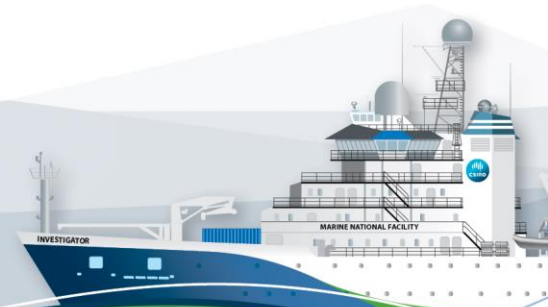


## RV Investigator Voyage Summary

<b>Voyage #:</b>	IN2015_v02		
<b>Voyage title:</b>	Sustained monitoring of the East Australian Current: Mass, heat and freshwater transports		
<b>Mobilisation:</b>	0800, Hobart, Wednesday, 6 May 2015		
<b>Depart:</b>	2000, Sydney, Friday, 15 May 2015		
<b>Return:</b>	1300, Brisbane, Tuesday, 26 May 2015		
<b>Demobilisation:</b>	Hobart, Friday, 26 June 2015		
<b>Voyage Manager:</b>	Tegan Sime	<b>Contact details:</b>	Tegan.Sime@csiro.au
<b>Chief Scientist:</b>	Bernadette Sloyan		
<b>Affiliation:</b>	CSIRO O&A	<b>Contact details:</b>	Bernadette.Sloyan@csiro.au
<b>Principal Investigators:</b>	Susan Wijffels, Rebecca Cowley		



## Objectives and brief narrative of voyage

### Scientific objectives

The East Australian Current (EAC) is a complex and highly energetic western boundary system in the south-western Pacific off eastern Australia. It provides both the western boundary of the South Pacific gyre and the linking element between the Pacific and Indian Ocean gyres. This voyage will deploy an array of full-depth current meter and property (CTD) moorings from the continental slope to the abyssal waters off Brisbane (27°S). At this location, just north of the high eddy variability, the EAC approaches its maximum strength and its flow is relatively uniform and coherent. The aim of this observing system is to capture the mean and time-varying flow of the EAC.

This is a component of IMOS and will provide an intensive reference set of measurements of the EAC flow over a sustained period. The moorings monitor EAC transport, will provide an improved understanding of the relationship of the EAC to the South Pacific gyre and impact of the coastal marine ecosystem, and will be used to validate and interpret the EAC current system in numerous climate and ocean models. The mooring array is located near the existing long-term XBT transect, satellite altimetry and glider tracks.

### Voyage objectives

This voyage will redeploy an array of six full-depth current meter and property (temperature, salinity and pressure) moorings from the continental slope to the abyssal waters off Brisbane (26°S). The observing system is designed to capture the mean and time-varying flow of the EAC. In order to resolve interannual and decadal signals we aim to maintain multi-year deployment of the array.

The main aim of the voyage will be to deploy an array of (6) full-depth current meter/CTD moorings extending from the continental slope to the abyssal waters off Brisbane. The following specific objectives will be performed:

#### *List of tasks*

1. Carry out swath mapping from the abyssal plain to the base of the continental slope
2. Deploy each of the moorings at appropriate locations, including position triangulation of each mooring
3. Complete CTD/rosette stations at each mooring, with LADCP
4. Complete a number of Ship ADCP sections along the mooring line
5. Complete deep CTD and RBR sensor testing at a number of CTD stations
6. Complete XBT and CTD side-by-side comparisons at CTD stations

## Results

1. Combined swath mapping over two days provided a bathymetric map of the EAC mooring array region.

While the swath map is reliable over hard bottom, we suspect the swath map is overestimating the depth of the bottom of the abyssal plain at the base of the continental slope. This conclusion has been reached based on evidence of a discrepancy of depth of CTD 5 and the EM 122, that had the water depth 30 m deeper than the CTD package that landed on the bottom. On retrieval of the CTD mud was found on the CTD package. Given this mishap with the CTD, comparison of CTD stations revealed that the EM 122 was estimating the depth of the abyssal plain to be 10 to 40m deeper than the bottom depth obtained from the CTD/rosette (Table 1). (CTD depth is determined from CTD pressure converted to depth and altimeter reading of CTD package above bottom.) Given these discrepancies caution was taken for CTD stations on the abyssal plain at the base of the continental slope.

CTD – EM 122 Bottom Depth Comparisons

CTD #	Depth Sounder (m)	CTD (m)	Difference (m)
2 18-May02015	4787	4777.09	9.90
3 19-May-2015	4781	4767.31	13.69
4 20-May-2015	4776	4765.27	10.72
5 20-May-2015	3936	3892.31	43.69

Table 1: Bottom depth difference in (m) from EM 122 (12kHz multi-beam) and the CTD pressure sensor. Note: CTD bottom depth converted with the gsw\_matlab\_v3\_04 toolbox.

2. Six moorings across the East Australian Current were deployed.

Six mooring were successfully deployed on the voyage. Table 2 was the target location of the moorings and Table 3 is the actually location the mooring landed. The difference between the target and landed positions of all mooring was small, approximately less than 800 m. Figure 1 gives the landed location of the mooring across the continental slope and abyssal plain.

Table 2 EAC mooring target location and swath depth

Target	EAC_500	EAC_2000	EAC_3200	EAC_4200	EAC_4700	EAC_4800
Longitude	153.8993 (153° 53.958'E)	153.9973 (153° 59.838' E)	154.1356 (154° 8.136' E)	154.2971 (154° 17.826' E)	154.6471 (154° 38.826' E)	155.2993 (155° 17.958' E)
Latitude	-27.327 (27° 19.620' S)	-27.3116 (27° 18.960' S)	-27.2853 (27° 17.118' S)	-27.2498 (27° 14.988' S)	-27.2086 (27° 12.516' S)	-27.102 (27° 6.120' S)
Swath Depth (m)	535.30	1927	3188*	4269*	4768*	4790*

\*EAC\_3200 – The swath depth is 30 m deeper than CTD in area which hit the bottom. Soft mud sediment was not identified by swath. Estimate bottom depth to be approximately 3158.

\*EAC\_4200, 4700, 4800 – Depth determined from swath may be too deep due to mud sediments.

Table 3 EAC mooring anchor location and swath depth

Anchor	EAC_500	EAC_2000	EAC_3200	EAC_4200	EAC_4700	EAC_4800
Longitude	153.9000 (153° 54.00' E)	153.9960 (153° 59.760' E)	154.1356 (154° 8.136' E)	154.2988 (154° 17.928' E)	154.6469 (154° 38.814' E)	155.3005 (155° 18.030' E)
Latitude	-27.3252 (27° 19.512' S)	-27.3141 (27° 18.846' S)	-27.2830 (27° 16.980' S)	-27.2490 (27° 14.940' S)	-27.2079 (27° 12.474' S)	-27.1026 (27° 6.156' S)
Swath Depth (m)	546	1902	3186*	4274*	4778*	4791*

\*EAC\_3200 – Swath depths may be 40 m too deep.

\*EAC\_4200, 4700, 4800 – Swath depth may be 10-20 m too deep.

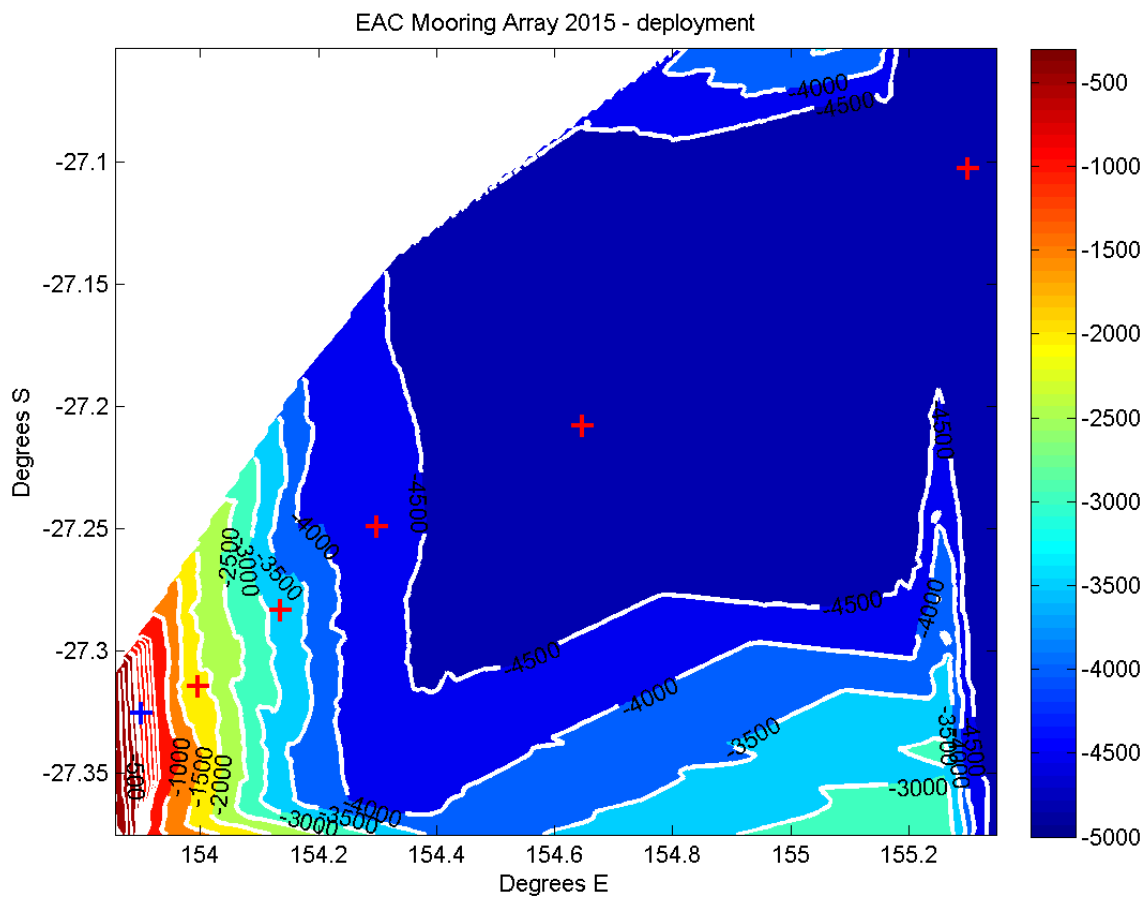


Figure 1 Landed position of six East Australian Current moorings.

3. Complete CTD/rosette stations at each mooring, with LADCP

A total of 18 CTD stations were performed. Station 1 was a test cast and there was 1 abandoned station due to failure of the CAP CTD/rosette system.

4. Complete a number of Ship ADCP sections along the mooring line

Two complete continuous Ship ADCP sections were completed.

5. Complete deep CTD and RBR sensor testing at a number of CTD stations

The RBR sensor was deployed on CTD stations 1, 6, 12, 15, 16, 17, 18. The maximum depth of these stations was less than <1800 m.

6. Complete XBT and CTD side-by-side comparisons at CTD stations

XBT and CTD side-by-side comparisons were undertaken at CTD stations 1, 2, 3, 4, 5, 6, 7, 8, 9, further XBT tests were performed when the ship was underway during swath mapping operations. A total of 144 XBTs were deployed. When the processed CTD data becomes available, the XBT/CTD pairs will be added to the XBT/CTD pairs database available via the CSIRO DAP (doi: <http://dx.doi.org/10.4225/08/543F60A3F1690>).

## Voyage Narrative

### Friday 15 May

During the day Bernadette Sloyan gave a number of interviews to Sydney media (radio and SBS TV). CSIRO mooring mechanics and science crew completed the mooring setup and tie-down and instrument settings, respectively. The students participating on the voyage arrived and became acquainted with the ship. We left Sydney at 2030.

### Saturday 16 May

We continued the transit northwards along the coast and then turned off-shore towards the position of EAC\_4800 (most off-shore mooring).

During the transit we held a whole-of-crew and science party meeting and mooring toolbox. Bernadette provided the science background and major aims of the voyage. Jamie Derrick distributed the mooring procedure documentation to everyone. He then provided detailed instructions on the mooring operations and deck safety. Jonno (bosun) outlined the deck procedure, and interaction and communication strategy amongst deck crew, mooring team and ship officers.

We completed a test CTD and XBT side-by-side to a depth of 1900 m. The RBR CTD was deployed on this station. The RBR was soaked at a few depths to investigate stability of sensors over 20 minutes. The MNF hydrochemistry team showed the students how to sample the CTD/rosette for nutrients and oxygen. All 24-bottles were fired at one depth to test for leakers.

Susan Wijffels and the MNF Data Acquisition and Processing team worked on setting up the ship ADCP system (75 kHz and 150 kHz).

Bernadette Sloyan and Bernadette Heaney setup the swath grid which was started as we approached the mooring site.

Rebecca Cowley and the students commenced the XBT/CTD inter-comparisons, deploying from the back deck (at 2m above the water) and from the bridge wings (at approximately 18m above the water). The first tests showed that deploying from the bridge while stationery was not successful, with XBT wire being caught on the ship's superstructure. A new deployment plan was

developed. XBTs will be deployed from the bridge and the deck while underway to compare XBT to XBT. XBTs will still be deployed from the back deck when CTDs are being run.

### **Sunday 17 May**

We continued the transit to the outside mooring location and set up the back deck for the deployment of EAC\_4800 (EAC\_6). This included a test anchor lift. The EAC\_4800 mooring releases were tested. Jamie, Phil and Kurt spooled the EAC\_4800 mooring wire/rope onto the mooring winch.

We arrived at the mooring location at 17:30 and immediately began the swath grid. The swath grid was completed at 2230. The depth of the EAC\_4800 was determined to be 4793 m. This was 10m deeper than the build length. We added 10m to the mooring length.

Susan Wijffels and MNF data and electronics technicians continued to try and get the ship ADCP system working. There are some concerns about the setup input into VMDAS and reboot of the system that occurs every 5-10 minutes.

It was decided that we would deploy EAC\_4800 tomorrow, subject to assessment of weather conditions.

We swathed the EAC\_4700 site overnight.

While swath during daylight hours, the XBT/XBT tests were continued from the bridge and the deck.

### **Monday 18 May**

After completion of swath of EAC\_4700 we returned to EAC\_4800 locations in preparation for the mooring deployment. Bernadette Sloyan was up at 0530 to assess weather conditions and forecast. The weather forecast was favourable – light rain and wind 15-20 knots.

Jamie and Jonno held a mooring toolbox on the bridge prior to breakfast. We requested an eight (8) hour setup to lay the mooring. Based on required ship speed through the water of 1.5 knots and prevailing conditions Bernadette worked with ship officers to determine the position of the ship and distance from the mooring target location. The sea conditions were a 1.3 knot southward current. We set up the vessel 5 n.m to the southeast of the target location, based on opposing current speed (-1.3 knot), speed through the water (1.5 to 2 knots) and expected speed over ground of 0.5-0.8 knots and eight hours to lay the mooring (0.5 knots \* 8 hours = 4 n.m + 1 n.m for slow mooring deployment).

During the mooring operation Jamie requested that the ship officers slightly increase the vessel speed to keep tension on the mooring line.

We began laying the mooring at 1000 and the anchor was released at 1700. Total deployment time of 7 hours. We towed the mooring for approximately 1 hour at 2 knots prior to anchor release.

A CTD was completed at the mooring site and mooring location was determined. XBTs were deployed from the deck during the CTD cast.

The mooring team cleaned the back deck and began preparations for deployment of EAC\_4700. The length of EAC\_4700 was as planned.

### **Tuesday 19 May**

Bernadette and mooring team were up early to assess weather conditions. The conditions were cloudy with wind 10 knots. The current is southward at 0.8-1 knot.

We tested the acoustic releases of the EAC\_4700 mooring.

Jamie and Jonno held a mooring toolbox. Jamie requested a lay-out time of 7 hours. Given current speed and direction, Bernadette and ship officer positioned the vessel 7 n.m to the southeast of the mooring locations.

The mooring operations started at 0932. All instruments were deployed by 1350. The mooring anchor was released at 1612, after approximately a 2 hour tow.

The location of the mooring was determined and a CTD was completed.

At the completion of EAC\_4700 mooring operation we steamed to the EAC\_4200 mooring site and began to swath the area around EAC\_4200 and across the continental slope to EAC\_500.

Susan continued to trouble shoot the ships 75 kHz and 150 kHz ADCPs. She fixed many issues and has the VHDAS display showing current for the upper 500 m and 150 m, respectively. Both instruments appear to be interfering with each other and the acoustic fish array. We turned off the ship fish acoustic array as there appears to be significant contamination of the near surface 150 kHz velocity that is either bubbles or ringing. We moved the drop keel position to attempt to trouble shoot the interference issues of the 150 kHz instrument.

### **Wednesday 20 May**

Swathing of the continental slope was completed at 1400. Initial analysis of the swath data indicates a depth of 4269 m of EAC\_4200 mooring site. We decided to add 10 m to the mooring length with the mooring length now 4268 m. We also moved the mooring location to a flatter site: mooring site -27.2498 and 154.2971 E. These changes in mooring location were provided to the bridge.

Jamie, Phil and Kurt completed the winding on of the EAC\_4200 m mooring wire and dynex. They re-arranged the back deck and moved floats and weights. Jim and Bernadette tested the EAC\_4200 releases.

We completed a number of CTD stations (CTD 4 and CTD 5). XBTs were deployed from the deck during the CTD casts.

Bernadette reviewed the location and depth of EAC\_3200. We plan to move the location of the mooring to a more favourable location. New position is -27.2853 and 154.1356 E. The mooring was built for 3254 m but the swath depth is 3188 m. The difference is 67 m. We will remove the bottom 64 m dynex length of the mooring and replace with 10m. Thus the mooring is shortened by 54 m. However, there is confusion between the swath depth and true water depth based on CTD 5. CTD 5 hit the bottom and was recording a depth 43 m shallower than swath. Given the uncertainty of the swath depth the 10m shoot added to EAC\_3200 was removed. The mooring was shortened by 67 m from original built length.

The vessel transited back to EAC\_4200 site. While underway, and during daylight hours, the XBT/XBT tests were continued from the bridge and the deck.

### **Thursday 21 May**

Bernadette, Jamie and mooring crew were on deck by 0530 to assess the weather and finalise the back deck in preparation for the deployment of EAC\_4200.

Jamie and Jonno held a mooring toolbox on the bridge. Jamie requested 7 hrs to lay the mooring. We have a 0.5-0.8 knot northward current and southerly wind. We moved the vessel to the north of the mooring site at a distance of 7 n.m.

The deployment of the mooring began at 0813 and the anchor was released at 1400. The mooring position was determined and a CTD completed at the mooring site.

Bernadette and Jim tested EAC\_3200 moorings. Acoustic release 36093 failed and was replaced with serial number 25691. Jamie, Phil and Kurt clean and prepared the back deck for EAC\_3200 mooring deployment.

We then completed CTD stations on the mooring line and the vessel moved to EAC\_3200 mooring site. XBTs were deployed from the deck during the CTD casts.

### **Friday 22 May**

All were awake and on deck to complete mooring preparation for deployment of EAC\_3200. Weather conditions were good with a 10-20 knot wind

Jamie and Jonno completed the toolbox. Jamie requested 7 hours to deploy the mooring. The vessel was setup 8 n.m to the north of the mooring site.

Mooring operations began at 0800 and anchor was deployed at 1442. The mooring was deployed in west to southwest wind of 25 knots. Wind was on the ships beam and bow thrusters were working at 100% capacity to keep the vessel on course. This was not ideal but was the result of the wind not shifting to the southwest- southerly as suggested by the forecast.

The mooring position was determined and a CTD was completed. XBTs were deployed from the deck during the CTD cast.

Bernadette reviewed the location of EAC\_2000. The mooring was location was moved to -27.3116 and 153.9973 E with a depth of 1927. The original length of the mooring was shortened by 24 m.

After completion of the CTD 10 (at mooring location), the vessel transited to location near EAC\_4700 and a CTD station (CTD 11) was completed overnight.



### **Saturday 23 May**

The vessel return transited to EAC\_2000 location was slowed due to slight swell conditions and strong winds. We arrived at the mooring location at 0830. We assessed the weather conditions and given the anticipated decrease of wind and wave conditions it was agreed to proceed with deploying the mooring. Weather conditions at 1000 were south-southeasterly 30-35 knots and water current 1 knot southerly.

Jamie and Jonno held the mooring toolbox and reminded everyone that conditions were not as calm as previous mooring operations and reminded everyone on the back deck of potential safety risks and procedures to mitigate these risks.

The vessel was to the north-northeast of the mooring. Jamie request 7 hours to lay the mooring. Mooring deployment began at 1100 and the anchor was released at 1732.

The mooring position was determined and a CTD was completed at the mooring site. We completed a number of CTD stations overnight.

### **Sunday 24 May**

We arrived at the EAC\_500 mooring location at 0630 and positioned the ship into the southerly wind to the north of the mooring location.

Mooring operations began at 0825. The deployment of the mooring anchor was deployed just after noon when the noon-midnight watch was on deck.

The mooring position was determined and a CTD station completed.

A plan to complete a number of CTD stations and ship ADCP sections was presented to the voyage manager and ship captain. This was approved and we began these operations.

Jamie, Phil, Kurt and Darren and Jim began clearing and packing the back deck and mooring lab into the containers.

### **Monday 25 May**

We complete the CTD section along the mooring line and began the ship ADCP sections.

The science party continued to pack gear and clean the science areas.

Science operations were stopped at approximately 2100, to enable the vessel to be at the pilot station by 0630 on Tuesday.

### **Tuesday 26 May**

The vessel transited to the pilot station and docked in Brisbane in the early afternoon. The science party departed.

### **Summary**

The science objectives of the voyage were successfully completed.

## Voyage Track

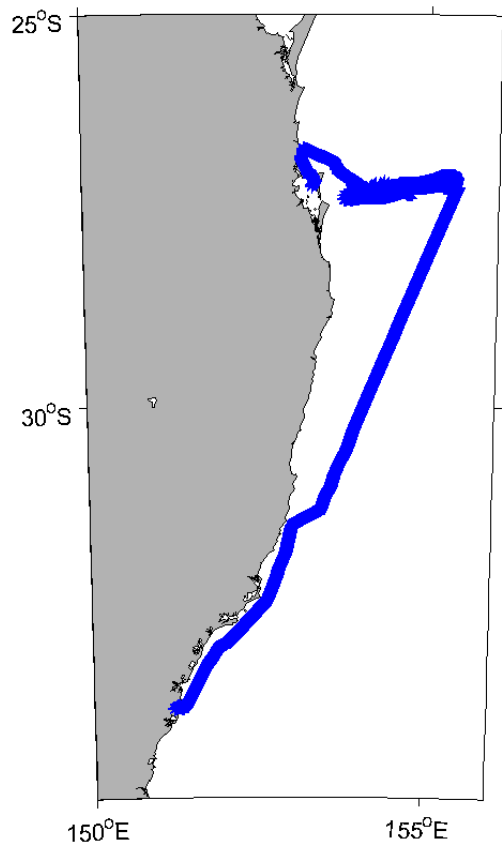


Figure 2 Voyage track of IN2015\_v02



## Moorings, bottom mounted gear and drifting systems

Item No	PI See page above	APPROXIMATE POSITION						DATA TYPE enter code(s) from list on last page	DESCRIPTION
		LATITUDE			LONGITUDE				
		deg	min	N/S	deg	min	E/W		
EAC_500	392	27	19.512	S	153	54.0	E	D01,D71	See mooring diagram
EAC_2000	392	27	18.846	S	153	59.76	E	D01,D71	See mooring diagram
EAC_3200	392	27	16.980	S	154	8.136	E	D01,D71	See mooring diagram
EAC_4200	392	27	14.940	S	154	17.928	E	D01,D71	See mooring diagram
EAC_4700	392	27	12.474	S	154	17.928	E	D01,D71	See mooring diagram
EAC_4800	392	27	6.156	S	155	18.030	E	D01,D71	See mooring diagram

## Summary of Measurements and samples taken

<b>Item No.</b>	<b>PI see page above</b>	<b>NO see above</b>	<b>UNITS see above</b>	<b>DATA TYPE  Enter code(s) from list on last page</b>	<b>DESCRIPTION</b>
CTD	392	18	Stations	H09,H10	CTD data and water samples
XBT	392	141	Profiles	H10	Temperature profile data
ADCP	392	2	Tracks	D71	Shipboard ADCP tracks

## Personnel List


	<b>Name</b>	<b>Organisation</b>	<b>Role</b>
1.	Tegan Sime	CSIRO	Voyage Manager
2.	Stephen McCullum	CSIRO	Deputy Voyage Manager
3.	Ian McRobert	CSIRO	SIT
4.	Nicole Morgan	CSIRO	SIT
5.	Pamela Brodie	CSIRO	DAP
6.	Steve Van Graas	CSIRO	DAP
7.	Bernadette Heaney	CSIRO	GSM
8.	Cassie Schwanger	CSIRO	Hydrochem
9.	Peter Hughes	CSIRO	Hydrochem
10.	Bernadette Sloyan	CSIRO	Chief Scientist/moorings/CTD
11.	Susan Wijffels	CSIRO	Principal Scientist (CTD sensor testing)
12.	Rebecca Cowley	CSIRO	Principal Scientist (Moorings/XBT)
13.	Jamie Derrick	CSIRO	Chief Mooring Tech
14.	Darren Moore	CSIRO	Mooring Tech
15.	Jim La Duke	CSIRO	Mooring Instrument Tech
16.	Phil deBoer	CSIRO	Mooring Tech
17.	Gabriela Semolini Pilo	UTAS	CTD,XBT
18.	Joshua Reinke	Griffith University	Whale watching
19.	Johan Gustafson	Griffith University	Whale watching
20.	Tim Austin	UNSW	Mooring tech
21.	Stuart Milburn	UNSW	Mooring tech
22.	Eduardo Vitarelli	UNSW	Student, CTD,XBT
23.	Nina Ribbat	UNSW	Student, CTD, XBT
24.	Anthony Gramoulle	UNSW	Student, CTD, XBT
25.	Ken Ridgway	CSIRO	Mooring, CTD
26.	Curt Chalk	CSIRO	Mooring Tech
27.			
28.			
29.			

## Marine Crew

<b>Name</b>	<b>Role</b>
John Highton	Master
Gurmukh Nagra	Chief Mate
Brendan Eakin	Second Mate
Andrew Roebuck	Third Mate
Gennadiy Gervasiev	Chief Engineer
Mark Ellicott	First Engineer
Ian McDonald	Second Engineer
Ryan Agnew	Third Engineer
John Curran	Electrical Engineer
Cassandra Rowse	Chief Caterer
Emma Lade	Caterer
Rebecca Lee	Chief Cook
Matt Gardiner	Cook
Jonathan Lumb	Chief Integrated Rating
Dean Hingston	Integrated Rating
Ryan Drennan	Integrated Rating
Murray Lord	Integrated Rating
Dennis Bassi	Integrated Rating
Kel Lewis	Integrated Rating
RoderickLangham	Integrated Rating

## Acknowledgements

### Signature

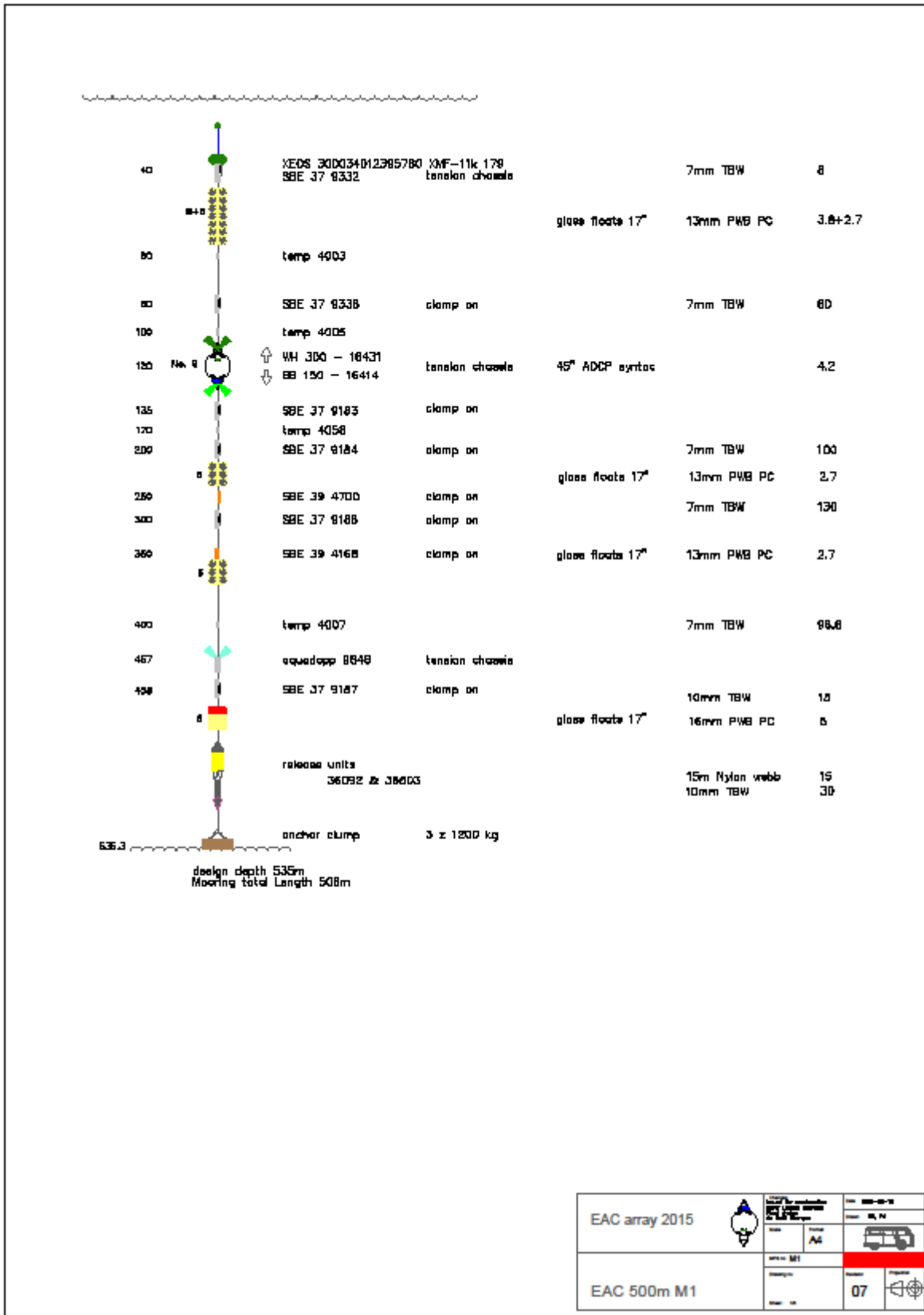
<b>Your name</b>	Bernadette Sloyan
<b>Title</b>	Chief Scientist
<b>Signature</b>	
<b>Date:</b>	09/08/2015

### List of additional figures and documents

- Appendix 1      Mooring Diagrams
- Appendix 2      Scientific Highlight



# Appendix 1 Mooring Diagrams



EAC array 2015		<table border="1"> <tr> <td>Project</td> <td>EAC</td> </tr> <tr> <td>Version</td> <td>M1</td> </tr> <tr> <td>Revision</td> <td>07</td> </tr> </table>	Project	EAC	Version	M1	Revision	07
Project	EAC							
Version	M1							
Revision	07							
EAC 500m M1		<table border="1"> <tr> <td>Author</td> <td></td> </tr> <tr> <td>Checker</td> <td></td> </tr> <tr> <td>Approver</td> <td></td> </tr> </table>	Author		Checker		Approver	
Author								
Checker								
Approver								

40	XEOS 300034012387750 XFM-11k-270 SBE 37 9333	tension chassie		7mm TBW	10
60	No. 3		Hydrofloat 45"		4.2
80	temp 4059				
90	SBE 37 9339	clamp on		7mm TBW	60
100	temp 4010				
120	↑ WH 300 - 14253 ↓ LR 75 - 14188	tension chassie	45" ADCP syntax		4.2
135	SBE 37 9155	clamp on			
170	temp 4011				
200	SBE 37 9159	clamp on		7mm TBW	200
250	SBE 39 4199	clamp on			
300	SBE 37 9190	clamp on			
300	5		glass floats 17"	13mm PWB PC	3.8
330	SBE 39 4170	clamp on			
400	temp 4012				
485	SBE 37 13081	clamp on		7mm TBW	320
610	SBE 37 9184	clamp on			
850	No. 7 ↓ EE 150 - 17995	tension chassie	40" ADCP syntax		4.2
900	SBE 39 4171	clamp on			
1000	SBE 39 4197	clamp on		7mm TBW	380
1400	5		glass floats 17"	13mm PWB PC	3.8
1180	SBE 37 4299	clamp on	glass floats 17"	7mm TBW	180
1300	equadopp 5979	tension chassie	glass floats 17"	13mm PWB PC	1.8
1300	temp 4013			8 mm DYNEX	300
1500	equadopp 5909 SBE 39 1332	tension chassie	glass floats 17"	13mm PWB PC	3.8
1700	temp 4071			8 mm DYNEX	374.4
1876	equadopp 5929	tension chassie			
1660	SBE 37 4300	clamp on		10mm TBW	15
1800	4		glass floats 17"	16mm PWB PC	9
	release units 24588 & 36091			10mm TBW	30
1857.4	anchor clamp	3 x 1500 kg			

Design Depth 1957m  
Total Length 1828. 3% DYNEX stretch is 20.3m shorter

EAC array 2015			REV: 002-00-10 DATE: 04/14
EAC 2000m M2	APP: M2	PROJ: A4	07

40	XEOS 3000340123065BD XNF-11-B31 SBE 37 9334	tension chocks		7mm TBW	10
No. 11			Hydrofloat 47m		4.2
60	temp 4015				
80	SBE 37 9340	clamp on		7mm TBW	60
100	temp 4060				
160	WH 300 - 18432 LR 70 - 14292	tension chocks	45° ADCP sytocs		4.2
170	SBE 37 9882	clamp on			
170	temp 4022				
200	SBE 37 9880	clamp on		7mm TBW	200
290	SBE 38 4188	clamp on			
300	SBE 37 9885	clamp on			
325			glass floats 17m	13mm PAB PC	3.0
360	SBE 38 4201	clamp on			
400	temp 4023				
480	SBE 37 9886	clamp on		7mm TBW	320
810	SBE 37 9887	clamp on			
830	BB 150 - 17850	tension chocks	45° ADCP sytocs		4.2
830	SBE 38 4328	clamp on			
1000	SBE 38 4500	clamp on		7mm TBW	380
1010			glass floats 17m	13mm PAB PC	2.7
1180	SBE 37 7897	clamp on		7mm TBW	180
1900	equedopp 5837	tension chocks			
1900	temp 4897			8 mm DYNEX	300
1900	equedopp 5838 SBE 38 3978	tension chocks			
1900			glass floats 17m	13mm PAB PC	2.7
1900	temp 4899			8 mm DYNEX	500
2000	equedopp 5843	tension chocks			
2000	SBE 37 6263	tension chocks	glass floats 17m	13mm PAB PC	2.7
				8 mm DYNEX	1000
3000		tension chocks	glass floats 17m	13mm PAB PC	2.7
3178	equedopp 5850			8 mm DYNEX	84
3177	SBE 37 8284			8 mm DYNEX 10mm TBW	100 15
			glass floats 17m	18mm PAB PC	8
	release units 38003 & 35710				
	15m Nylon webb 10mm TBW				15 30
	anchor clump 3 x 1800 kg				
3254.3					

Design Depth 3254m  
Mooring Total Length 3225, 3m DYNEX stretch is 50m shorter

EAC array 2015		DATE: 2015-06-06 BY: [Signature]	TITLE: RELEASE
	APPROVED BY: [Signature]	CHECKED BY: [Signature]	
EAC 3200m M3		PROJECT NO: 06	

40	XEOS 360034-01272770 KMF-11k-638 SBE 37 8335	tension clamp	7mm TBW	8
10			glass floats 17"	7.2
40	temp 4028 SBE 37 8341	clamp on	7mm TBW	80
80	temp 4081			
120	WH 300 - 17054 LR 75 - 14434	tension clamp 40" ADCP syntec		4.2
130	SBE 37 8686	clamp on		
170	temp 4029			
200	SBE 37 9888	clamp on	7mm TBW	200
280	SBE 38 4881	clamp on		
300	SBE 37 9800	clamp on		
300			glass floats 17"	13mm PWB PC
380	SBE 39 4882	clamp on		
400	temp 4030			
480	SBE 37 8806	clamp on	7mm TBW	320
810	SBE 37 9804	clamp on		
840	BB 150 - 22801	tension clamp 40" ADCP syntec		4.2
860	SBE 39 4883	clamp on		
1000	SBE 38 4884	clamp on	7mm TBW	380
1010			glass floats 17"	13mm PWB PC
1180	SBE 37 7840 aquadopp 5981	clamp on tension clamp	7mm TBW	180
1300	temp 4031		6 mm DYNEK	300
1500	aquadopp 5971 SBE 38 4777	tension clamp	glass floats 17"	13mm PWB PC
1740	temp 4033		8 mm DYNEK	800
2000	aquadopp 5976	tension clamp		
2010	SBE 37 9185	tension clamp	glass floats 17"	13mm PWB PC
3000	aquadopp 5978	tension clamp		8 mm DYNEK
3200			glass floats 17"	13mm PWB PC
4180	SBE 37 9287	tension clamp		8 mm DYNEK
4280	aquadopp 5977 SBE 38 4778	tension clamp	8 mm DYNEK 8 mm DYNEK	1000 100
		clamp on		
			10mm TBW	15
			10mm PWB PC	5
	release unit 35720 & 30080			
			15m Nylon web	15
	anchor clump		10mm TBW	30
			3 x 1500kg	

Design Depth 4288  
Total Mooring Length 4230, 3% DYNEK stretch is 88m shorter

EAC array 2015			Drawn: 2015-08-14
Scale: A4	Project: A4	Client: M4	Sheet: 07
EAC 4200m M4			

40	NE90 300034013247540 XMF-11k-833 SBE J7 8336	tension shackle	7mm TBW	8	
10			glass floats 17"	13mm PWB PC	7.7
40	temp 4034				
40	SBE J7 8807	clamp on	7mm TBW	80	
100	temp 4035				
150	WH 300 - 17055 LR 75 - 14345	tension shackle	45° ADGP syntec	4.2	
150	SBE J7 8806	clamp on			
170	temp 4062				
200	SBE J7 8800	clamp on	7mm TBW	200	
230	SBE J9 4588	clamp on			
300	SBE J7 8810	clamp on			
350			glass floats 17"	13mm PWB PC	3.9
350	SBE J9 4813	clamp on			
400	temp 4063		7mm TBW	270	
450	temp 4039				
600	equadapp 8803 SBE J7 8811	tension shackle clamp on			
800	SBE J9 4675	clamp on	7mm TBW	300	
8			glass floats 17"	13mm PWB PC	2.7
1000	equadapp 8377 SBE J7 4208	tension shackle clamp on	7mm TBW	100	
1200	temp 4042		7mm TBW	200	
1200			glass floats 17"	13mm PWB PC	2.7
1300	temp 4065		8 mm DYNEX	300	
1500	equadapp 8381 SBE J9 4780	tension shackle	glass floats 17"	13mm PWB PC	2.7
1700	temp 4045		8 mm DYNEX	500	
2000	equadapp 8448	tension shackle			
8			glass floats 17"	13mm PWB PC	2.7
3000	SBE J7 7750	tension shackle			
8			8 mm DYNEX	1000	
3000	equadapp 8481 SBE J9 4782	tension shackle			
8			glass floats 17"	13mm PWB PC	2.7
4700	equadapp 8470 SBE J9 4887	tension shackle			
			8 mm DYNEX 8 mm DYNEX 8 mm DYNEX	1000 505 100	
			10mm TBW	15	
			glass floats 17"	16mm PWB PC	5
			release units 24087 & 33723	13	
			anchor clamp	3 x 1500kg	30

Design Depth 4768m  
Mooring Total Length is 4739m, 3% DYNEX stretch is 104m shorter

EAC array 2015			<table border="1"> <tr> <td>Project No.</td> <td>08-08-01</td> </tr> <tr> <td>Client</td> <td></td> </tr> <tr> <td>Scale</td> <td></td> </tr> <tr> <td>Sheet No.</td> <td>08</td> </tr> </table>	Project No.	08-08-01	Client		Scale		Sheet No.	08
Project No.	08-08-01										
Client											
Scale											
Sheet No.	08										
EAC 4700m M5			<table border="1"> <tr> <td>Project No.</td> <td>08-08-01</td> </tr> <tr> <td>Client</td> <td></td> </tr> <tr> <td>Scale</td> <td></td> </tr> <tr> <td>Sheet No.</td> <td>08</td> </tr> </table>	Project No.	08-08-01	Client		Scale		Sheet No.	08
Project No.	08-08-01										
Client											
Scale											
Sheet No.	08										

40	GESD 300034013803330 ZNF-11k-034 SBE 37 8337 tension chumbe	6 mm DYNEX	10
14		7mm TBW	8
80	temp 4089	glass floats 12"	13mm PWB PC
70	aquodopp BB64 tension chumbe	7mm TBW	10
80	SBE 37 9912 clamp on		
100	temp 4047		
130	SBE 37 11405 clamp on		
170	temp 4048		
200	SBE 37 13077 clamp on	7mm TBW	270
230	temp 4048		
300	SBE 37 13076 clamp on		
300		glass floats 12"	13mm PWB PC
330	SBE 38 4888 clamp on	7mm TBW	80
400	temp 4080		
410	No. 2 LR 25 - 14800 tension chumbe	45° ADCP syntac	4.2
440	temp 4051	7mm TBW	180
440	aquodopp BB60 tension chumbe		
480	SBE 38 4889	7mm TBW	200
500		glass floats 12"	13mm PWB PC
500	SBE 38 4878 clamp on	7mm TBW	200
1000	aquodopp BB20 tension chumbe		
1000	SBE 37 7894 clamp on	7mm TBW	200
1200	temp 4052	glass floats 12"	13mm PWB PC
1300	temp 4053	6 mm DYNEX	280
1500	aquodopp BB27 tension chumbe	glass floats 12"	13mm PWB PC
1500	SBE 38 4880		2.7
1700	temp 4070	6 mm DYNEX	500
2800	aquodopp BB40 tension chumbe	glass floats 12"	13mm PWB PC
2800	SBE 37 7895 tension chumbe	6 mm DYNEX	1000
2800	aquodopp BB41 tension chumbe	glass floats 12"	13mm PWB PC
2800	SBE 37 7893 tension chumbe		2.7
4700	aquodopp BB42 tension chumbe	6 mm DYNEX	1000
4700	SBE 37 13082 clamp on	6 mm DYNEX	584
		6 mm DYNEX	100
		10mm TBW	15
	glass floats 12" 16mm PWB PC		5
	release units 35503 & 38488		13
	Nylon		30
	10mm TBW		
	anchor dump 3 x 1500 kg		

Design Depth 4782m  
Mooring Total Length 4753, 3% DYNEX stretch is 104m shorter

EAC array 2015			Scale: 1:1000
Project: EAC	Client: AA	Scale: 4000m M6	Scale: 1:1000
EAC 4800m M6		Sheet: 08	