**ss2012_v01**

**Voyage:** Sustained Monitoring of the East Australian Current: Mass, Heat and Freshwater Transports.

**Voyage Period**
Start: 20/04/2012  
End: 29/04/2012  
Port of departure: Brisbane, Australia  
Port of return: Brisbane, Australia

**Responsible laboratory**
CSIRO Marine and Atmospheric Research  
Castray Esplanade, Hobart, Tasmania, 7000 Australia

**Chief Scientist**
Ken Ridgway (Chief Scientist)  
Bernadette Sloyan (co-Investigator)

CSIRO Marine Research  
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Email: Ken.Ridgway@csiro.au  Bernadette.Sloyan@csiro.au
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 (26oS). At this location the EAC, north of the high eddy variability, the approaching 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. The array is a component of IMOS, and will provide an intensive reference set of measurements of the EAC flow over sustained period for monitoring EAC transport, improved understanding of relationship of EAC and the South Pacific gyre and impact of the coastal marine ecosystem, and validation and interpretation of the current system in numerous climate and ocean models. The mooring array is located on the existing long-term XBT transects, satellite altimetry and glider tracks. The EAC deep mooring array will be complemented by a Queensland-IMOS operated inshore mooring array on the continental shelf region.

Voyage Objectives

The main aim of the voyage will be to deploy an array of (5) 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 shelf to the end of the section and return
2. Detailed swath mapping at each mooring location
3. Deploy each of the moorings at appropriate locations including position triangulation of each mooring’
4. Complete CTD/rosette station at each location with LADCP.
5. Complete a LADCP section along the mooring line
Results

All objectives of the voyage were completed successfully. The central aim was to deploy 5 deepwater moorings which captured the flow of the EAC adjacent to Brisbane. A combination of a very professional, well organized mooring team, a highly supportive ships master and crew, a good stable platform and excellent weather ensured that all tasks were completed with a minimum of fuss.

At each mooring the target site was chosen after undertaking a detailed swath survey. This was particularly important for the two inshore moorings (EAC1, EAC2) as they were located on the continental slope and only a limited number of relatively flat sites of sufficient size were available (see Appendix 3). Each of the 5 mooring assembly and deployment turned out to be quite straightforward. This was due to a combination of the well prepared, highly competent mooring team and the ideal weather conditions. The anchor deployment location was chosen to allow for the estimated fallback of the mooring during descent within the high prevailing current. Details of the target, release and final anchor positions are shown in Table 1 (see also appendix 3).

Table 1 – Mooring Locations

<table>
<thead>
<tr>
<th>Mooring</th>
<th>Target</th>
<th>Release</th>
<th>Anchor</th>
<th>Distance from target</th>
<th>Target Depth</th>
<th>Actual Depth</th>
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<td>1510-m</td>
<td>1570-m</td>
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<td>344-m</td>
<td>4765-m</td>
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<td>EAC5</td>
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<td>155.3018</td>
<td>155.2993</td>
<td>241-m</td>
<td>4777-m</td>
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Since the moorings will not be recovered for 18-24 months clearly no results are available from these deployments. However, a range of supplementary measurements were made during the voyage including CTDs, LADCP profiles, shipboard ADCP and standard underway observations. These data provide a comprehensive picture of the state of the EAC system east of Brisbane. Figure 2 shows the surface current field, SST of the Coral Sea region as determined from satellite observations. A strong EAC is seen to be pushing southwards advecting warm surface water all along the eastern Australian coast south of 24°S. The voyage track off Brisbane cuts across this southward flow and into a region of northward return flow east of 155°E. In fact, the track bisects a small (100-km diameter) anticyclonic eddy which is attached to the east of the main EAC core.
Figure 1: The surface geostrophic velocity (arrows) derived from satellite altimetry (sea level anomaly) plus a mean dynamic height field (CARS). The filled contours show the satellite SST and the white contours indicate the sea surface topography (m). All results apply to 25-April 2012 which is the mid-point of the voyage.

The subsurface velocity structure along the section is shown in Figure 3. We note that the main EAC core appears to be located east of 153.98°E, with a separate flow further inshore in the upper 250-m. At this time the southward flow of the EAC extends out to 154.8°E – the zero contour is almost vertical. The main EAC core (> 0.2-ms-1) is contained in the upper 400-m while the return flow is rather weaker, is a more narrow feature and limited to the upper 200-m. There is a hint of a northward undercurrent at about 650-m depth at the continental slope. Such subsurface northward flows are nearly always present in XBT transects collected some 75-km to the north.
Figure 2: Average southward current velocity (ms⁻¹) through the mooring array section derived from all the SADCP data collected over the 10-day duration of the voyage. The 5 mooring locations are shown by the red dashed lines, the 3 inshore moorings are indicated by the cyan lines.

The temperature and salinity sections from the CTD casts are presented in Figure 4. The seasonal anomalies of temperature and salinity from the 14 casts are obtained by removing the long-term mean from CARS09 for April. The seasonal layer with enhanced warming in the upper 80-m has now been removed. However, there is an anomalous warming of the thermocline (100-300-m) of between 1-2°C over the whole section.
Figure 3: Upper panel - The temperature anomaly (with respect to the CARS mean) along the section from the 14 CTD profiles. Lower panel – Salinity anomaly.
Voyage Narrative  All times are local.

19 April 2012

The science party joined the RV Southern Surveyor throughout the day. All the mooring instruments and consumables were already in place – they were loaded on the vessel in Hobart (10 April 2012). During the day Danny McLaughlin and Jamie Derrick continued mooring preparation while Phil Adams and Bernadette Sloyan rechecked instrument configuration (SBEs, RDI, and Aquadops). A vessel safety induction was completed at 4:30pm. Ken Ridgway undertook a number of radio and newspaper interviews.

20 April 2012

Ken Ridgway and Bernadette Sloyan were interviewed for ABC Country hour, Brisbane.

We departed Brisbane on time at 1000 with a 5 hour pilotage along the Brisbane River and out to a location off Caloundra. The SADCP was started within the Brisbane River in narrowband, bottom tracking mode. The voyage plan for the first day was finalized; this included an overnight swath survey of the EAC moorings 1 and 2.

We began the steam to the nominal position of EAC mooring 1 at 3pm. Danny and Jamie continued to work on the back deck, they unloaded floats from the container, and finished preparing the parachutes for moorings 1, 2 and 3. All instruments were programmed to commence sampling at 00:00 20 April 2012 UTC. Phil and Bernadette confirmed that all ADCPs were on and pinging at the appropriate time interval.

We arrived in area of mooring 1 and 2 at 1900 and turned off bottom tracking on the SADCP (changed setup to long-range narrowband). A swath mapping grid was commenced at approximately 1930 with a grid pattern (approximately 7-km or 3.5-nm) along the continental slope between EAC1 and EAC2, a final leg will be cross shelf along a line of the nominal mooring positions.

21 April 2012

Swath mapping was completed at 0330. Problems were encountered with the ship autopilot and so the last leg of the swath (cross shelf) was hand steered. The final target location of mooring was determined with mooring depth to be 1500-m. The ship was to steam into the current (running at slightly southeastward (310°)). Mooring to be released at 360- m north of target to allow standard fall-back plus current influence. A toolbox meeting at 0800 set out the details of the deployment of EAC1. Mooring preparation commenced at 9am lead by Danny assisted by Jamie and crew. The weather was favourable (winds < 10 kn) with some swell conditions. Preparation was completed at 1330 when the mooring was successfully deployed. The surface expression of the mooring was last observed 17 minutes after release. Triangulation of the actual position was performed and found to be some ~360-m southeast of target in water depth of 1570-m. A CTD was commenced at 1630 adjacent to the anchor position and completed at 1800. Danny and Jamie prepared mooring 2 for deployment the following day. A problem with altimeter on CTD was identified and several options were explored without success. The vessel proceeded to mooring location 3 and commenced swath mapping.
22 April 2012

Swath mapping was completed – the site is located on the abyssal plain providing excellent level region for deployment. Toolbox meeting was conducted at 0800 – the days deployment was outlined. Final mooring preparation was completed by Danny and Jamie – the mooring was laid out ready for deployment. Mooring deployment commenced at 9.08. Weather conditions were once again good but with a strong swell state. A strong southward EAC was present. All components were deployed without problem and the deployment was completed at 16.28. Some time taken to position the ship for the final release of the anchors. Using the result from mooring 1 the fallback on this mooring was estimated to be 1035-m. The mooring was again deployed with the ship pointing into the current. Triangulation of the actual mooring position was completed at 1730. Position was determined to be approx 250-m from target with actual fallback of 990m – very close to the estimate. Well done Bernadette. A CTD at EAC2 (2000-m) was commenced at 1900 and completed at 2100.

23 April 2012

We proceeded to mooring location 4 (EAC4) and swath survey was completed by Sascha. The location is very flat at around 4780-m. We then transited to a location midway between EAC2 and EAC3 to complete an additional CTD. This was commenced at 8am. No bottle samples were taken as the main objective was to collect the LADCP profile and there were no mooring observations to be calibrated. The altimeter had been replaced on the CTD, but even though the CTD was taken near to the bottom, no bottom was determined from the altimeter.

Due to the strong EAC, the CTD was likely to be at a high angle which prevented it from reaching bottom.

During the morning Danny and Jamie prepared mooring 3. The toolbox meeting at 1200 provided a briefing for the deployment. Mooring deployment commenced at 1345 under grey overcast skies but the large swell were much reduced – ideal conditions for deployment. With their usual meticulous preparation from Danny and Jamie the mooring deployment continued smoothly until a break for dinner at 1700. The final deployment of anchors occurred at 2000. After mooring descent was completed (43 minutes), triangulation was performed at 2100. The actual location was determined to be some 230-m from the target position. A CTD was commenced at 2250.

24 April 2012

The CTD was back on deck at 0115 and the sampling completed at 0200. The ship then proceeded to the location of the National Reference Station (NRS) just offshore from Stradbroke Island. The aim was to obtain a complete shipboard ADCP transect along the mooring line. Bottom tracking of ADCP was turned on once shallow water reached at ( ). We arrived at the NRS station by ( ) and then turned to occupy the full section out to EAC5. Work proceeded on the back deck – a general clean-up and preparation for mooring 4 tomorrow (Wednesday). A CTD was occupied between EAC4 and 5 with no bottles sampled. The altimeter cut in suddenly at 4500-m and went to zero. All other information indicated that the depth was at least 4770-m so the CTD was taken down to 4700-m. The altimeter came back online after 4300-m was reached. The ship proceeded to EAC5 for a swath survey (commenced at 1940). Results showed a very flat
topography. A logging malfunction was identified. The logging of SADCP data stopped for some reason for a 12-hour period on April 22. Despite best efforts the source of this problem was not found. Extra vigilance on the logging was required and the MNF Computing support person created an alarm to warn if logging of the data ceased. Since the failure occurred during the CTD (at EAC2) this needed to be repeated.

25 April 2012

Vessel proceeded slowly back to EAC4. Briefing for the deployment today occurred at the toolbox meeting at 0800. This was the deepest location at 4750m. Mooring deployment commenced at 0900 and was completed at 1534. Triangulation confirmed that the mooring was close to target point. A CTD cast was completed at 2100. The vessel then proceeded to location -27 04.524°S, 155 26.056°E (east of EAC5) and a further CTD (including sampling) was occupied.

26 April 2012

The CTD was completed at 0930 and we then returned to the EAC5 site. Following a toolbox meeting at 1130 the final deployment was commenced at 1230. With ideal conditions once again the mooring was completed at 1830. The actual location of the mooring was found to be 241-m from the target but since the region was very flat the actual depth was within 3-m of the expected depth. We then completed a full CTD (with sampling).

27 April 2012

Since all the moorings were now in place we concentrated on completing a high-resolution LADCP section. This aimed to provide further current data between each of the mooring sites in addition to the SADCP observations. A further 7 CTDs were occupied which then made up a total of 14 profiles along the section. No bottle samples were planned to be collected on these CTDs. The CTD at EAC2 was repeated (required due to logging failure).

Throughout the day the wind steadily built up to reach 30-35 knots with associated bigger sea conditions. During the CTD at 154.16°E; 27.29°S, a false bottom reading on the sounder meant that that the bottom depth was assumed to be ~ 4500-m when actually it was closer to 3500-m. Consequently the CTD hit bottom – fortunately with no apparent ill-effects. All sensors continued to operate as normal. Two further CTDs were completed successfully – all sensors again were operating correctly. Further bottle samples were taken (5) to confirm that the calibration of the sensors remained stable. All results confirmed that the CTD was unaffected.

28 April 2012

Now that all moorings were deployed and a full section of CTDs completed all that was left was to occupy the transect from inshore (NRS) out to EAC5 and return with the ADCP operating.

29 April 2012

The pilot boarded at 1000 and we proceeded to the wharf at 1600. All in all a very successful voyage.
Summary

All objectives of the voyage were completed successfully. The central aim was to deploy 5 deepwater moorings which captured the flow of the EAC adjacent to Brisbane. A combination of a very professional, well organised mooring team, a highly supportive Ship Master and crew, a good stable platform and excellent weather ensured that all tasks were completed with a minimum of fuss.

Project

Project name  Improving the understanding and prediction of ocean currents and the links between large-scale offshore variability and the response of the Australian shelf/slope boundary current system
Coordinating body Integrated Marine Observing System, Science and Implementation Plan

Project name  SPICE Observation Network
Coordinating body  South Pacific Climate and Circulation Experiment (SPICE)

Principal Investigators

Ken Ridgway, CSIRO Marine & Atmospheric Research
Bernadette Sloyan, CSIRO Marine & Atmospheric Research
Marsden Squares

Move a red “x” into squares in which data was collected
### MOORINGS, BOTTOM MOUNTED GEAR AND DRIFTING SYSTEMS

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<th>Item No</th>
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<th>DATA TYPE</th>
<th>DESCRIPTION</th>
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<td>1</td>
<td>A, B</td>
<td>27°18.6'S 153°58'E</td>
<td>D01,D71, H10,H72</td>
<td>Mooring deployed 21/04/2012, includes ADCP, current meters, CTDs, and temperature sensors. See Appendix 2 for detailed instrument configuration.</td>
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<td>Mooring deployed 22/04/2012, see appendix 2 for details.</td>
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### SUMMARY OF MEASUREMENTS AND SAMPLES TAKEN

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Figure 4: Voyage track of ss2012-v01 (red). The CTD casts are shown as black squares.

**GENERAL OCEAN AREA(S)**

Coral Sea, Pacific Ocean.

**SPECIFIC AREAS**

Continental slope and abyssal plain east of Brisbane, Coral Sea

**Curation Report**

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<th>Item No.</th>
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Personnel List

Scientific Participants

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<tr>
<th>Name</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>Ken Ridgway</td>
<td>CMAR</td>
<td>Chief Scientist</td>
</tr>
<tr>
<td>Bernadette Sloyan</td>
<td>CMAR</td>
<td>Co-investigator</td>
</tr>
<tr>
<td>Phil Adams</td>
<td>CMAR</td>
<td>Moorings</td>
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<tr>
<td>Dan McLaughlan</td>
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<td>Jamie Derrick</td>
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<tr>
<td>Tara Martin</td>
<td>CMAR</td>
<td>MNF Voyage Manager</td>
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<tr>
<td>Lindsay Macdonald</td>
<td>CMAR</td>
<td>MNF Electronics Support</td>
</tr>
<tr>
<td>Hugh Barker</td>
<td>CMAR</td>
<td>MNF Computing Support</td>
</tr>
<tr>
<td>Sascha Frydman</td>
<td>CMAR</td>
<td>MNF Swath Mapping Support</td>
</tr>
<tr>
<td>Dave Terhell</td>
<td>CMAR</td>
<td>MNF Hydrochemistry Support</td>
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<tr>
<td>Steph Brodie</td>
<td>UNSW</td>
<td>Moorings support, CTD</td>
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<tr>
<td>Phyllis Yu</td>
<td>Sydney University</td>
<td>Moorings support, CTD</td>
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<tr>
<td>Andreas Marouchos</td>
<td>CMAR</td>
<td>Moorings engineering</td>
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Marine Crew

<table>
<thead>
<tr>
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<tr>
<td>Mike Watson</td>
<td>Master</td>
</tr>
<tr>
<td>John Boyes</td>
<td>1st Mate</td>
</tr>
<tr>
<td>Simon Smeaton</td>
<td>2nd Mate</td>
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<tr>
<td>Fred Rostron</td>
<td>Chief Engineer</td>
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<tr>
<td>Mike Yorke-Barber</td>
<td>1st Engineer</td>
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<td>Paul Buffet</td>
<td>2nd Engineer</td>
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<td>Graham McDougall</td>
<td>Bosun</td>
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<tr>
<td>Bob Dittko</td>
<td>Chief Cook</td>
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<td>Rebecca Lee</td>
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<td>Mick O’Connor</td>
<td>Chief Steward</td>
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<td>Rod Langham</td>
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<td>Jonathon Lumb</td>
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Acknowledgements

The deployment of the EAC mooring array was funded by the Integrated Marine Observing System (IMOS). This project forms a central component of the IMOS boundary current monitoring array. Additional support was provided by the CSIRO Wealth from Oceans Flagship. KRR was supported by the Australian Climate Change Science Program (ACCSP). The MNF personnel provided excellent support both before and during the voyage. The meticulous preparation and high level of professionalism of the mooring team led to a very efficient set of deployments. The contributions of the science team provided were greatly appreciated. The Master and crew provided a high level of assistance that contributed greatly to the smooth operation of the voyage. In general, the voyage was a most satisfying experience both on a scientific and a personal level.

Chief Scientist
Ken Ridgway
Principal Research Scientist
CSIRO Marine & Atmospheric Research
Appendix 2 – Mooring Array Design

Table: Mooring Array Design

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**Materials**

- **Depth**
- **Instrument Name**
- **Part**
- **Length**

**Notes:**
- Aquadopps are moved to above glass floats to avoid turbulence.
- Top SBE 37 is moved to EXOS package.
- Release and lower assembly's are all standard 62 meter packages.
- Anchor clamps are mostly interchangable.
- Anemometers are not show but are installed.
- EXOS packages are all standard.
- Ferructhes are not shown, but are installed.
- Anti-fouling applied to top instrument packages.

**CSIRO Marine and Atmospheric Research**

**Dataset:** ss2012_v01
### EAC 2012  M2 2257m

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**Notes:**
- 1830102312
- EXOS5 are moved to above glass float to avoid turbulence.
- 42S 37 is moved to EXOS5 package.
- Release and lower assembly are all standard 62 meter packages.
- Anchor clumps are mostly interchangeable.
- Amandals are not shown but are installed.
- EXOS5 packages are all standard.
- Details are not shown, but may be included.
- Articulating applied to top instrument package.
- Peacocks are not shown, but are installed.

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### Deep Ocean Group

CSIRO Marine and Atmospheric Research

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**DIAGRAM:**

1. EXOS5
2. Glass Floats
3. Anchor Clumps
4. HDPE release
5. 1830102312
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**Materials**
- **Materials**
  - 800 kg release: 5m
  - 4000 kg release: 5m
  - 3125 kg anchor

**Aquadopp**
- Moved to above glass float to avoid turbulence.
- Top EAC 37 is moved to EXOS package.
- Release and lower assembly are one standard 62 meter package.
- Anodes are not shown, but are installed.
- EXOS packages are all standard.
- Sabertooth are not shown, but may be installed.
- Antifouling applied to top instrument packages.
- Fathometer packages are not shown, but are installed.
Appendix 3 - EAC Mooring deployment notes.

EAC 1

Saturday 21 April

The mooring was deployed on Sunday 21 April, we anticipated a fall back of 360m but fall back was actually 570m, based on distance between release site and anchor position estimated by triangulation method. From the time of deployment the top buoy on the mooring took 17 minutes to be dragged below the surface. This gives the fall rate of 88m/min (ITF mooring fall rates were 123m/min Timor Sill, 73m/min Timor North and 106m/min Ombai). The EAC 1 fall rate seems reasonable based on previous experience. We suspect that the current had a greater influence on the mooring fall back than anticipated.

If we assume a mean current of 55cm/s in the upper 250 m and time rate of fall of 88m/min, a post deployment fall back can be estimated from time of fall and mean current speed.

Fall back = mean current × fall time = (18 × 60) sec × 0.55m/s = 561m.

We will use this for estimating fall back for subsequent mooring deployments.

Distance of anchor from target is approximately 360m.

Target position: 153.9665 E -27.3102 S

Release position: 153.9662 E -27.3082 S

Anchor Position: 153.9690 E -27.3126 S

Anchor depth: 1570 m

Figure 5: Bottom bathymetry of the EAC1 region. The release, target and anchor (final) positions are shown as green, black and red crosses.

Figure 6: The intersection of the three triangulation ellipses provides the estimate of the final (anchor) position for EAC1.
EAC 2

Sunday 22 April

The length of the mooring was decreased by 20 m from 2000 m to 1980 m. For planning of mooring EAC 2 we have calculated the anticipated decent time of mooring to be 1980 m / 88 m/min = 23 min, and fall back based on current speed of 0.75 m/s of (0.75 * (23 * 60)) = 1035 m, or 0.56 nm.

We will deploy the mooring towing it into the current. The current speed at 10:00 am was, surface > 1.25 m/s, 100 m = 1.0 m/s and 125 m = 0.75 m/s.

EAC 2 took roughly 18-19 minutes for top buoy to leave the surface. Deployed 4:26 local time (06:26 UTC). Decent rate of 110 m/min. Mooring fell back 990 m, landing approximately 250 m from target site. The average fall rate for mooring 1 and 2 (88+110)/2 is 99 m/min.

Distance of anchor from target is approximately 360 m

Target position: 153.9960 E -27.3062 S
Release position: 153.9910 E -27.2985 S
Anchor Position: 153.9921 E -27.3064 S
Anchor depth: 1970 m

---

Figure 7: Bottom bathymetry of the EAC 2 region. The release, target and anchor (final) positions are shown as magenta (upper left), black and red crosses.

Figure 8: The intersection of the three triangulation ellipses provides the estimate of the final (anchor) position for EAC 2.
EAC 3

Tuesday 23 April

We modified the depth of the mooring from 4227 to 4257 (added 30m). The expected fall time of 4257m/99min = 43 min. The speed of average current in the upper 250m 0.75m/s, but there is an northward undercurrent below 2000m of 0.05m/s (5cm/s). Therefore, we have calculated the expected fall back for only the upper 2000m of the mooring which (0.75*(43/2*60) = 945m or 0.51 nm. However, half time in EAC and other not is not completely correct as much of the mooring will be above 2000m for most of the descent. We decided to apply the EAC current drift to 2/3 of the estimated fall rate (43min*2/3)*60*0.75cm/s = 1290m or 0.69 nm. We told the bridge to deploy at 0.65 nm beyond the target site. Changed fall back distance as current not as strong as expected. Now using current speed of 0.45m/s which gives a fall back of 774m approximately 0.4 nm. The mooring was deployed in the dark so we were unable to estimate time of submersion of top float.

Actual fall back of the mooring was 978m, and the mooring landed 230m from target site.

Mooring depth is 4257 m, 8% of mooring length is 425m for normal static fall back.

Target position: 154.2907 E -27.2497 S

Release position: 154.2869 E -27.2436 S

Anchor Position: 154.2904 E -27.2518 S

Anchor depth: 4247.4 m

Figure 9: Bottom bathymetry of the EAC3 region. The release, target and anchor (final) positions are shown as magenta, black and red crosses.

Figure 10: The intersection of the three triangulation ellipses provides the estimate of the final (anchor) position for EAC3.
EAC 4

Wednesday 25 April

This mooring is on a flat abyssal plain in water depth of 4766 m with no variation in depth. No change to location, we will use position given in the initial voyage plan. Mooring length is was adjusted 10 m form original design. Mooring is designed for 4765m

To calculate mooring fall back we are using descent rate of 99m/ min, current speed of 0.25 m/s. The estimated time of fall 4756 m/99m/ min = 48 min. Fall back due to current (48*2/3)*60 *0.25 = 480m or 0.25 nm.

Actual fall back of the mooring was 486 m, and the mooring landed 344 m from target site.

Target position: 154.6500 E -27.2100 S
Release position: 154.6496 E -27.2047 S
Anchor Position: 154.6471 E -27.2086 S
Anchor depth: 4767 m

Figure 11: The very flat bottom bathymetry of the EAC4 region. The release, target and anchor (final) positions are shown as magenta, black and red crosses.

Figure 12: Only two effective triangulation ellipses were determined. The estimate from these is shown in the figure.
EAC 5

Thursday 26 April

Swath depth of EAC 5 site is 4779.8. We have built the mooring for a water depth of 4597. Therefore we added 180 m to the mooring. Mooring is now 4777m.

To calculate mooring fall back we are using descent rate of 99m/min, current speed of 0.25 m/s.

The estimated time of descent 4777 m/99m/min = 48 min.

Fall back due to current (48*2/3)*60*0.25 = 480m or 0.25 nm.

Actual fall back of the mooring was 326 m, and the mooring landed 241 m from target site.

Target position: 155.300 E -27.100 S

Release position: 155.3018 E -27.1041 S

Anchor position: 155.2993 E -27.1020 S

Anchor depth: 4780 m

On descent of the mooring we ranged on the acoustic release to provide a fall rate of 79m/min.

Figure 13: Bottom bathymetry of the EAC5 region. The release, target and anchor (final) positions are shown as magenta, black and red crosses.