

RV Investigator Scientific Highlights

Voyage #:	IN2017_T02		
Voyage title:	Collaborative Australian Postgraduate Sea Training Alliance Network Pilot Voyage 1		
Mobilisation:	Henderson, Tuesday, 14 November 2017		
Depart:	Henderson, 1030 Tuesday, 14 November 2017		
Return:	Hobart, 0830 Sunday, 26 November 2017		
Demobilisation:	Hobart, 1000 Sunday, 26 November 2017		
Voyage Manager:	Matt Kimber	Contact details:	matt.kimber@csiro.au
Chief Scientist:	A/Prof Jochen Kaempf		
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Principal Investigators:	Dr April Abbott		
Project name:	Collaborative Australian Postgraduate Sea Training Alliance Network (CAPSTAN)		
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The Chief Scientist



Jochen Kaempf is a passionate physical oceanographer with over 20 years of experience in research and teaching. He completed a Ph.D. of Natural Sciences (Oceanography) on ice-ocean interactions in polar regions after only 2.5 years in 1996 at the University of Hamburg, Germany, and is currently employed as Associate Professor in Oceanography at Flinders University, Adelaide, Australia.

His research has led to the discovery of the Great Southern Australian Coastal Upwelling System, which is deemed a key nutrient source for the Southern Ocean

marine food web. He was the first scientist exploring and describing the water circulation of both the Persian Gulf and South Australian gulfs with 3D hydrodynamic models. Recently, Kaempf has proposed the gelling-ignition mechanism to play a fundamental role in the wave-induced creation of fluid mud, and he uncovered physical mechanisms leading to gigantic phytoplankton blooms in the Arafura Sea.

Kaempf has published two textbooks on ocean modelling as a popular contribution to classroom teaching of oceanography, a monograph on upwelling systems of the world (co-authored by Piers Chapman), numerous book chapters, and more than 40 peer-reviewed publications.

Title

Collaborative Australian Postgraduate Sea Training Alliance Network (CAPSTAN)

Purpose

The Collaborative Australian Postgraduate Sea Training Alliance Network is a post-graduate at sea training initiative on the RV *Investigator*. Governed by a network of leading industry and university partners from within marine science and geoscience, CAPSTAN is a first of its kind programme which will transform the way marine science education is delivered. My role as Chief Scientist of this voyage was to plan and implement a scientific program that meets the principal objectives of the CAPSTAN initiative. To this end and for logistical reasons, I decided to select the shelf break and upper continental slope in vicinity of the Bremer Canyon in the far western Great Australian Bight as study region. Surprisingly, it turned out that region was largely uncharted and has never been scientifically surveyed before. Hence, in addition to meeting the educational program objectives, this voyage also gave us the opportunity to collect a unique multidisciplinary scientific data set from a truly remote Australian coastal region.

The voyage consisted of five main projects with the following objectives to:

1. Demonstrate a diverse range of state-of-the-art marine instrumentation via both deployment and underway data collection;
2. Train students in project management and planning of complex scientific programs;
3. Complete SWATH mapping of the bathymetry, whenever possible and needed;

4. Monitor the birdlife and megafauna diversity along the voyage track; and
5. Deploy four ARGO floats along the voyage transect at designated locations.

Contribution to the nation

First of foremost, CAPSTAN is an important teaching initiative that contributes to the education of postgraduate and honours students in the marine sciences and the geosciences. There is no doubt that this excellence in education as delivered by the CAPSTAN experience is essential to sustain Australia's "blue economy". Clearly, such sea-going experience should be offered to both high-achieving undergraduate and postgraduate students in Australia on an annual basis. It should be noted that sea-going practicums are much more common in other countries such as Germany where a larger fleet of research vessels is available than in Australia.

What is so valuable about the CAPSTAN program is not only the technical training aspect. In addition, there are several other high-quality learning opportunities that do not exist in the normal university study environment. These are outlined in the following.

Firstly, students have close access to a team of academic trainers and scientific experts from various discipline backgrounds ranging from geology, sedimentology, physical oceanography, planktology, marine ecology to ornithology. This also includes communication outside working hours. Not even on modern research expeditions would one find such as truly multidisciplinary team of experts. Secondly, as part of the CAPSTAN experience, students become involved in the actual planning of the research voyage and the conduction of real scientific measurements. This component on its own has many different levels of complexities – from communication and negotiation to rational planning and time management.

In this CAPSTAN voyage we had enough time for an extra training component not included in the original plan thanks to fortunate weather and the availability of another two days for activities. A clear educational highlight of this voyage was that we decided that make all students "chief scientists" with the task to plan and conduct an entire day (19/11/2017) of field activities. Overall and due the fact that the students already gained experience from three days of intense field data collection, this extra training component was successful, not only educationally, but also scientifically, noting that we could valuable scientific information during this day (see Table 1).

Altogether, the CAPSTAN experience is an important training component for building Australia's future excellence of marine scientists. In addition, this CAPSTAN voyage also collected a range of scientific data that, on their own, are a valuable resource for the understanding of Australia's past, present and future natural environments.

In addition, we deployed four ARGO floats during this voyage. Indeed, maintaining and upgrading Australia's fleet of ARGO floats in the oceans is an important international commitment to monitoring climate-change effects in the ocean.

As a result of this voyage

1. We have provided valuable training of 19 postgraduate students (including honours students) in marine data collection and scientific research
2. We have acquired a better understanding of natural factors shaping the upper continental slope of the continental margin surrounding the Bremer Canyon
3. We have mapped for the first time the bathymetry of the shelf break and upper continental slope of the continental margin surrounding the Bremer Canyon
4. We have deployed a total of four ARGO floats