CTD_025					CTD	Vertical profile data. Analysis planned = BTEX / Volatile Organics: HDM: Isotopes: Metals: Nutrients: PAHs, Biomarkers for 30 samples
CTD_034					CTD	Vertical profile data. Analysis planned = HDM: Isotopes: Metals: Nutrients: PAHs, Biomarkers for 22 samples
CTD_045					CTD	Vertical profile data. Analysis planned = HDM: Isotopes: Metals: Nutrients: PAHs, Biomarkers for 20 samples
CTD_057					CTD	Vertical profile data. Analysis planned = HDM: Isotopes: Metals: Nutrients: PAHs, Biomarkers for 24 samples
CTD_072					CTD	Vertical profile data. Analysis planned = HDM: Isotopes: Metals: Nutrients: PAHs, Biomarkers for 30 samples
CTD_089					CTD	Vertical profile data. Analysis planned = BTEX / Volatile Organics: HDM: Isotopes: Metals: Nutrients: PAHs, Biomarkers for 51 samples

CAST_ID	ROCK WEIGHT(KG)	CORE RECOVERY(M)	FISH(G)	INVERTEBRATES(G)	CAST_TYPE	DESCRIPTION
CTD_111					CTD	Vertical profile data. Analysis planned = HDM: Isotopes: Metals: Nutrients: PAHs, Biomarkers for 18 samples
DRDGE_012	4.28			1	Dredge	Collection of geological specimens from towed gear. Analysis planned = Taxonomy/Tissues for 1 samples
DRDGE_015	47.78			4	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM: Taxonomy/Tissues for 5 samples
DRDGE_018	2.61				Dredge	Collection of geological specimens from towed gear. Analysis planned = Headspace Gas: Taxonomy/Tissues for 2 samples
DRDGE_021	46.36			7.5	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM for 3 samples
DRDGE_022	38.42			2	Dredge	Collection of geological specimens from towed gear
DRDGE_024	4.38			0.017	Dredge	Collection of geological specimens from towed gear
DRDGE_029	3.4			1	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM: Foraminifera for 3 samples
DRDGE_042	14.02			4676	Dredge	Collection of geological specimens from towed gear
DRDGE_043	0.956			1908	Dredge	Collection of geological specimens from towed gear. Analysis planned = Macrofauna: Taxonomy/Tissues for 3 samples
DRDGE_059	157.96			13	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM: Foraminifera: Macrofauna: Taxonomy/Tissues for 6 samples
DRDGE_061	342.74			10	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM: Foraminifera for 5 samples
DRDGE_063	0.863			1	Dredge	Collection of geological specimens from towed gear. Analysis planned = Foraminifera for 1 samples
DRDGE_066	30.16			2	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM: Foraminifera: Macrofauna: Taxonomy/Tissues for 7 samples
DRDGE_069	1.08			903	Dredge	Collection of geological specimens from towed gear. Analysis planned = Taxonomy/Tissues for 2 samples
DRDGE_070					Dredge	Collection of geological specimens from towed gear. Analysis planned = for samples
DRDGE_071	12.22			410	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM: Foraminifera: Macrofauna for 6 samples
DRDGE_085	24.88			31727	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM: Foraminifera for 4 samples
DRDGE_087	141.5		0.1	3531	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM for 3 samples
DRDGE_103	85.4			155	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM: Foraminifera: Taxonomy/Tissues for 6 samples
DRDGE_104	10.258			814	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM: Foraminifera: Isotopes for 4 samples
DRDGE_106	68.064			15711	Dredge	Collection of geological specimens from towed gear. Analysis planned = Foraminifera: Taxonomy/Tissues for 2 samples
DRDGE_113	5			123536	Dredge	Collection of geological specimens from towed gear. Analysis planned = Foraminifera: Macrofauna: Taxonomy/Tissues for 4 samples

CAST_ID	ROCK WEIGHT(KG)	CORE RECOVERY(M)	FISH(G)	INVERTEBRATES(G)	CAST_TYPE	DESCRIPTION
DRDGE_116	2.22				Dredge	Collection of geological specimens from towed gear. Analysis planned = Foraminifera for 1 samples
DRDGE_124	4.055			495	Dredge	Collection of geological specimens from towed gear. Analysis planned = HDM: Foraminifera for 4 samples
GCORE_121		1.84			Gravity Corer	Analysis planned = Headspace Gas: Headspace Gas: PAHs, Biomarkers for 8 samples
GCORE_128		4.98			Gravity Corer	Analysis planned = Headspace Gas: Headspace Gas: PAHs, Biomarkers for 20 samples
ICP_008				1	ICP multicorer	Analysis planned = Grain Size: HDM: Isotopes: Macrofauna: PAHs, Biomarkers: TC/ TOC/ TIC/ TN: Unspecified: Alkalinity: HDM: Metals for 27 samples
ICP_077					ICP multicorer	Analysis planned = Grain Size: HDM: Isotopes: Macrofauna: PAHs, Biomarkers: TC/ TOC/ TIC/ TN: Unspecified: Alkalinity: HDM: Metals for 18 samples
ICP_078					ICP multicorer	Analysis planned = Grain Size: HDM: Isotopes: Macrofauna: PAHs, Biomarkers: TC/ TOC/ TIC/ TN: Unspecified: Alkalinity: HDM: Metals for 21 samples
ICP_090					ICP multicorer	Analysis planned = Foraminifera: Grain Size: HDM: Isotopes: Macrofauna: PAHs, Biomarkers: TC/ TOC/ TIC/ TN: Unspecified: Alkalinity: HDM for 22 samples
ICP_092	0.271			605	ICP multicorer	Analysis planned = Grain Size: HDM: Isotopes: Macrofauna: PAHs, Biomarkers: TC/ TOC/ TIC/ TN: Unspecified: Alkalinity: HDM: Isotopes: Metals for 29 samples
ICP_094		0.3			ICP multicorer	Analysis planned = Grain Size: HDM: Isotopes: Macrofauna: PAHs, Biomarkers: TC/ TOC/ TIC/ TN: Unspecified: Alkalinity: HDM: Isotopes: Metals for 22 samples
ICP_105					ICP multicorer	Analysis planned = Grain Size: HDM: Isotopes: Macrofauna: PAHs, Biomarkers: TC/ TOC/ TIC/ TN: Unspecified: Alkalinity: HDM: Isotopes: Metals for 33 samples
ICP_107				5	ICP multicorer	Analysis planned = Grain Size: HDM: Isotopes: Macrofauna: PAHs, Biomarkers: TC/ TOC/ TIC/ TN: Unspecified: Alkalinity: BTEX / Volatile Organics: HDM: Isotopes: Metals for 29 samples
ICP_122					ICP multicorer	Analysis planned = Grain Size: HDM: Isotopes: Macrofauna: PAHs, Biomarkers: TC/ TOC/ TIC/ TN: Unspecified: Alkalinity: HDM: Metals for 24 samples
MCORE_053					Multicorer	Analysis planned = Grain Size: Taxonomy/Tissues for 4 samples
PCORE_033		2.2		1	Piston Corer	Analysis planned = Headspace Gas: Headspace Gas: Macrofauna: PAHs, Biomarkers: Taxonomy/Tissues for 16 samples
PCORE_037		4.19			Piston Corer	Analysis planned = Headspace Gas: Headspace Gas: Macrofauna: PAHs, Biomarkers for 19 samples
PCORE_076		1.66		482	Piston Corer	Analysis planned = Headspace Gas: Headspace Gas: Macrofauna: PAHs, Biomarkers: Taxonomy/Tissues for 11 samples
PCORE_081		0.35			Piston Corer	Analysis planned = Macrofauna for 2 samples
PCORE_091		0			Piston Corer	Analysis planned = Macrofauna: PAHs, Biomarkers for 4 samples
PCORE_093		0			Piston Corer	Analysis planned = HDM: Headspace Gas: Macrofauna: PAHs, Biomarkers for 13 samples
PCORE_095					Piston Corer	Analysis planned = Headspace Gas: Macrofauna: PAHs, Biomarkers for 14 samples

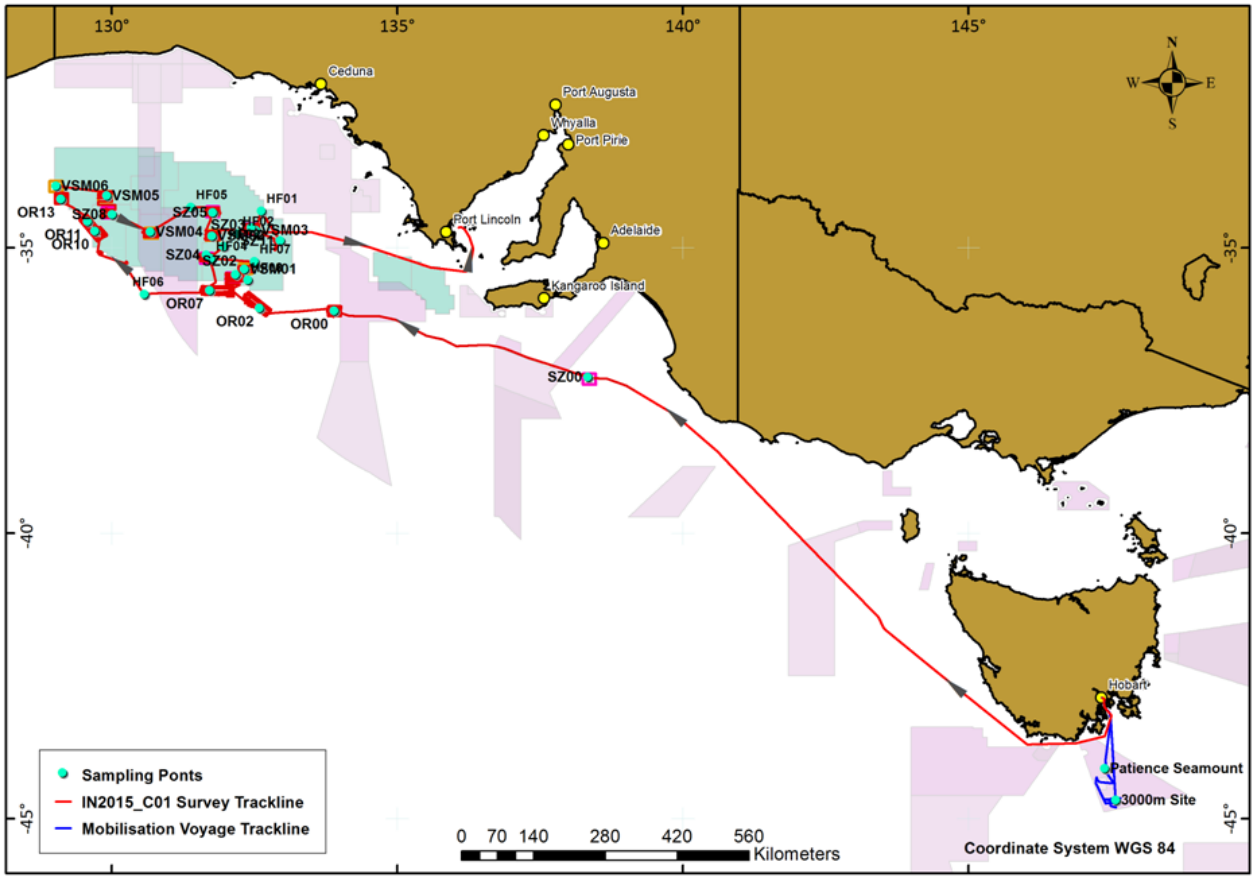
CAST_ID	ROCK WEIGHT(KG)	CORE RECOVERY(M)	FISH(G)	INVERTEBRATES(G)	CAST_TYPE	DESCRIPTION
PCORE_097		0			Piston Corer	Analysis planned = Macrofauna for 2 samples
SLED_014				9	Sherman Sled	Analysis planned = Taxonomy/Tissues for 3 samples
SLED_019	46.02			388	Sherman Sled	
SLED_020	44.72			71	Sherman Sled	Analysis planned = HDM for 6 samples
SLED_027	18.12			1	Sherman Sled	Analysis planned = HDM for 3 samples
SLED_028	4.68			3	Sherman Sled	Analysis planned = HDM for 2 samples
SLED_041	0.635			794	Sherman Sled	Analysis planned = Foraminifera for 1 samples
SLED_044	0.07			193	Sherman Sled	
SLED_055	78.21			4	Sherman Sled	Analysis planned = HDM: Foraminifera for 3 samples
SLED_058	97.16			145	Sherman Sled	Analysis planned = HDM: Foraminifera for 3 samples
SLED_062	1.92				Sherman Sled	Analysis planned = Macrofauna: Taxonomy/Tissues for 3 samples
SLED_086	0.82		24	49	Sherman Sled	Analysis planned = Macrofauna: Taxonomy/Tissues for 3 samples
TCAM_003					Towed Camera	Video and still images taken during towed camera deployment
TCAM_031					Towed Camera	Video and still images taken during towed camera deployment
TCAM_038					Towed Camera	Video and still images taken during towed camera deployment
TCAM_039					Towed Camera	Video and still images taken during towed camera deployment
TCAM_040					Towed Camera	Video and still images taken during towed camera deployment
TCAM_050					Towed Camera	Video and still images taken during towed camera deployment
TCAM_051					Towed Camera	Video and still images taken during towed camera deployment
TCAM_065					Towed Camera	Video and still images taken during towed camera deployment
TCAM_067					Towed Camera	Video and still images taken during towed camera deployment
TCAM_068					Towed Camera	Video and still images taken during towed camera deployment
TCAM_073					Towed Camera	Video and still images taken during towed camera deployment
TCAM_074					Towed Camera	Video and still images taken during towed camera deployment
TCAM_075					Towed Camera	Video and still images taken during towed camera deployment
TCAM_082					Towed Camera	Video and still images taken during towed camera deployment
TCAM_083					Towed Camera	Video and still images taken during towed camera deployment
TCAM_084					Towed Camera	Video and still images taken during towed camera deployment
TCAM_100					Towed Camera	Video and still images taken during towed camera deployment
TCAM_101					Towed Camera	Video and still images taken during towed camera deployment
TCAM_102					Towed Camera	Video and still images taken during towed camera deployment
TCAM_112					Towed Camera	Video and still images taken during towed camera deployment
TCAM_115					Towed Camera	Video and still images taken during towed camera deployment

CAST_ID	ROCK WEIGHT(KG)	CORE RECOVERY(M)	FISH(G)	INVERTEBRATES(G)	CAST_TYPE	DESCRIPTION
TCAM_118					Towed Camera	Video and still images taken during towed camera deployment
TCAM_119					Towed Camera	Video and still images taken during towed camera deployment
TPRBE_006					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_007					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_030					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_046					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_047					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_048					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_049					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_056					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_088					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_109					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_125					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_126					Temperature Probe	Temperature measurements taken during probe insertion
TPRBE_127				1	Temperature Probe	Temperature measurements taken during probe insertion. One biological specimen caught at the time

Curation Report

Item No.	DESCRIPTION
1.	All raw voyage data will be stored by the MNF with a duplicate copy retained by the CS for further analysis and interpretation.
2.	Analytical data collected during the course of the survey will be stored by CSIRO until post survey data processing is complete, after which the data will be made available to AODN and the National Geological Data repository.
3.	Biological taxonomic samples: All samples were preserved in Ethanol or Formalin and stored at ambient conditions, depending on taxa samples will be publically accessible through the various organisations responsible for their curation (SARDI, CSIRO, South Australian Museum, Museum of Victoria, Australian Museum, Sydney).
4.	Biological microbial samples: All samples will be preserved at -80^{o}C before destructive testing.
5.	Sediment samples: All samples to be initially stored at CSIRO in order to undertake subsampling for more detailed analysis. After which the samples stored, at ambient conditions, cold store or freezer at the Geoscience Australia publically accessible government geological sample repository.

Track Chart


130°
135°
140°
145°
-35°
-40°
-45°
N
W
E
S
Ceduna
Port Augusta
Whyalla
Port Pirie
Port Lincoln
Adelaide
Kangaroo Island
Hobart
VSM06
VSM05
HF05
HF01
OR13
SZ08
SZ05
VSM04
VSM03
OR11
OR10
SZ04
SZ02
HF06
OR07
OR02
OR00
SZ00
Patience Seamount
3000m Site
Sampling Ponts
IN2015_C01 Survey Trackline
Mobilisation Voyage Trackline
0 70 140 280 420 560
Kilometers
Coordinate System WGS 84

Personnel List

	Name	Organisation	Role
1.	Stephen McCullum	CSIRO MNF	Voyage Manager
2.	Andrew Ross	CSIRO, Energy	Voyage leader
3.	Aaron Tyndall	CSIRO MNF	SIT Support
4.	Alan Williams	CSIRO, O&A	Shift leader, Co-PI
5.	Amy Nau	CSIRO, O&A	Data visualisation
6.	April Pickard	CSIRO, Energy	Core & rock description/logging
7.	Asrar Talukder	CSIRO, Energy	Shallow geophysics/Co-PI
8.	Bernadette Heaney	CSIRO MNF	GSM Support
9.	Charlotte Stalvies	CSIRO, Energy	Water and sediment sampling
10.	Christian Müller	Fielax	Temperature probe technician
11.	Christine Trefry	CSIRO, Energy	Data management/Reporting
12.	Dan Gledhill	CSIRO,O&A	Fish processing and curation
13.	David Fuentes	University of Sydney	Water and sediment sampling
14.	David Mole	CSIRO, Mineral Resources	Core & rock description/logging
15.	David Staples	Museum Victoria	Fish processing
16.	Emanuelle Frery	CSIRO, Energy	Geophysics
17.	Hugh Macintosh	Museum Victoria	Invertebrate processing and curation
18.	Jessica Lopez	South Australia Museum	Invertebrate processing and curation
19.	Karen Gowlett-Holmes	CSIRO, O&A	Biological sampling - imagery
20.	Karl Forcey	CSIRO O&A	Electronics
21.	Ken Graham	Australian Museum, Sydney	Fish processing and curation
22.	Mark Green	CSIRO, O&A	Benthic sampling
23.	Mark Lewis	CSIRO MNF	SIT Support
24.	Martijn Woltering	CSIRO, Energy	Analytical instrumentation
25.	Matt Boyd	CSIRO MNF	GSM Support
26.	Matt Lansdell	CSIRO, O&A	Biological and geological sampling
27.	Mederic Mainson	CSIRO, Energy	Sensor tech/sampling
28.	Nick Mortimer	CSIRO, O&A	ADCP and LADCP processing
29.	Pamela Brodie	CSIRO MNF	DAP
30.	Peter Hughes	CSIRO MNF	Hydrochemistry
31.	Rod Palmer	CSIRO MNF	SIT Support
32.	Stephen Doyle	South Australia Museum	Fish processing curation
33.	Steve Keable	Australian Museum, Sydney	Invertebrate processing and curation
34.	Stewart Wilde	CSIRO MNF	DAP
35.	Stuart Edwards	CSIRO, O&A	USBL Navigation
36.	Sureyya Kose	Curtin University	Geochemical sampling
37.	Wade Farley	Wade Farley	Communications/videographer

Marine Crew

Name	Role
Mike Watson	Master
Rod Quinn	Chief Mate
Andrew Roebuck	Second Mate
James Hokin	Third Mate
Ian Mortimer	Chief Engineer
Sam Benson	First Engineer
Ian McDonald	Second Engineer
Damian Wright	Third Engineer
Shane Kromcamp	Electrical Engineer
Cassandra Rowse	Chief Caterer
Emma Lade	Caterer
Keith Shepherd	Chief Cook
Matt Gardiner	Cook
Jonathan Lumb	Chief Integrated Rating
Dean Hingston	Integrated Rating
Darren Capon	Integrated Rating
Murray Lord	Integrated Rating
Dennis Bassi	Integrated Rating
Kel Lewis	Integrated Rating
Ryan Drennan	Integrated Rating

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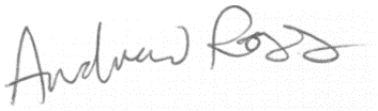
Signature

Your name	Andrew Ross
Title	Chief Scientist
Signature	
Date:	22/01/2016