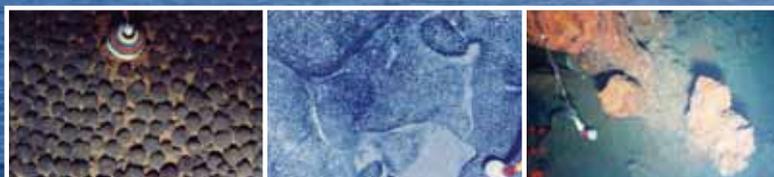




The Prospect



Issue 3. January 2014

NEWS FROM THE PACIFIC DEEP SEA MINERALS PROJECT

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Welcome to The Prospect!

The third issue of The Prospect is pleased to bring you news and developments from the SPC-EU Pacific Deep Sea Minerals Project and its participating member countries. The Deep Sea Minerals Project is designed to help Pacific Island governments ensure that any efforts to harvest deep sea minerals will directly support national economic development while also minimizing any negative impacts on the environment and local communities. The Project is

funded by the European Union and managed by the Geoscience Division (GSD) of the Secretariat of the Pacific Community (SPC), on behalf of 15 Pacific Island Countries: the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu and Vanuatu.

Nadi Workshop Focuses on Environmental Management of Deep Sea Minerals

The SPC-EU Deep Sea Minerals Project co-hosted the 4th regional training workshop with the Secretariat of the Pacific Regional Environment Programme (SPREP) from 9th-13th December 2013 in Nadi, Fiji. This workshop was designed to help countries to identify any environmental management needs before any deep sea mining activities occur in the region.

The workshop included representatives from Pacific Island countries, civil society organisations, deep sea mining companies together with international experts on deep sea ecosystems such as Professor Cindy Van Dover from Duke University in the United States and Dr Malcolm Clark from New Zealand's National Institute of Water & Atmosphere (NIWA).



Initiated in 2011, the SPC-EU Deep Sea Minerals Project is helping Pacific Island countries to improve the governance and management of their deep-sea minerals resources coordinated way within the Pacific.

While access to the deep sea has improved in recent decades, the workshop found that the understanding of deep sea ecology has been limited by the high cost of research and exploration. Most of the deep sea remains unexplored and key scientific questions have yet to be answered on the dynamics of the deep sea “ecosystem” including linkages between habitats, depths, and the potential impacts from proposed activities such as mining.

SPREP’s Director General, Mr David Sheppard, said there was a critical need for more baseline environmental data to be collected to enable Pacific countries to ensure informed decision making and strengthen the responsible management of their deep sea mineral resources. “The companies themselves need to allocate money for independent scientific studies of the biodiversity and the environment in the deep sea. There is good understanding of the mineral deposits but we need to have the same level of information on the deep sea ecosystems where they occur,” he said.

SPC Geoscience Division Director, Professor Mike Petterson said the workshop will help to ensure that the best current knowledge is used to put in place regulatory measures before any seabed mining starts. “By proactively agreeing common standards and tools across the Pacific, we can empower member countries to protect their marine environments and apply the precautionary approach, whilst exploring the economic opportunity presented by their seabed minerals,” he said.

Mr Akula Tawake, the Team Leader of the SPC-EU Deep Sea Minerals Project, said the workshop recognised that deep sea mining will be destructive at the local scale and may lead to species loss. However, he also said the three types of deep sea mineral deposits will require significantly different mining methods and the management of their impacts will entail different requirements.

In 2011 the International Seabed Authority, with the Geoscience Division of SPC, published an EIA template for the environmental management of deep sea mineral activities that countries can modify to suit their own national settings, and during one session of the December workshop, working groups considered what amendments should be made. The workshop also recommended that any project-specific Environmental Impact Assessment (EIA) should also be coupled with Strategic Environment Assessment (SEA). An SEA is a planning tool that assesses the environmental

impacts of potential developments and resources uses on the wider ecosystem. This will be necessary in order to consider wider impacts on transboundary resources such as migratory fish stocks on which many Pacific Islands currently depend.

It is currently believed that direct impacts on commercial fish stocks are unlikely because most fishing occurs at depths of less than 600 metres, while mining will occur at depths greater than 1000 metres. However, indirect impacts on fish of deep sea minerals activities may include dispersal of sediments in the water column or changes in primary productivity from increased marine traffic, surface discharges, or chemical ‘leaks’ when ore is lifted through the water column.

Variable currents near the deep seabed mean that it is uncertain how far sediment plumes may or may not travel up the water column, and/or linger as a cloud. The extent will depend on individual sites and technology used. Therefore more information about oceanographic processes is required to understand the potential impacts on the water column, ecosystems and human communities.

Mr Tawake said the workshop made several recommendations including the need for SPC and the Forum Fisheries Agency to bring fisheries and deep sea minerals officials together to examine how deep sea minerals policies and procedures can learn from and complement fishery policies. Areas for joint working between SPC-Geoscience Division and SPREP were also highlighted.

“Through the DSM Project, SPC and NIWA in collaboration with SPREP are now planning to develop Regional Guidelines for Seabed Mineral Research Activities to provide a framework for research that supports good environmental management of deep sea mineral activities. Other interest groups such as the Marine Sector Working Group will also be involved in the review of the guidelines. This will support the development of region-wide understanding of biological and ecological communities and identify what is important to measure, how it can be measured and the frequency of monitoring required once a deep sea mining operation commences,” Mr Tawake said.

The next SPC Deep Sea Minerals Project workshop in May 2014 will cover fiscal regimes and revenue management including models of managing extractive industry wealth so as to provide long-term sustainable benefits for Pacific Island countries from the development of deep sea mineral resources.



Launch of the SPC-UNEP/GRID-Arendal Pacific Marine Minerals Assessment Report



Professor Mike Petterson (Director, SPC-GSD) handing over the Pacific Marine Minerals Assessment reports to Mr Samuela Namosimalua (Permanent Secretary, Ministry of Local Government and Environment, Fiji)

On behalf of the Director General of the SPC, Professor Mike Petterson, the Director of the Geoscience Division, officially launched the Pacific Marine Minerals Assessment Report during the opening session of the 4th DSM Regional Training Workshop in Nadi Fiji on Monday 9th December 2013.

UNEP/GRID-Arendal was contracted to conduct a state of knowledge assessment of Pacific marine minerals based on previous marine scientific studies and exploration. A technical Steering Committee, comprising a number of world renowned experts as well as representatives of the SPC-EU DSM Project and key stakeholders in the region, was established to guide and support this Project deliverable under the SPC-UNEP/GRID-Arendal partnership.

In his remarks during the launch, Professor Petterson said, "Today we are going to celebrate another milestone achievement of the SPC-EU Deep Sea Minerals Project that has been made possible through collaboration with UNEP/GRID-Arendal, the United Nations Environment Programme (UNEP) collaborating centre located in Arendal, Norway".

This assessment report provides a synthesis and review of existing knowledge and information on deep sea minerals and is targeting a broad range of audience. It is also designed as a tool for managers and national experts who are engaged in developing national legislation, policy, technical and environmental guidelines and strategies related to various aspects of deep sea minerals.

"Although it has taken a little bit longer to complete the report, this was necessary to ensure the highest quality of content. I therefore would like to take this opportunity to thank UNEP/GRID-Arendal for completing and delivering hard copies of the report for the official launch today. Unfortunately UNEP/GRID-Arendal is not represented here today to witness this occasion. I also wish to acknowledge the contribution of all the chapter writers and reviewers who willingly gave their time to put together this excellent product", said Professor Petterson.

This publication consists of a series of volumes on deep sea minerals involving a network of some 60 of the world's leading experts. Volume 1 examines the geology and associated biology of the three principal deep sea mineral deposit types found in the Pacific Region and the environmental and technical aspects related to deep sea mineral extraction. Volume 2 provides a green economy context for examining how deep sea mining could be profitable, sustainable and meet the needs of Pacific Island people without sacrificing cultural heritage, community values or the health of ocean ecosystems.

"I encourage Pacific Island Countries and Territories to read this report and to learn more about issues relating to deep sea minerals. I am sure this publication will contribute to better planning and sound management of deep sea mineral resources in the region. We are here today to witness the launch of this report and I commend it to you" said Professor Petterson.

A copy of the Executive Summary and Volumes 1 and 2 of the publication were handed to Mr Samuela Namosimalua, the Permanent Secretary of the Ministry of Local Government and Environment in Fiji, who received the report on behalf of the Pacific Island Countries and Territories.

To access these volumes please visit: <http://gsd.spc.int/dsm/index.php/publications-and-reports>



The Pacific Marine Minerals Assessment Reports

Q&A with Cindy Van Dover – Deep Sea Biologist



Cindy Van Dover
Deep Sea Biologist

Cindy Van Dover, a Professor of Biological Oceanography at Duke University in the United States, was a key presenter at the recent regional workshop on environmental management of deep sea minerals in Nadi. On receiving her Ph.D. in 1989, Professor Van Dover joined the elite group that operates the deep-diving submersible ALVIN and she has participated in expeditions to nearly all the known hydrothermal vent fields in the

Atlantic and Pacific Oceans. Her current research focuses primarily on deep-ocean exploration and the study of biodiversity and biogeography of invertebrates from chemosynthetic ecosystems.

What is it like to pilot the ALVIN to the deepest parts of the ocean?

On the surface, the sea is very transparent and you can watch fish darting, jellyfish drifting. As you start to sink down, the colour changes through an amazing palette of ever darkening blue, until finally you're in the black at about 500 metres. This part of the descent happens very quickly and then, once sunlight is extinguished, the only sense you have of the descent is by looking out the view ports at the bioluminescent light produced by organisms in the water column as they are disturbed by the submarine. Otherwise there's just no sensation of sinking down into the depths of the ocean.

As you make the bottom approach, the pilot turns the exterior lights on and seafloor features start to come in view. The hot spring areas that I study, the hydrothermal vents, they are typically on hard substrata – hard rock. That rock is black, often glossy, glassy black basalt and it is draped in ways that capture motion frozen. In these areas, molten lava has erupted and instantly freezes in place as it chills. Where we dive in active seafloor spreading centres, we can often go into fissures that are literally where the great ocean plates are being ripped apart. It is a very dramatic landscape.

When you approach a hot spring, the gradient of life gets richer and richer. At vents in waters of Fiji, Tonga, and Papua New Guinea, the hot springs are colonised by large snails of several different species; those snails are often surrounded by mussels and barnacles. There's a lot to look at and wonder about. Why are these animals distributed the way they are? How do they feed? How fast do they grow? There is an exuberance of life at these hot springs.

Why should we care about these deep-sea organisms?

The deep-sea animals that live at hot springs give us clues about how they adapt to extreme conditions; we want to figure out how they survive and thrive in what seems to us like a noxious environment full of chemicals. The chemical and physical extremes we see at the hydrothermal vents serve as analogs for what extra-terrestrial environments might be like – especially where there may be oceans, like we know exists on Europa, a moon of Jupiter. Deep-sea ecosystems at hot springs teach us about the potential for life on other planets and also how life might have originated on our own planet.

These hydrothermal vents also have value beyond the mineral resources. They have proven to be rich in scientific value and they have genetic resources that could eventually be used for societal

benefit. Enzymes in some of the microorganisms at vents are adapted to very high temperatures and high pressure and may be useful in industrial applications. Some enzymes that have been developed from hydrothermal vents are already used in molecular science. There are cosmetics that are derived from deep-sea hot spring microbes. There is potential for therapeutic agents, anti-cancer and other anti-disease agents from the genetic resources of deep-sea vents.

Why is it important for scientists like you to be involved in commercial mining activities like Solwara 1?

We are interested in understanding how the vent ecosystems respond to the impact of mining. Mining will remove the animals; will they come back? We think there will be recovery, but on what time scale? How much will the fluid chemistry that they depend on be modified by the mining activity? Can we facilitate recovery of the system?

We have worked with industry to collect baseline data from proposed mine sites, against which we can compare the recovery. As part of this effort, we have hosted individuals from Papua New Guinea at Duke University, to work with us in the lab and learn some of the genetic techniques we used to identify invertebrates at the vents and determine their genetic diversity.

For now, our understanding of the impacts of mining on vent ecosystems is theoretical. If mining takes place at Solwara 1, we will be able to compare the pre-mining baseline data to data collected during the post-mining monitoring phase. This will advance our understanding of the resilience of these vent communities and allow us to assess the risks associated with mining events in a region.

What can be done to minimize the impacts of mining?

A key mitigation tool to minimize the impacts of mining is to establish a network of reserve areas throughout a region that remain untouched. This network of reserves should be designed and situated in such a way as to ensure that there are always healthy vent systems that can supply recruits to colonize mined areas. These reserve areas should be monitored as well as during the mining phase, to understand natural dynamics of the systems and monitor against cumulative impacts resulting from multiple mining projects. Another tool that could be important is controlling the rate at which mining activities are allowed to take place. If we could let one site recover before moving to the next site in a region, this would help to minimize the mining impact. There is still a lot to learn about the most effective way to enable mining without causing significant harm to vent ecosystems.

When we think about environmental management we think about multiple, cumulative impacts. We need to watch and monitor, see what happens with one mining event. If the vent ecosystem recovers very quickly, then there's the possibility of adapting the strategy, the environmental management plan, and moving to other sites quickly. But if it takes a long time for the vent ecosystem to recover, then we need to adapt the management strategy, re-evaluate the assumptions, and understand why the system did not recover. Hot springs are thought to be some of the most resilient systems in the deep sea, so it may be possible to extract minerals from them and they'll come back right away. But we don't know that yet.

Deep Sea Minerals in Pacific Plan Review Report

The Pacific Plan Review report published on 19 December 2013 recommended that the Pacific Island Forum Secretariat (PIFS) work with relevant Council of Regional Organisations in the Pacific (CROP) agencies to investigate the merits of establishing a self-funding secretariat to assist Pacific Island Countries (PICs) with the development of seabed mining. It also recommended PIFS develop policy proposals on “establishing a body to provide commercially focused advice on maximising revenue from seabed mining modelled on the self-funding secretariat that supports the Parties to the Nauru Agreement on fishing”.

SPC-GSD Director, Professor Mike Petterson says that SPC would like to work closely with PIFS and member countries in developing a comprehensive programme to assist island countries in sustainably developing deep sea minerals (DSM).

“The EU has funded SPC to develop a number of initiatives in this area, particularly with respect to the legal framework, capacity building, and a range of scientific and other information essential for the development of DSM. However the region as a whole is weak in many essential areas for mineral development such as geological skills and knowledge, deep sea marine biology and environment, and many regulatory and socio-economic areas,” Prof. Petterson said.

“The current SPC-EU DSM project is just the beginning and we hope that PIFS and Pacific Island country leaders will support SPC in attracting significant further funding to build capacity, strength, knowledge and systems to assist decision makers in the attraction, development and management of deep sea mining for the benefit of Pacific people.”

SPC - GSD Annual Meeting calls for Forum Leaders to Address Deep Sea Minerals as High Regional Priority

The third annual meeting of the Geoscience Division of the SPC was held at the Edgewater Resort in Rarotonga, Cook Islands, from 9 to 11 October 2013. This meeting called for the next Pacific Island Forum Leaders’ Meeting to address economic potential of deep sea minerals as a high regional priority. The Geoscience Division meeting also noted that the region would require a consistent programme of work in order to increase the capacity of member countries to take full advantage of this potential.

The meeting also acknowledged that environmental and social concerns about mining and mineral development should be addressed at an early stage. This should involve the identification of knowledge gaps and more awareness raising and informed

engagement with Pacific Island communities. It recommended that member countries, the Geoscience Division and key support agencies work together in developing the appropriate range of needed expertise for the whole Pacific community in areas such as: the geosciences; environmental and biological science; ecosystems expertise; economics; law, community relations; land and resource ownership, and other areas.

The meeting also suggested that the development of an integrated minerals database would empower Member countries in truly understanding their mineral deposits and strengthen their hands with respect to company negotiations.



Cook Islands Enters New International Seabed Minerals Arrangement in Cooperation with GSR of Belgium

On 27 December the Honourable Mark Brown, the Cook Islands Minister of Finance and Minister responsible for Minerals and Natural Resources, issued a media release announcing that the Cook Islands Investment Corporation (CIIC) had submitted an Application for exploration of polymetallic nodules to the International Seabed Authority (ISA).

The Cook Islands Investment Corporation (CIIC), which is a Cook Islands state enterprise, submitted an application for approval of a plan of work for exploration for polymetallic nodules in a reserved site in the Clarion-Clipperton Fracture Zone (CCZ). The ISA records confirm that value of the in-ground seabed minerals in this 75,000km² site is estimated at \$US227 Billion.

This application will be considered by the relevant ISA advisory and decision-making organs at a closed meeting in February, and at the (open) Annual Session in July. If it is successful, the Cook Islands will be the 4th Pacific Island to have sponsored an ISA contract (along with Tonga, Nauru and Kiribati).

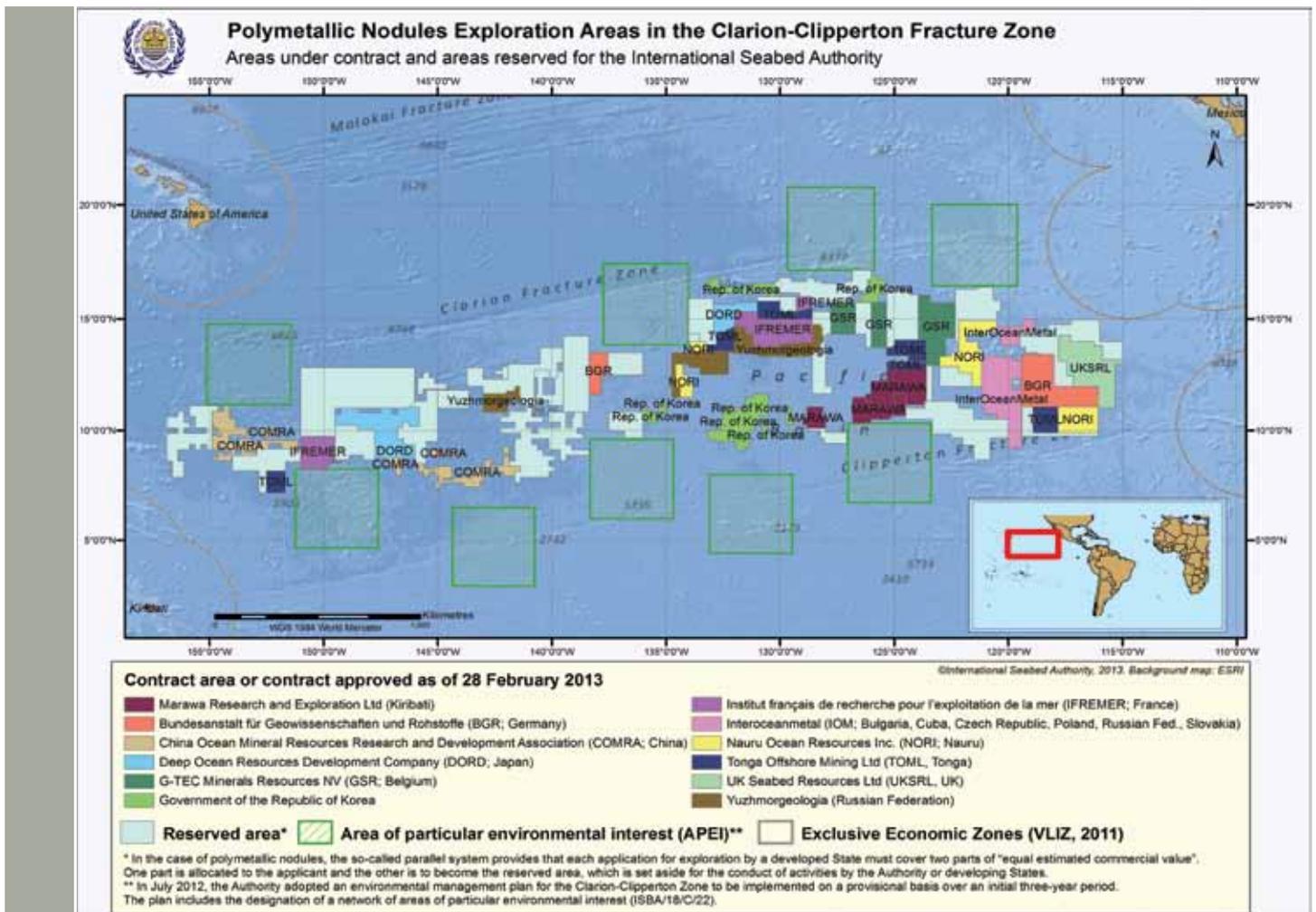
The site will be controlled, explored and developed by CIIC on behalf of and supported by a joint arrangement between the Cook

Islands Government and G-TEC Sea Mineral Resources NV (GSR) of Belgium. All potential future revenues from development of the site, in case of a future mining contract, will be shared on a 50/50 basis. Employment, training and capacity building opportunities will be created for Cook Islands people, directly related to work in the CI-GSR site.

Minister Brown sought to assure all Cook Islanders that detailed technical and environmental information would be obtained and evaluated before any possible seabed mineral exploitation takes place.

“Our ISA Application is one of many steps we are adopting for our country to sustainably utilise and harvest the mineral bounty of the sea that has been bestowed upon us, in our own EEZ and the CCZ area. It is our goal for this to be done for the mutual benefit of its investment partners and stakeholders. We now await the deliberations on our ISA Application by the February 2014 session of LTC of the ISA at its headquarters in Kingston, Jamaica,” he said.

GSR - A private Belgian company who already hold a contract with the ISA for the exploration of polymetallic nodules in the Clarion Clipperton zone, under sponsorship by the Government of Belgium.



Winner of the Cook Islands Youth Debate Meets EU Ambassador



Left to right: TIS executive member, Teina Mackenzie; SPC-EU DSM Project Team Leader, Akuila Tawake; debate winner Teherenui Koteka; EU Ambassador Andrew Jacobs; Teherenui's mother, Elizabeth Wright and; EU's Attache for Natural Resources and Infrastructure, Thierry Catteau.

Fifteen year-old Tehere Koteka, the winner of the inaugural Cook Islands National Youth Debate on Seabed Minerals, met with the EU Ambassador to the Pacific, Andrew Jacobs, as part of her visit to SPC-EU Deep Sea Minerals project workshop in Nadi, Fiji in December. Mr Jacobs congratulated the Titikaveka College student on her win. "I'm very happy to have met Teherenui. I know that during the debate she showed astuteness, confidence and eloquence. She is a great representative of an aspiring, environmentally-aware young generation in the Pacific which bodes well for the future of the region. I wish Teherenui all the success in her future studies

and endeavours," he said. The debate on October 06, 2013 was organised by the Cook Islands Seabed Minerals Authority (SBMA) and Te Ipukarea Society (TIS), and saw 12 young people discuss the arguments around seabed minerals. Contestants were asked to argue the pros and cons of deep sea mining from a technical, societal, legal and environmental perspective. The debate received financial support from the European Union and the Geoscience Division of the Secretariat of the Pacific Community.

New Resources

New documentary focuses on environmental impacts of deep sea mining

The SPC-EU Deep Sea Minerals project has launched a second documentary titled "Out of Darkness". This video explores the potential environmental issues related to the extraction of deep sea mineral resources and includes some spectacular underwater footage from several international science agencies. The film also includes interviews with scientists such as Dr Malcolm Clarke from NIWA, Dr Jim Hein from the US Geological Survey and Dr Ray Binns from CSIRO. The film can be viewed on the SPC Division website (gsd.spc.int) and free copies of the DVD can be obtained by emailing: viraa@spc.int.

Cook Islands develops excellent online FAQs on seabed minerals

The Cook Islands Seabed Minerals Authority has published an excellent series of Frequently Asked Questions on its website. If you want to become an instant expert on deep sea minerals in the Cook Islands and the wider Pacific make sure to visit: <http://www.seabedmineralsauthority.gov.ck/index.php/seabed-minerals-in-the-cook-islands/frequently-asked-questions>

Profile

Alison Swaddling, Environment Advisor for the SPC-EU Deep Sea Minerals Project



Alison Swaddling

Alison, a Marine Environmental Scientist with six years' experience in the offshore minerals industry, has joined the SPC-EU Deep Sea Minerals Project as Environment Advisor. With qualifications in Media Communications and Marine Science, Alison was part of the team that developed the world's first Environmental Impact Assessment for deep-sea mineral production. She has participated in offshore exploration campaigns in Papua New Guinea, Tonga, and Fiji.

Q: What do you hope to achieve in your new role?

A: I will provide information and assistance on Deep Sea Mineral environments to people of the Pacific. I hope to empower them to make their own well-informed decisions on DSM activities.

Q: What do you like most about your new job?

A: The opportunity to meet many new people and participate in developing this new industry in a way that values and respects the environment.

Q: Where are you from and what was it like growing up there?

A: I grew up in rural suburb on the outskirts of Sydney, Australia. It is a fantastic place that I will always call home.

Q: What do you like to do when you're not at work?

A: To relax I enjoy reading, watching movies and cooking. However, at any chance I get I try to travel and explore new places. I am hoping to see a lot of Fiji and other Pacific Islands.

Q: What would you really like to be doing in 10 years?

A: I would love to be involved with the United Nations Environment Program.

Q: What's the one thing you'd really like to do that you haven't done yet?

A: I would really like to do the Camino de Santiago, a pilgrim's walk across northern Spain.

Q: What's your favourite movie and why?

A: The French film Amelie. It is quirky and enthralling.

Internship Programme



Marica Higley Vereakula

Marica, a young lawyer from Fiji, was the 10th legal intern with the project, working with Hannah Lily (DSM Project Legal Advisor) from 21 October to 15 November 2013. Marica said she really enjoyed the welcoming environment and "excellent team spirit" at the SPC-EU DSM Project, as well as the professional guidance she received from Hannah Lily. "The internship work really challenged me to greater heights. It encouraged me to believe that the impossible can be done regardless of the limited time frame," she said.



Johnathen Kawakami and Yolanda Lodge, Asst. Attorney Generals from Marshall Islands

Johnathen and Yolanda, lawyers from the Marshall Islands Attorney General's office, visited the DSM Project in October 2013. Through very impressive efforts and joint working, in just 2 weeks Johnathen and Yolanda managed to develop a draft Cabinet paper, a draft national policy, and a draft Bill for the regulation of national seabed mineral activities in the Marshall Islands. Johnathen and Yolanda now hope to work with Government colleagues to receive a Cabinet mandate for the set-up of an inter-Ministerial national DSM committee, and to continue working and consulting on the Bill. DSM Project looks forward to supporting these processes.



Intern Update: Amy Ponton

Amy, a Tuvaluan / British national, was the first legal intern to the DSM Team in January 2012 – and indeed it was through her initiative in approaching the Project that the internship scheme started. After her internship Amy pursued a Masters degree in London. Based on her experience working with us, Amy wrote her dissertation on DSM law (the Principle of the Common Heritage of Mankind) – and we are very pleased to report that Amy has recently been awarded the Queen Mary's School of Law award for achieving the year's highest mark in the LL.M in Public International Law. Amy will also be assisting DSM Project's Hannah Lily run a one-day DSM law workshop in London in March 2014.

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For more information please contact: Geoscience Division (GSD), Secretariat of the Pacific Community,
Mead Road, Nabua, Fiji Islands. Tel. (+679) 3381377 / Fax. (+679) 3370040/3384461
Website: gsd.spc.int/dsm / email: SOPACDirector@spc.int