



Asia-Pacific Network for Global Change Research

Asian Neighbours Network: Training Through Global Change Research

Final report for APN project 2005-16-NSY-Skilbeck

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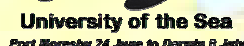
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Asian Neighbours Network: Training Through Global Change Research

2005-16-NSY-Skilbeck

Final Report submitted to APN

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Overview of project work and outcomes

Non-technical summary

This project was designed to create practical at-sea training opportunities for marine science graduate students from the Asia-Pacific region. Through participating in climate and environmental change research in a multinational multidisciplinary environment students gain skills in marine research and commence international networking.

Objectives

The main objectives of the project were:

1. To provide the opportunity for senior students specialising in marine sciences to participate in real research.
2. To provide access to state-of-the-art shipboard research facilities and to work in a genuine problem-solving environment.
3. To maximise the expertise of senior researchers available for mentoring and monitoring marine science students.
4. To provide a forum for students from a variety of cultural backgrounds in the Asia-Pacific region, form a regional network from which to develop future collaborations.
5. To provide a structured research environment and program that will result in publications for the students that will enhance their further academic and career opportunities.

Amount received and number years supported

\$USD15,000.00 for 2005 only

Activity undertaken

Eighteen students from eight countries participated in a research cruise aboard the design-built research vessel *Marion Dufresne*. The cruise took place from 24 June to July 8 2005, embarking in Port Moresby (Papua New Guinea) and disembarking in Darwin (Australia) 15 days later. Funding from the grant provided by APN allowed non-Australian based students to travel to and from the ports.

The research training activities of the University of the Sea piggy-backed on an IMAGES (International Marine Global Change Studies) cruise mainly in the Gulf of Papua and the Torres Strait. This cruise (coded MD148 – PECTEN) involved scientists from France, USA and Japan undertaking coring in the sea way between Australia and New Guinea, in order to analyse the record of past climate change and ocean circulation contained in the subsea-floor sediments.

The students time was divided between formal instruction, through lectures and training on the research instruments available on the ship, and in the latter part of the cruise, assisting the IMAGES staff with data collection.

Results

The first three objectives were attained in full and objective 4 and 5 were partly met. The students participated in collection of real marine science data, they were given instruction in the use of state-of-of-the-art equipment and then

witnessed it being deployed and retrieved for collection of real data. They then took part in the ship-board sampling and description of the material. This was done under the supervision of both instructors from the University of the Sea, and the researchers participating in the IMAGES project. The work was undertaken as part of a structured research program. The selected students were from a range of cultural backgrounds and in the two weeks at sea had the opportunity to discuss their social, cultural and tertiary backgrounds.

The overall project was less successful at setting up a formal network in order to maintain and further the initial steps networking made during the cruise. Because the cruise route was not finalised until late in the planning cycle, we were not able to gather the students together after the cruise in the workshop setting, and hence the intention to produce formal publications did not eventuate. Originally the cruise was to return to Sydney and the workshop was to be held near there. However because the leg disembarked in Darwin, we did not have sufficient funding to continue to Sydney and complete this task.

We have run a second leg of the University of the Sea in 2006, unfortunately without support from the APN. During this iteration, we have addressed both issues. A web-based network has been established in order to maintain communication between participants (and first-round participants have been asked to subscribe), and publications were prepared during the second cruise, for presentation at the Australian Geological Congress in July 2006.

Relevance to APN scientific research framework and objectives

The Asian Neighbours Network: Training Through Global Change Research project was a capacity building exercise that incorporates the APN priority topics of climate change and climate variability, and incorporates aspects of the human dimension of global change and the impacts on biodiversity, as part of the training schedule.

Self evaluation

Individual self-evaluation comments on each objective have been made above. We believe the principal objective of providing an opportunity for young marine scientists from the Asia-Pacific region to gain experience in sea-based research activity has been met and all participants provided positive feedback about this.

The main shortcoming of the research training aspect was in not having a structured plan to ensure student involvement in ongoing shore-based research activities. In terms of setting the seeds for a viable long-term network of research collaboration, we feel that we need to develop a strategy for following up with participants post-cruise, and in particular, in facilitating their ongoing involvement in research projects arising from the cruise. This has been addressed further in the Results section.

Potential for further work

The University of the Sea has potential to play a significant role in the training of the next generation of marine scientists from the Asia-Pacific region, and to provide a framework for networking their activities. Since the initial training cruise

in mid 2005, a second successful cruise has run (February 2006) in the western Pacific Ocean. We are currently preparing a Australian Research Council Large Infrastructure Grant application in order to provide financial support for the 2007-2009 Triennium. The concept of the University of the Sea has been supported by Geoscience Australian, who are providing financial backing for the grant application. In addition, we continue to seek and are hopeful of gaining additional support from outside Australia in the Asia-Pacific, because we believe that one of the central tenets of the program, that of networking and capacity building in the region is a worthy one.

Publications

DeDeckker, P., E. Baker, J. Keene, G. Skilbeck, J. Dickinson, L. Anderson, J. Bowen-Thomas, D. Chand, T. Donaldson, M. Dryburgh, U. Kadarwati, B. Kinna, Z. Kurnia, J. H. Lee, M. Lewis, B. Mamo, H. Pethybridge, P. Terney, A. Singh, E. Taloiburi, E. Twiggs, M. Verhoeven, L. Weiland, F. Weir and Shipboard Party, 2006, *The University of the Sea: Practical Marine Sciences Education*. Accepted for the "The future starts with resourcing geoscience education" session of the 18th Australian Geological Congress, in Melbourne July 2006.

References

A number of relevant published articles were provided to the students as part of the pre-cruise training. These are listed in the report appendix.

Acknowledgments

We would like to take this opportunity to thank all our financial sponsors, in addition to the Asia-Pacific Network for Global Change Research. The University of the Sea receives funding from The Toyota Foundation, Intergovernmental Oceanographic Commission (IOC), ARC Network for Earth System Science, and the Office for Promoting Marine Geoscience in Australia (MARGO). We are particularly indebted to M. Yvon Balut and the crew of the RV *Marion Dufresne* from the Institut Polaire Francais. Without their support, the University of the Sea would not be possible.

Minimum 2 pages (maximum 4 pages)

Technical Report

Preface

APN provided support for travel of senior marine science students to participate in the inaugural Asia-Pacific University of the Sea. The support enabled a total of eighteen students from eight Asia-Pacific countries to attend. The initial cruise took place in July 2005 aboard the RV *Marion Dufresne* a purpose-built marine science research ship operated by the Institut Polaire Francais (IPEV). The leg was at sea for 15 days traversing from Port Moresby (PNG) to Darwin (Australia), collecting water-column, sea floor and subseafloor data aimed at investigating the climate-driven denudation of the PNG highlands. Students received tuition and participated in data collection and description during their time at sea.

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1.0 Introduction

There is a current paucity of opportunity for Asia-Pacific-based research students in marine sciences to receive practical, sea-based training as part of their studies. In an increasingly globalised world, this places them at a disadvantage compared with both European and American graduates who do have access to ships and ship-based projects during their study. In addition, the study of the world oceans generally takes place in a multidisciplinary and multinational environment and participation relies, at least in part, on individuals being included within a network of interested scientists. Finally, much of the archive of global climate and sea-level change is contained within ocean sediments, and for students intending to pursue a career in climate change research, a knowledge of both the practicalities of ocean-based research and the current extent of knowledge of the oceans, is essential.

The concept of the Asian Neighbours Network: Training Through Global Change Research project was to provide students from a range of scientific disciplines requiring ocean-based research (e.g. marine biology, geoscience, physical and chemical oceanography) the opportunity to gain experience at sea. The opportunity arose mainly through the foresight of M Yvon Balut of IPEV, the scientific manager of the *RV Marion Dufresne*, who made available spare capacity aboard the ship for student training. An informal group of scientists from the Asia Pacific region who were engaged in climate and related marine research, but who were also concerned about practical training for marine scientists into the future, banded together under the Asia-Pacific University of the Sea, to bring this proposal to fruition.

The initial cruise was finally scheduled for July 2005. Prior to the cruise, students received a bibliography and a prescribed reading list of thirteen journal articles specifically relevant to the geographic location of the leg (copy in Appendix 1). This included articles on the palaeoceanography of the Banda Sea, a history of Indonesian current throughflow, a framework of deltas in southeast Asia, and biomass and primary ocean production and their effect on east Asian monsoon dynamics.

As the University of the Sea ran in conjunction with an existing French-USA-Japan research program, the students participated in activities associated with this research, under instruction of the participating scientists.

The two principal research aims of the leg were:

1. to analyse past climate change and ocean conditions from the continental shelf to the abyssal plain in the Gulf of Papua and the northern Coral Sea, and
2. to determine processes and rates of sedimentation between sediments derived from New Guinea and those moving northwards from the Great Barrier reef.

Consequently students participated in high resolution mapping of the sea floor using multibeam sonar arrays and seismic profiling, including processing and interpreting data. They assisted in collection of ocean column (plankton) and sea floor sediments using box, gravity and piston corers, and were involved in the description, cataloguing and interpretation of these data. The student group participated in these activities as part of six four-hour watches. In addition, formal lectures were held every day between 8-11am. During these periods students received general instruction in physical and chemical oceanography, marine biology, marine geology and tectonics and climatology and global climate change.

In the later part of the cruise, groups of students produced six posters on the various techniques available on the ship for conduction marine science research (copies of these posters are provided in Appendix 2 and at full resolution on the accompanying CD. Finally each was asked to prepare a short report on their participation in the cruise and the impact this would have on their research career. These reports are provided in Appendix 3.

Students were asked to provide feedback on the sea-board learning experience, and their responses are reported in Appendix 4. A report on the cruise and a daily log of activities during the cruise were kept by the UoS leader, Professor DeDeckker. This document is attached in Appendix 5.

2.0 Conference Outputs

DeDeckker, P., E. Baker, J. Keene, G. Skilbeck, J. Dickinson, L. Anderson, J. Bowen-Thomas, D. Chand, T. Donaldson, M. Dryburgh, U. Kadarwati, B. Kinna, Z. Kurnia, J. H. Lee, M. Lewis, B. Mamo, H. Pethybridge, P. Terney, A. Singh, E. Taloiburi, E. Twiggs, M. Verhoeven, L. Weiland, F. Weir and Shipboard Party, 2006, *The University of the Sea: Practical Marine Sciences Education*. Accepted for the "The future starts with resourcing geoscience education" session of the 18th Australian Geological Congress, in Melbourne July 2006.

A single conference abstract has been submitted for presentation at the Australian Geological Congress, due to be held in Melbourne in July 2006. The aim of this presentation which is supported by posters prepared by the students during the cruise. Its aim is to publicise the University of the Sea in a wider community including government and industry attendees, and to present a case for public funding of the project.

3.0 APN-Funded Participants

Funding was used entirely to transport the student participants to and from the ship. Participants are listed below. Expenditure of the APN grant is detailed in Appendix 9, and receipts for expenditure are included. Statements from the participating students are given in Appendix 2.

Sal	Fname	Sname	Nationality	Institution	email
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4.0 Conclusions

The academic staff involved in the project believe it was a worthwhile exercise and student feedback suggests they think it is a valuable addition to their training and to their career opportunities. Consequently, the group are intending to run the project into the future, for as long as funding can be sought and ship-board time can be provided. It is pleasing to report that the second cruise of the Asia-Pacific University of the Sea ran for a second time in February 2006, this time in the Tasman Sea (from Auckland to Sydney, via Noumea).

The exercise itself currently runs on the invaluable support of IPEV and the goodwill of the participating academics and their institutions. Without the in-kind support provided particularly by the French Polar Institute, the shipboard researchers and the staff and crew of the *Marion Dufresne* it would not be possible to run the Asia-Pacific University of the Sea in its current form. It is somewhat of an anomaly that the French are able to supply the infrastructure to underwrite the project.

A number of activities planned in the original proposal to the APN ran in a modified format, or are ongoing projects. In particular, the desire to have a fully integrated web site in place to provide background resources such as an online text book and fully detailed lecture material, has yet to be realized. For the first two cruises of the UoS students were provided in advance with a CD containing copies of 5-10 critical refereed journal articles, of specific relevance to the cruise research objectives. A full program of lectures on the general principles of ocean sciences was delivered on each cruise, and the slides accompanying these were again distributed via CD before the cruise.

Currently the single objective that has not been realized is the involvement of students in a large way in post-cruise research work. The reasons for this are two-fold: 1. most are already involved in postgraduate research work and have specific projects on which they are fully occupied, and 2. to date, research programs on both cruises have been managed by outside agencies (such as Geoscience Australia and IMAGES), and whilst these people are happy to include students in their post-cruise work, the reality of the situation is that this would require additional financial support to make it happen. Nevertheless, two student honours projects have arisen from the most recent UoS cruise, and preliminary work undertaken during the cruise has resulted in two conference abstracts (with the one relevant to this grant listed above).

In order to progress the University of the Sea, we are now seeking triennial funding through the Australian Research Council Large Infrastructure granting scheme. This proposal includes a request for 1-2 days of sea board operations per year, so that the participants in the UoS can collect, analyse and publish data from a project specific to the leg. In this way we hope to overcome the publications objective.

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The final project report must follow the template outlined in this document.

Please submit the report to Linda Stevenson < l Stevenson@apn-gcr.org > by:
31 May 2006

In the following formats:

***Soft Copy version (CD-ROM about 30) and
Hard Copy version (about 3 bound copies)***

Both hard and soft copies of the report should be addressed to:

**Linda Stevenson
APN Programme Manager for Scientific Affairs
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Appendices

Appendix 1: Bibliography of References and Reading Material

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Appendix 2: Student Reports

Appendix 3: Student Poster Preparations

Appendix 4: Student Subject Evaluation Report

Appendix 5: Cruise Report and Diary

Appendix 6: Conference/Symposia/Workshops

Title: "The University of the Sea: Practical Marine Sciences Education"

Authors: P. DeDeckker, E. Baker, J. Keene, G. Skilbeck, J. Dickinson, L. Anderson, J. Bowen-Thomas, D. Chand, T. Donaldson, M. Dryburgh, U. Kadarwati, B. Kinna, Z. Kurnia, J. H. Lee, M. Lewis, B. Mamo, H. Pethybridge, P. Terney, A. Singh, E. Taloiburi, E. Twiggs, M. Verhoeven, L. Weiland, F. Weir and Shipboard Party.

Session: The future starts with resourcing geoscience education

Abstract:

The second Asia-Pacific University of the Sea research training cruise has recently been completed in conjunction with the ZONOCO12 and AUSFAIR research programs. The University of the Sea is a practical solution to the paucity of funding for support of expensive training of Australian and Asian marine scientists. With the strong and critical support of the French Institute for Polar Research (IPEV) and M. Yvon Balut, it is now possible to provide seaboard experience for up to 20 students during each cruise. While at sea the students are involved in active research programs, as well as undertaking learning activities such as lectures and the preparation of posters detailing the various aspects of data collection and interpretation. The five posters presented here were prepared by participating students.

Appendix 7: Funding Sources outside the APN

In kind contribution:

<ul style="list-style-type: none"> Ship time (including food and accommodation) (Compagnie Générale Maritime): 	\$US400,000
<ul style="list-style-type: none"> In kind salary contribution from participants: 2 staff x 2 weeks (average top Associate Professor, level D) for cruise and preparation work. 	\$US10,000
<ul style="list-style-type: none"> In kind salary contribution for secretarial and office support for organisation of travel and associated costs 	\$US6,000
Total in kind support:	\$US 416,000

Cash Contributions:

<ul style="list-style-type: none"> MARGO (Office of Marine Geoscience in Australia) 	\$US7,500
<ul style="list-style-type: none"> ARC NESS (ARC Network on Earth Systems Science) 	\$US7,500
Total cash outside APN:	\$US 15,000

* in kind and Cash contributions calculated in Australian dollars and converted using an exchange rate of \$US0.75 = \$AUD1.00

Appendix 8: Glossary of Terms

APN	Asia-Pacific Network for Global Change Research (<i>i.e.</i> you).
CD	compact disc (removable computer media)
IMAGES	International Marine Past Global Change Study. A global program to collect and study marine sediment records and investigate climate change throughout the Quaternary. One of the programs of PAGES.
IOC	International Oceanographic Commission
IPEV	The French Polar Institute Paul Emile Victor (IPEV) is a Non-Profit Group ("Groupement d'Interet Public", or GIP) composed of nine public or parapublic organizations. Among them, three are of particular importance: the French Delegate Ministry of Research and New Technologies, which provides most of the funding to IPEV, the French Ministry of Foreign Affairs, and the French CNRS, which provides staff to the GIP. This is the organisation that runs and operates the <i>MV Marion Dufresne</i>)
MARGO	Office of Marine Geoscience in Australia
Marion Dufresne	The research vessel used for the University of the Sea; named after Marc Joseph "Macé" Marion-Dufresne (1724-1772) a French explorer in the Pacific region in the late 18 th Century.
MD-148	Cruise designation for the research leg attended by the inaugural University of the Sea cruise participants (<i>Marion Dufresne</i> Cruise Number 148)
PAGES	Past Global Change - PAGES is a core project of International Geosphere-Biosphere Programme (IGBP) and is funded by the U.S. and Swiss National Science Foundations, and the National Oceanic and Atmospheric Administration (NOAA). It is overseen by a Scientific Steering Committee comprised of members chosen to represent the major techniques and disciplines, while at the same time providing regional geographic representation.
PECTEN	Acronym for Past Equatorial Climate: Tracking El Niño, the name given to the MD-148 research cruise.
PNG	Papua New Guinea
UNESCO	United Nations Educational, Scientific and Cultural Organization.
UoS	Asia-Pacific University of the Sea (the informal group that conducts the research training program detailed in this report).

Appendix 9: Expenditure of Finances Report.

Date 2005	Person	Item	Route/Location	Cost	Eligible	\$US
21-Jun	Wadanahaluge	Airfare	Balance	\$346.00	Y	\$259.50
21-Jun	Wadanahaluge	Accomm	Singapore	\$167.00	Y	\$125.25
7-Jun	Berdin	Airfare	Canberra-Port Moresby; Darwin Canberra	\$1,457.00	Y	\$1,092.75
7-Jun	Rogers	Airfare	Canberra-Port Moresby; Darwin Canberra	\$1,457.00	Y	\$1,092.75
7-Jun	Dedecker	Airfare	Canberra-Port Moresby; Darwin Canberra	\$1,889.00	N	
7-Jun	Doubleday	Airfare	Hobart-Port Moresby; Darwin-Hobart	\$1,461.00	Y	\$1,095.75
7-Jun	Golding, York, Strotz	Airfare	Sydney-Port Moresby; Darwin-Sydney	\$3,594.00	Y	\$2,695.50
7-Jun	Keene	Airfare	Sydney-Port Moresby; Darwin-Sydney	\$1,816.00	N	
7-Jun	Li	Airfare	Melbourne-Port Moresby; Darwin-Melbourne	\$1,497.00	Y	\$1,122.75
7-Jun	Supian	Airfare	Perth-Port Moresby; Darwin-Perth	\$1,496.00	Y	\$1,122.00
7-Jun	Couglin	Airfare	Darwin-Townsville one way	\$600.00	Y	\$450.00
7-Jun	Couglin	Airfare	Townsville-Port Moresby one way	\$674.00	Y	\$505.50
7-Jun	Susan John, Marissa Taro	Airfare	Darwin-Port Moresby	\$1,894.00	Y	\$1,420.50
7-Jun	Tidswell	Airfare	Hamilton-Port Moresby; Darwin-Hamilton	\$1,985.00	Y	\$1,488.75
7-Jun	Sri, Roni	Airfare	Jakarta-Port Moresby; Darwin-Jakarta	\$4,424.00	Y	\$3,318.00
7-Jun	Rachmawati	Airfare	Jakarta-Port Moresby	\$2,277.00	Y	\$1,707.75
7-Jun	Liu	Airfare	Shanghai-Port Moresby; Darwin-Shanghai	\$2,807.00	Y	\$2,105.25
8-Jun	Isozaki	Airfare	Tokyo-Port Moresby; Darwin-Tokyo	\$3,782.00	Y	\$2,836.50
9-Jun	Manterio	Airfare	Dili-Port Moresby; Darwin-Dili	\$1,871.00	Y	\$1,403.25
10-Jun	Wadanahaluge	Airfare	Colombo-Port Moresby; Darwin-Colombo	\$2,497.00	Y	\$1,872.75
15-Jun	Li, Berdin, Doubleday, Isozaki, Liu, Golding, Rogers, Strotz, York, Azlan, Supian	Accomm	YHA Cairns	\$240.00	Y	\$180.00
15-Jun	Li, Berdin, Doubleday, Isozaki, Liu, Golding, Rogers, Strotz, York, Azlan, Supian	Accomm	YHA Darwin	\$306.00	Y	\$229.50
15-Jun	Reekes	Accomm	YHA Darwin	\$21.00	N	
15-Jun		Accomm	YHA Sydney	\$33.00	Y	\$24.75
25-Jun		Transfers		\$33.45	Y	\$25.09
17-Aug		Transfers		\$20.00	Y	\$15.00
23-Jun		Insurance		\$488.00	Y	\$366.00
			TOTALS	\$39,132.45		\$26,554.84

All costs incurred in Australian dollars; converted to \$US at exchange rate of 0.75. Eligible expenditure for student participants only. Receipts attached.