

RV Investigator Voyage Scientific Highlights

Voyage #:	IN2016_V06		
Voyage title:	Sustained monitoring of the EAC: mass, heat and freshwater transports		
Mobilisation:	Brisbane, Friday, 28 October 2016		
Depart:	Brisbane, 0800 Saturday, 29 October 2016		
Return:	Brisbane, 1300 Sunday, 13 November 2016 (16 Days)		
Demobilisation:	Brisbane, Monday , 14 November 2016		
Voyage Manager:	Tegan Sime	Contact details:	Tegan.Sime@csiro.au
Chief Scientist:	Bernadette Sloyan		
Affiliation:	CSIRO	Contact details:	Bernadette.Sloyan@csiro.au
Supplementary Principal Investigators:	Dr Remo Cossu (not on voyage)		
Project name:	Turbulence scales and horizontal variability in the surface layer of the Ocean		
Affiliation:	University of Queensland	Contact details:	r.cossu@uq.edu.au
Supplementary Principal Investigators:	Dr Eric Woehler and Nicholas Carlile		
Project name:	Spatial and temporal variability in the distribution and abundance of seabirds		
Affiliation:	Australasian Seabird Group (BirdLife Australia) and University of Tasmania	Contact details:	eric.woehler@gmail.com 0438 204 565 (EJW) Nicholas.Carlile@environment.nsw.gov.au , Mob:0419 909 707 (NJC)

Scientific Highlights



The Chief Scientist

Dr. Bernadette Sloyan is a Principal Research Scientist with CSIRO's Oceans and Atmosphere. She is a national and international leader in documenting and understanding the role of ocean circulation in the global climate system. Her work has elucidated the importance of ocean key processes, mixing and air-sea interactions, in the Southern, Pacific and Indian Oceans that determine the ocean climate and moderate the rate and nature of climate change and variability through their role in of the global energy, freshwater and carbon budgets. She is leading CSIRO's ocean

observation efforts in major national – Integrated Marine Observing System (IMOS) – and the international - Global Ocean Ship-based Hydrographic Investigations Program (GO-SHIP) – programs. Her membership of numerous national panels and appointment of Co-Chair of GO-SHIP and Ocean Observations Panel for Climate (OOPC) is recognition of her national and international leadership in ocean climate research.

Title

Sustained monitoring of the EAC: mass, heat and freshwater transports

Purpose

The East Australian Current (EAC) is a complex and highly energetic western boundary current system in the south-western Pacific off eastern Australia. Off Brisbane (27°S) the EAC, north of the high eddy variability region, approaches its maximum strength and is relatively uniform and coherent current. The aim of this observing system is to capture the mean and time-varying flow of the EAC.

This voyage will recover and re-deploy an array of six full-depth current meter and property (temperature, salinity and pressure) moorings from the continental slope (500 m) to the abyssal waters (4800 m) off Brisbane (27°S). In order to resolve interannual and decadal signals we aim to maintain a long-term deployment of the array.

The following specific objectives were performed:

1. Recover and re-deploy six (6) deep ocean mooring that monitor the EAC
2. Complete CTD stations at each mooring location, with LADCP
3. Complete a number of Ship ADCP sections along the mooring line

In addition, two supplementary projects were support on the voyage. The objectives of these two projects are:

1. Acquisition of upper ocean (0-200 m) turbulence profiles.

This project aims to gather information on turbulence, temperature, salinity within the surface mixed layer across the EAC using a Turbulence Ocean Microstructure Acquisition Profiler (TurboMAP). Vertical and horizontal profiles give insight into relative scales of different upper ocean layers, e.g. turbulence scales and variations of density and temperature. Vertical profiles are carried out in free-falling mode whilst the horizontal transects are carried out with the RV Investigator being adrift at a speed of 0.5 m/s.

Three students (PhD, graduate and undergraduate level) were involved in the deployment.

2. Seabird survey

The project seeks to quantify the distribution and abundance of seabirds at sea using standardised seabird survey protocols. Two dedicated observers collected real-time data on seabirds observed within 300m transect during daylight hours (sunrise to sunset) while the vessel was underway. Incidental observations were collected while the vessel was stationary (CTD stations and while the vessel was recovering and deploying moorings. A PhD student was included in the survey team to broaden her field survey techniques.

Contribution to the nation

The East Australian Current (EAC) is the complex and highly energetic western boundary current of the South Pacific Ocean. The EAC is the dominant mechanism for the redistribution of heat and freshwater between the ocean and atmosphere in the Australian region; it is a vital component of the eastern Australian coastal ecosystem. The monitoring of the EAC is central to our understanding of how climate variability is communicated through the global ocean. This ocean current time-series will provide significant insights into the interactions between the EAC, the Pacific basin and the local shelf ocean circulation.

As a result of this voyage

Observations obtained on this voyage will:

1. Improve our understanding of the relationship of EAC to the South Pacific gyre;
2. Determine the impact of the EAC variability on the shelf circulation and coastal marine ecosystem along the east coast of Australia;
3. Enable us to Investigate the relative influence of local and large-scale remotely driven variability on coastal dynamics and;
4. Build a long time-series of the EAC for assessment of the simulation of the EAC system in climate and regional ocean models and high resolution coastal forecasting models.