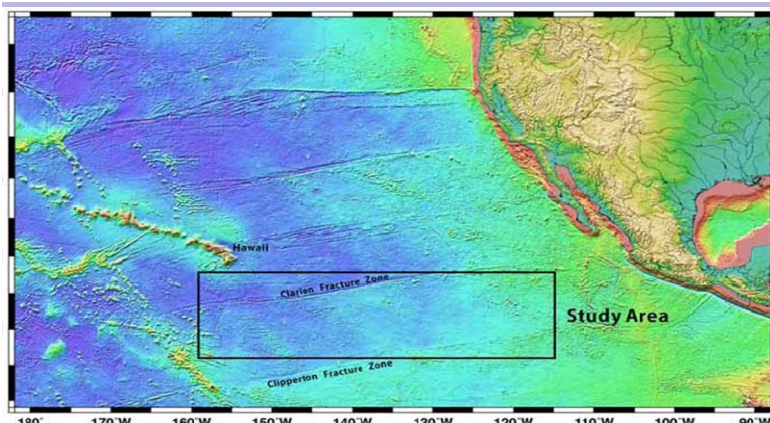
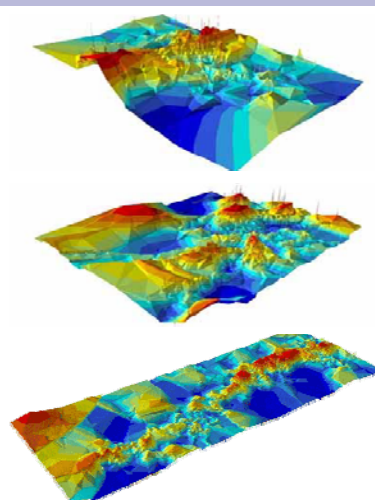


ISA to host Geological Model Workshop in December



Above: The study area of the model: 110° - 160° W Longitude and 0° - 20° North Latitude. Right: Results of calculations using the SIS method in ArcGIS software



SEMINAR

ISA also hosted a 3-day meeting in September to facilitate discussion of the peer review of the Geological Model and the Prospector's Guide documents carried out by two external reviewers - Dr James Hein of USGS and Prof Peter Halbach of Free University, Berlin.

At the meeting, ISA provided an overview of various data sets received from the contractors for model development. Experts attending the meeting also gave presentations on their reviews.

At the end of the meeting, it was agreed that the modalities would be incorporated into the model documents. ■

While nodules have been found in all the world's oceans, their abundance and distribution in certain areas are more economically interesting to mining prospectors.

The Clarion-Clipperton Fracture Zone (CCZ) in the Pacific Ocean, for instance, has the largest known deposits of seabed polymetallic nodules, where distribution can be compared to a carpet along the seabed covering more than 70% of the Zone.

In March 2001, Authority and contractor representatives decided to develop a geological model of the deposits in the Zone. This project was led by a group of technical experts in partnership with ISA.

The December workshop follows on from a workshop in 2003 and a series of seminars to develop the model.

Scheduled for 14-17 December at the ISA headquarters, the workshop will finalize the

Geological Model utilizing the recommendations of the expert seminar held in September. The necessary modifications to the figures and tables of the geological model, and the preparation of a glossary of terms have been completed and will be appended to the Prospector's Guide.

At the workshop, developers of the Model will provide complete documentation describing the model testing procedures and algorithms used in producing the final model results.

Presentations by experts at the workshop will be on various related topics including the analysis of volcanic and structural elements of the CCZ, and the relation between nodule coverage, morphology and distribution, biogeochemical modeling, and environmental and biological factors in the CCZ. The participants will also break into four working groups in parallel sessions to deliberate on the extension of the Model to

other oceans (e.g. the Indian and Atlantic Oceans); exploration technology; the environmental component; and education and outreach relating to the results of the model studies.

The Model will consist of a set of digital maps and tables describing predicted metal content and abundance of deposits, along with associated error estimates. The appended Prospector's Guide examines all potential proxy data variables identified as important indicators of metal content and abundance, specific data sets that qualify for use in the Geological Model and data information on all known nodule deposits in the CCZ.

The Model will be able to predict geographical distribution of nodule metal content as well as abundance. Using the data of other known variables on the seabed in the water column of the CCZ will provide information indicators for exploration to prospectors. ■

ALSO IN THIS ISSUE...

China Scholarships	2
Article 82 of the Convention of the Law of the Sea	3
Mexico implements Article 76 para 9	3
CBD Experts Workshop	4
TAP MAR Training	4
Geological Model Project for CIOB	5
ISOPE-OMS Exhibition	5
Staff Updates	6

ENDOWMENT FUND PROJECTS

Encouraging marine science research in the international seabed area has been a key pillar of the Authority's mandate and the Endowment Fund continues to carry out activities designed to draw the attention of the international donor community to opportunities offered by the Fund to encourage additional contributions.

Sponsorships and cost-sharing activities for the training of developing country scientists continue, with the most recent being the InterRidge/ISA Student Postdoctoral Fellowship Programme and the awarding of three TAP-MAR fellowships for training in India.

Previous successful collaborations include the Kaplan Project—the first attempt to analyze species composition and rates of gene flow across the CCZ; the CenSeam Project—a programme within the Census of Marine Life with which ISA has partnered to assess the patterns of biodiversity on seamounts and the factors that determine these patterns in order to identify the gaps in current knowledge and encourage collaborative research initiatives; and the Geological Model Project - to develop a comprehensive representation of the quantity, distribution and metal content of polymetallic nodules in the CCZ, and provide entities under contract with the ISA and future mining prospectors with a detailed mineral resource assessment of the Zone. The Model is in its final stages of completion and will be reviewed at the upcoming workshop at the Authority's headquarters from 14-17 December.

.../Page 5



China Announces Funding for Five Scholarships

In a bid to further strengthen the existing cooperation with the International Seabed Authority, China has granted funding to support five candidates to pursue Masters or Doctorate degrees in Marine Science at the **Tongji University**.

Tongji University has more than 20 specialized colleges offering 82 undergraduate programs, 217 Master degree programs, and 89 PhD programs. There are 13 postdoctoral research centers and 10 State key disciplines taught at the university. As one of the State key research centers, the university has 14 State key laboratories and engineering research centers either at the state level or ministerial and provincial level.

The Scholarship Program **Announcement** stresses that all applications should be marked with "Applying for the Chinese Government Scholarship" and submitted to either Professor Zhou Huiyang (zhouhy@tongji.edu.cn) of the **School of Ocean and Earth Sciences at Tongji University** or through the Tongji University's **International Students Office** by 15 December 2009.



The scholarship includes; the waiver of fees for registration, tuition, laboratory experiments, internship, basic Chinese tuition, materials and accommodation; a monthly living allowance; and a comprehensive medical insurance plan.

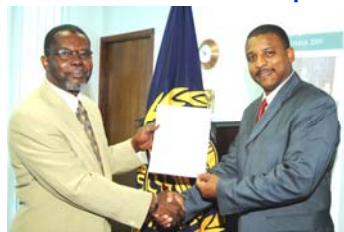
For the successful applicants, the first academic year is probationary. Candidates will only be considered as being qualified to prepare their dissertations after passing all the degree exams and the interim evaluations in that first academic year. Credits scored on probation, however, will be included in the total credits.

In June this year, the Authority signed a MOU with China to strengthen existing cooperation in issues relating to the international seabed in the field of marine science, the establishment of technical standards for marine protected areas (MPAs), and to assist in aspects of personnel training and marine science popularization. ■

Member State Updates...

Switzerland (1 May 2009) and the Dominican Republic (10 July 2009) have acceded to the 1982 Convention on the Law of the Sea, bringing the number of members of the Authority to 159. Both countries also became parties to the Agreement relating to the implementation of Part XI of the Convention.

New Permanent Representatives



Secretary-General Oduntun with HE Mr. Yuri A. Gala Lopez (above) and HE Mr. Alexandre Ruben Milito Gueiros (below)



HE Mr. Yuri A. Gala Lopez presented his credentials on 14 September 2009 as the new permanent representative of **Cuba** to the International Seabed Authority.

HE Mr. Alexandre Ruben Milito Gueiros presented his credentials on 30 October 2009 as the new permanent representative of **Brazil** to the International Seabed Authority.

ISA News is published by the Secretariat.

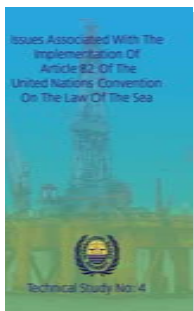
Opinions expressed in this publication are not necessarily those of the Authority, neither does the mention of any firm or licensed process imply endorsement by the Authority.

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Potential claims to Outer Continental Shelf (OCS) areas under the 1982 UN Convention on the Law of the Sea may eventually cover more than 15 million square kilometers of seabed

IFREMER 25th Anniversary

As part of its 25th Anniversary celebrations, IFREMER hosted a conference entitled 'Alliance for marine science: from national to global network' on 28-29 September, which covered environment, biodiversity and marine geosciences issues that needed to be put in perspective with collaboration from the scientific community to create awareness of sustainable exploitation and the protection of biodiversity and the marine environment.

The Authority was represented by the Secretary-General.



Issues Associated with the Implementation of Article 82

In February 2009, the Authority co-convened a seminar with the Royal Institute of International Affairs (Chatham House), at which invited experts discussed issues associated with Article 82.

A report, which examines the legal and policy issues associated with the implementation of Article 82, was originally prepared as a background paper for the seminar, and was subsequently extensively revised to take into account the views expressed by participants in the seminar.

Responsibility for the implementation of Article 82 rests with the Authority

and with States that exploit the non-living resources of their Outer Continental Shelf (OCS). However, Article 82 does not address many of the specifics of how this is to be accomplished. Therefore, careful consideration is required of the obligation, principles and criteria for the distribution of benefits, procedural aspects, the role of the Authority, the role of OCS States, and economic and temporal issues.

Potential claims to OCS areas under the 1982 UN Convention on the Law of the Sea may eventually cover more than 15 million square kilometers of

seabed. Under Article 82 of the Convention, a portion of the revenue from the extraction of non-living resources from the OCS must be disbursed through the ISA 'on the basis of equitable sharing criteria, taking into account the interests and needs of developing States, particularly the least developed and the land-locked among them.

The publication is in press with print copies expected to be available in December. The [electronic version](#) of the report, however, is available on the Authority's website. ■

Mexico and Ireland Implement Article 76 Paragraph 9

Mexico and Ireland are the first two coastal States to implement Article 76 paragraph 9 of the Convention on the Law of the Sea by [depositing](#) with the UN-Secretary General charts and relevant information, including geodetic data, permanently describing the outer limits of their continental shelves.

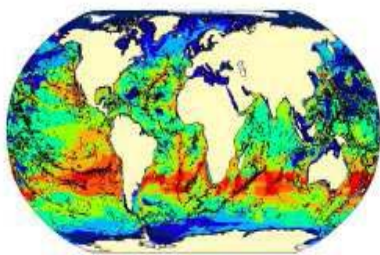
On 20 May 2009, [Mexico](#) deposited a chart and relevant information,

including geodetic data, permanently describing the outer limits of its continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured in respect of the Western Polygon in the Gulf of Mexico.

On 19 August 2009, [Ireland](#) deposited a list of geographical coordinates of points, including geodetic data and an illustrative

map, permanently describing the outer limits of its continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured in the area abutting the Porcupine Abyssal Plain. ■

Convention on Biological Diversity (CBD) Expert Workshop



Global map of predicted marine mammal species richness and seamount density (<http://openoceansdeepseas.org>).

[Continued from Page 2]

In March 2009, an award of 25,000 euros was made to the Rhodes Academy of Oceans Law and Policy to fund a number of student fellowships for individuals from developing countries, and to expand the Academy's training programme to cover issues relating to marine science.

The Rhodes Academy was founded in 1995 and entails an intensive 3-week course of study with lectures by leading jurists and international law faculty members from around the world.

In September, in Ottawa, Canada, the Convention on Biological Diversity (CBD) convened an expert workshop on scientific and technical guidance on the use of biogeographic classification systems and identification of marine areas beyond national jurisdiction in need of protection.

The workshop reviewed and synthesized progress on the identification of areas beyond

national jurisdiction that meet CBD scientific criteria. It also assessed experience in the use of biogeographic classification systems in marine conservation and management in order to develop: scientific and technical guidance on the identification of areas beyond national jurisdiction that meet the CBD scientific criteria; and guidance on the use and further development of

biogeographic classification systems to inform international cooperation and action.

The Authority was represented by its Scientific Officer, Dr. Adam Cook, who presented a paper on the relevant work of the Authority, including the areas of environmental interest in the CCZ currently being considered by the Legal and Technical Commission. ■

ISA and ITLOS

In September, the Authority's Secretary-General, Nii Odunton, and Legal Counsel Michael Lodge, visited the International Tribunal of the Law of the Sea (ITLOS) in Hamburg.

While at the Tribunal, the Secretary-General held consultations on the work of

the Authority with the President of ITLOS, Judge Jose Luis Jesus.

Other matters discussed included the work of the Seabed Disputes Chamber and the work of the Authority that may be taken up by the Chamber of the Tribunal. ■



Michael Lodge, Nii Odunton and Jose Luis Jesus (front-centre) with the 21 judges of ITLOS



Awardees Wickramaarachchi (front row, third from left), Rocha (front row, centre) and Nubi (front row, fifth from left) with NIO resource staff

TAP-MAR fellowship awardees Alejandra Mariana Rocha, a professor at the University of Pampa, Argentina; Olubunmi Nubi, a senior research officer at the Nigerian Institute of Oceanography and Marine Research in Lagos, Nigeria; and Niroshana Wickramaarachchi, a research

officer at the National Aquatic Resources Research and Development Agency in Colombo, Sri Lanka, have begun their training attachments with the National Institute of Oceanography (NIO) in Goa, India.

The first training phase began with orientation lectures on various topics of marine scientific research, incorporating marine surveys for interdisciplinary research; exploration of marine minerals and resource evaluation; marine ecosystems; and biodiversity environmental impact assessment of offshore projects.

The second phase includes hands-on projects to develop skills relating to various topics within the candidates'

areas of interest under the supervision of scientists from the Institute.

Dr. Rahul Sharma of NIO says the training programme will also include a field trip visit aboard the *ORV Sagar Sukti*. Sagar Sukti is NIO's coastal research vessel, measuring 23.5 m in length and 6.5 m in breadth. It provides accommodation for eight scientists, four officers and eight crew, and has an endurance of 12 days. ■



ORV Sagar Sukti

India and ISA Discuss Geological Model Project for the Central Indian Ocean Basin



Top: Dr. S. R. Shetye, Director, National Institute of Oceanography, Goa, and Secretary General Nii Odunton in the meeting. Bottom: Representatives of the Indian government

Following the Authority's geological model project for the Clarion-Clipperton Zone (CCZ), efforts are now being made to begin the initial project plan for developing a geological model of the polymetallic nodules of the Indian Ocean (IO).

The development of the

IO geological model would provide scientific information for other prospectors on possible indicators for the future exploration of potential areas of polymetallic nodules, and the resources will help the understanding of nodule occurrences and distribution.

During his recent visit to India (21-23 October) to meet with the National Institute of Oceanography (NIO) and the Ministry of Earth Sciences, Secretary-General Odunton stated that, unlike the model of the CCZ, work on the IO model could be developed in a relatively shorter time because expertise would be culled from mostly within NIO.

The parameters for developing the geological model would include bathymetry, tectonics, lithology of surface sediments, nodule grade and abundance, morphological classification of nodules, genetic type of nodules, sediment mineralogy, down-core mineral concentrations, petrology of the area, palaeo-oceanography and depth minus carbonate compensation depth (CCD) with respect to nodule abundance.

At the meeting, the Secretary-General suggested

that scientists also look at the data outside the Indian claim area that may have been collected either as a part of the initial surveys in the Central Indian Ocean Basin (CIOB), or from explorations conducted by scientists at other organizations and available in the public domain.

He said that to develop a geological model, it would be necessary to establish relationships between the associated parameters and nodule grade and abundance.

NIO has been involved in the exploration of deep-sea minerals as sources of certain strategic metals since 1981, which has led to the development of several facilities and expertise within the Institute. The allotment of an area of 150,000 sq km in the CIOB to India was due to the efforts of the scientists of NIO, who will also be involved in the development of the geological model for CIOB.

NIO scientists have reviewed exploration data regarding polymetallic nodules dating from the 1873 voyage of *HMS Challenger* and from research activities from 1965 onwards, and have conducted detailed studies of the geological, biological, chemical and physical characteristics associated with nodule deposits. ■

ISA Exhibits at ISOPE Ocean Mining Symposium

The 8th Ocean Mining Symposium (OMS) organized by the International Society for Offshore and Polar Engineers (ISOPE) was held 20-25 September at the National Institute of Technology in Chennai, India, and was attended by some 80 representatives from China, Germany, Japan, the Republic of Korea, Papua New Guinea, Poland, Russia and the United States, as well as representatives from the host country.

OMS is a biennial international forum for researchers and engineers to promote technical cooperation in ocean mining and technology.

The program included papers on deep-ocean mining review, manganese nodules, crusts, sulphides, gas hydrates, engineering, exploration, the environment, mineral processing, mining systems and technology, ocean energy, and underwater and sub-sea systems.

As a co-sponsor, ISA was represented by senior scientific officer, Dr. Vijay Kodagali, who also co-chaired a session on marine mineral exploration and manned an exhibition booth showcasing the role and activities of the Authority in the Area using maps, posters and information brochures. ■

Top right: Dr Kodagali (ISA) and Dr Valcana Stoyanova (IOM) at the ISA Exhibition Booth. Middle: OMS participants. Right: showcase booths at the OMS



CALENDAR OF EVENTS

November 2009

Expert Workshop on environmental impact assessment, 18–20 November, Manila

December

UN General Assembly —Oceans and Law of the Sea general debate; 4 December, New York

Workshop on the Geological Model of the Clarion-Clipperton Zone, 14–17 December, Kingston, Jamaica

FORTHCOMING PUBLICATIONS

- Exploration and exploitation of deep seabed mineral resources in the Area: Challenges for Africa and opportunities for collaborative research in the South Atlantic Ocean
- Cobalt-Rich Crusts and the Diversity and Distribution Patterns of Seamount Fauna
- Polymetallic Nodule Mining Technology - Current Status and Challenges Ahead
- Selected Decisions of the 15th Session

Staff Updates

ISA has two new staff members: James McFarlane (US) joined in September as Head of the Office of Resources and Environmental Monitoring and Frazer Henderson (UK) joined in November as Editor.

James has spent over 30 years in the marine environment – manufacturing underwater vehicles as shop manager at International Submarine Engineering (ISE) in British Columbia, and working in the offshore oil and gas industry in Canada, Norway, Scotland and the United States operating ROVs for various international commercial diving companies.

He joined Monterey Bay Aquarium Research Institute (MBARI) in 1987 as its Chief ROV Pilot, logging over 10,000 hours in oceanographic research, and resigned

in 2002 as one of the directors of the Institute. Prior to joining the Authority, he was Vice President of Sound Ocean Systems whilst maintaining and operating his marine consulting company, which he started in 2003.

His experience in all facets of subsea development, research and operations has provided him with a unique perspective on oceanographic endeavors and the marine environment.

He has been co-chairperson of the National Science Foundation, National Visiting Committee, for the Marine Advanced Technology Education (MATE) Center for the last decade. He has also been directly involved in numerous film, television and documentary programs highlighting oceanographic

research, education and current news, and is active in the scientific oceanographic community, presenting at various international workshops and conferences. He is also a member of the Marine Technology Society and a Fellow National ('97) of the Explorers Club.

Frazer joins the Secretariat from Cambodia where he has spent the last three years as a freelance writer and editor, working for UN agencies and NGOs.

He was an arts administrator in South Wales before joining the documentation unit of the UN Framework Convention on Climate Change in Bonn in 1998, where he helped to process documentation for its international climate change conferences in The Hague, Bonn, Lyon and Marrakesh.



James McFarlane

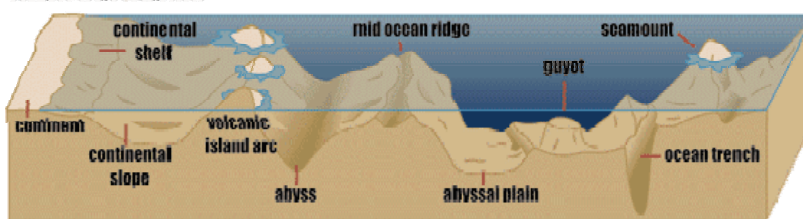


Frazer Henderson

He joined the communications department at UNICEF headquarters in New York in 2002 as a Senior Editorial Assistant, and turned freelance in 2005 when he returned home to Wales for a year.

Frazer is married with three daughters. His family will be joining him in Kingston in December. ■

Features of the Ocean Floor



Beneath the world's oceans lie rugged mountains, active volcanoes, vast plateaux and almost bottomless trenches. Around most continents are shallow seas that cover gently sloping areas called *continental shelves*. These reach depths of about 650 feet (200 m). The continental shelves end at the steeper *continental slopes*, which lead down to the deepest parts of the ocean. Beyond the continental slope is the *abyss*. The abyss contains plains, long mountain ranges called *ocean ridges*, isolated mountains called *seamounts*, and *ocean trenches*, which are the deepest parts of the oceans. Some seamounts, called *guyots*, are extinct volcanoes with flat tops. In the center of some ocean ridges are long rift valleys, where earthquakes and volcanic eruptions are common. Some volcanoes that rise from the ridges appear above the surface as islands.

Metal Prices (www.metalprices.com)

