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Active hydrothermal vent at the Menez Gwen hydrothermal field, Azores. Image courtesy MARUM/University of Bremen.



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Welcome to the second newsletter of the MIDAS project. So far we have had a very busy nine months with the completion of seven cruises that have visited the Black Sea, Mid-Atlantic Ridge, Fram Straight and Clarion Clipperton Zone in the Pacific. A further six cruises will take place this year, and many more in 2015. This is providing the project with a wealth of information that is now starting to be analysed and interpreted. In addition, a wide range of laboratory experiments are underway and we are “mining” the core repositories to analyse existing geological material. This newsletter focuses on these data-gathering activities and highlights some early results; more comprehensive results will be revealed in future newsletters.

The concept of deep-sea mining continues to be a hot topic, with numerous articles appearing in the media to which we have made several contributions. The Deep Ocean Stewardship Initiative recently organised an online seminar (‘webinar’) series, to which Sandor Mulsow from the ISA and myself contributed presentations. Additionally, Kristina Gjerde gave a talk on legal issues and Matt Gianni spoke on aspects of deep-sea mining. Recordings of the webinars are available on the INDEEP/DOSI website (www.indeep-project.org/deep-ocean-stewardship-initiative).

We have responded to two independent stakeholder questionnaires in the last few months. The ISA sought responses to wide-ranging questions in relation to the development of a regulatory framework for deep-sea mineral exploitation, and our response stressed that we are willing to engage in this process as it progresses, since we are researching many of the key areas. Responses to this consultation are available to view on the ISA website (www.isa.org.jm/en/sessions/2014/Survey).

The EC’s DG MARE consultation aimed at determining some of the key issues related to deep-sea mining, including barriers to progress, and the responses to this survey are due to be published soon. DG MARE also commissioned the ECORYS consultancy to carry out a broad review of the current state of knowledge of deep-sea mining, encompassing geological, environmental, legal, economic and technological aspects. A number of MIDAS partners contributed to this report, which is now available in draft form on the DG MARE website (<https://webgate.ec.europa.eu/maritimeforum/en/community/articles/3574>).

There is continued commercial interest in deep-sea mineral resources with contractors applying to the ISA for new mineral exploration licences (see article in this newsletter by David Billett), and commercial companies seeking agreements to exploit resources within territorial waters. Nautilus Minerals has recently reached agreement with the Government of Papua New Guinea, clearing the way for mining operations to begin. In preparation, it has commissioned some of the necessary equipment to be constructed (www.nautilusminerals.com/s/Media-NewsReleases.asp).

MIDAS is very well positioned to provide crucial advice to inform the development of deep-sea mineral exploitation regulations, and I am very much looking forward to our first annual meeting in October this year where our first project results will be presented.

Phil Weaver, MIDAS Project Coordinator

Tracing the Rainbow hydrothermal plume

The TREASURE-MIDAS cruise on the MAR

A. Rabitti & TREASURE-MIDAS cruise team

Scientists from NIOZ, University of Azores, IPMA and University of Utrecht left the harbour of Ponta Delgada on 10 May 2014 aboard the RV *Pelagia*, bound for the hydrothermal vent fields located on the Mid-Atlantic Ridge south-west of the Azores. The research area for this 22-day cruise included two active hydrothermal areas containing massive sulphide deposits of potential interest to the mining industry: Lucky Strike and Rainbow, with a special focus on the latter (see inset in Figure 2).

The cruise was designed to address the scientific goals of the Dutch TREASURE project and MIDAS; both projects aim to collect scientific data needed for the prediction, monitoring and mitigation of the environmental impact caused by deep-sea mining. During the cruise, geological, geochemical, biological and ecological aspects were investigated by the TREASURE team, whilst the MIDAS team acquired data for a detailed hydrographic and hydrodynamic characterisation of the study area. High-resolution, multibeam bathymetric surveys were also performed at the Rainbow site.

An example of the variety of landscapes and sea life encountered in the vicinity of the Rainbow vent field is shown in Figure 1. These images were acquired towing a high definition camera at few meters above the seabed, while the ship was sailing at about 0.5 knots.

In the coming months, hydrographic information and current measurements will be used by other MIDAS partners

within WP2 for the initialisation and validation of numerical models with different spatial and temporal resolutions. One of the main goals for WP2 is to be able to understand and predict the behaviour of plume dispersal in the deep sea, as a sediment plume is one of the expected side-effects of deep sea mining activities. Tracing the plume of hydrothermal emissions from Rainbow was a first step in this direction.

Figure 2 shows a composite image obtained with data from three tow-yo stations, generating a three-dimensional picture of the hydrothermal plume dispersal around the flanks of the Rainbow hill, and its spatial evolution in the northern canyon. Measurements were acquired by yo-yoing a CTD rosette between 1750 m and 2500 m (or the bottom, if shallower) while sailing at 0.5-1 knots. In Figure 2, only turbidity is shown (in colour) and is used to trace the hydrothermal plume from the source (the blue triangle in Figure 2, corresponding to the centre of the Rainbow field), up to about 15 km north-east (downstream) of the source.

This is an efficient strategy for sampling dilution and dispersion of neutrally buoyant hydrothermal plumes because the time spent measuring unaffected portions of the water column is minimised, resulting in high density data along the track of the ship. The whole water column is measured (and visible in Figure 2) for reference only during the first and last profile of each station, showing no relevant features (the light blue colour) between the thermocline maximum and the plume itself.



Figure 1: Landscapes and deep-sea life at different stations (between 2400 m and 2200 m) in the vicinity of Rainbow vent field. The two green dots are used for reference and are 20 cm apart.

From preliminary results, the overall picture of the plume dispersal agrees with previous literature reports: the plume signature in turbidity is clearly visible in the depth range 2000-2200 m, with a single or double peak around 2100 m, following the 3.9°C isotherm. The plume, released by the hydrothermal vents at about 2300 m on the western flank of the Rainbow hill, is observed travelling northward, strictly constrained by the residual mean flow (northward) and the bathymetry. When entering the northern part of the canyon it deflects eastwards, following the 2100 isobath, where it becomes more vertically and horizontally diluted. From these and other data collected during an intense hydrographic campaign, a plume signature in turbidity was detectable more than 20 km north-east of the source, whereas no plume was observed south or south-west of the

source, even at the closest stations (about 500 m from the field centre). However, a strong tidal variability was observed in the 13-hour hydrographic and current measurements, performed at about 3.5 km north-east of the source, that has not been previously reported in literature.

Time series from the three long-term oceanographic moorings deployed during the cruise (in the upstream and downstream region) will certainly shed further light on the strength and the temporal and spatial variability of tidal flows in the area, how they interact with the existent hydrothermal plume, and if and how tidally-induced dynamics (waves and currents) would affect the behaviour of human-induced plume dispersal in such complex deep-sea environments.

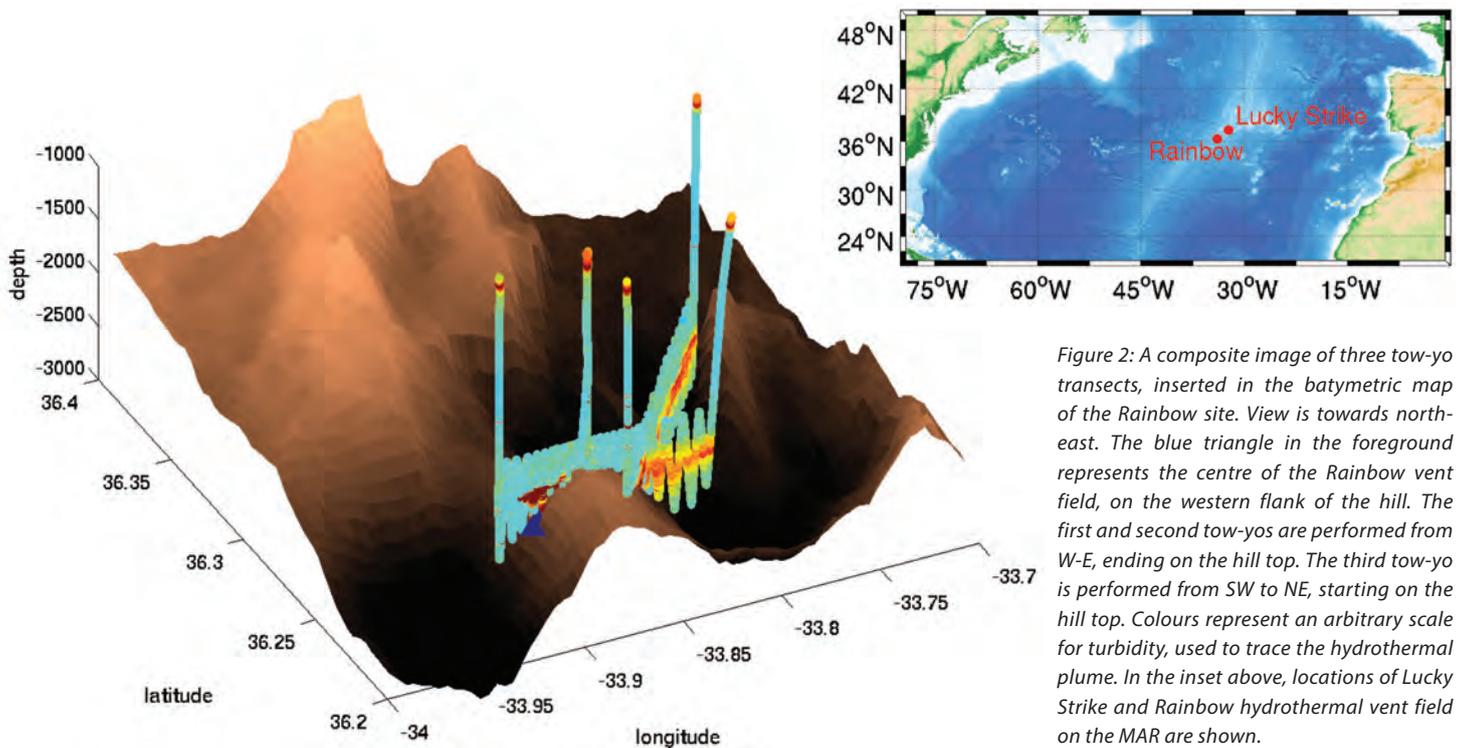


Figure 2: A composite image of three tow-yo transects, inserted in the bathymetric map of the Rainbow site. View is towards north-east. The blue triangle in the foreground represents the centre of the Rainbow vent field, on the western flank of the hill. The first and second tow-yos are performed from W-E, ending on the hill top. The third tow-yo is performed from SW to NE, starting on the hill top. Colours represent an arbitrary scale for turbidity, used to trace the hydrothermal plume. In the inset above, locations of Lucky Strike and Rainbow hydrothermal vent field on the MAR are shown.

Figure 3: Thanks to all who made RV Pelagia cruise 64PE388, TREASURE-MIDAS, a success: from left to right, Marc Lavaleye, Lise Klunder, Mário Mil-Homens, Lorendz Boom, Inge van Dijk, John Ellen, Hein de Vries, Chris Pham, Bert Puijman, Alle Fockema, Bob Koster, Roald van der Heide, Erwin Lambert, Alex Popov, Anna Rabitti, Sjaak Maas, Sietske Lips, Martijn Heesemans, Ger Vermeulen, Shree Ram Prakya, Henko de Stigter, José Vitoria, Barry Boersen [Photo: Marc Lavaleye]



TREASURE-MIDAS cruise diary extract: 24 May 2014

Mooring at the end of the Rainbow: just another day on board RV *Pelagia*

By Anna Rabitti, NIOZ

“Our first ‘mooring day’ of the cruise actually started yesterday evening, when, during a spectacular sunset on the Atlantic Ocean, a final decision is made on the optimal positions and depths for the deployment of three lines of moored instruments. The plan is to anchor them at the sea bottom at about 2300 m depth, and let them in the water for about one year.

On each line, consisting of a thin steel cable anchored to the seabed by a heavy weight at one end and kept upright in the water by a float at the other end, different instruments are attached at different depths, to be able to capture as accurately as possible the spatial and temporal variability of the physical properties of the water column (temperature, salinity, turbidity) and of the current velocity field in the area.

Today we deploy two of these moored instrument lines, each of those 1400 m long, in two locations downstream of the source of our plume, the Rainbow vent field. According to previous studies and to our intense CTD survey of last week, we selected two locations northeast of Rainbow, one close to the vents (about 2 miles away from the source) and one where the plume should be more dispersed (about 5 miles away from the source). Tomorrow, the third line of instruments will be moored upstream of the plume source, in a south-southwest direction, to understand the properties of the currents before the interaction with the vent area.

The purpose of these measurements is twofold. On the one hand, we will have a direct view on plume behavior in a deep sea environment, constrained by the topography of the submarine canyon and Rainbow hill. Hydrographic and hydrodynamic conditions in the region constitute a paradigmatic example for general flows, their stratification and their vertical mixing



properties, in future, topographically complex, deep-sea mining locations. On the other hand, data collected in situ will be used by modelers to force and constrain numerical simulations of deep current field and hydrography in the area, helping us in refining our understanding of the complex dynamics and processes taking place in the deep sea.

The deployment of a mooring is a very delicate phase of the cruise, requiring a lot of manpower and concentration of the technicians, and a lot of patience from the scientists. The latter have to wait till all 1400 m of cable, starting with the top floats and ending with the anchor, are paid out and dropped to know if the line is actually anchored where they wanted. And those 1400 m of cable go even slower when the length counter is broken! Fortunately, a stopwatch can do miracles, and eventually all the instruments are attached at the required distance along the line. At last the heavy weight (the actual anchor, about 1 ton) is attached, and dropped in the water with a big splash. Gravity will then take the whole line down to the deep and keep it in place until we will be back next year.

It is actually a strange feeling to know that a 1400 m long line is standing straight up from the bottom of the ocean, however, even if a ship will pass on top of it, there will be still 1000 m between the top buoy of the instrument line and the sea surface, so no problem if you will be sailing across the Atlantic this summer! The first mooring line goes down into the abyss around 11, supervised by a group of dolphins, curious about who and what is disturbing the flat surface of the ocean. The second one goes down around 15.30, still with perfect weather conditions contributing much to a smooth operation. In this second line, a very special instrument has been mounted: a moving device that will measure temperature, salinity and turbidity while moving up and down the line for 1000 meters every 8 hours, for the next 5 months. This will provide unique information on the temporal variability of the plume intensity and water properties, over the tidal cycle but also over a longer time scale. After the deployment of the second mooring, we revert to the usual “down to bottom-up to surface” measurements: this time using the so-called large volume water sampler, that will collect 1 cubic meter of water from the bottom of the ocean, and hopefully for the biologists on board catch unlucky larvae that found themselves in the wrong place in the wrong moment.”

You can read the rest of the cruise diary at www.nioz.nl/cruise-diary (cruise number 64PE388).

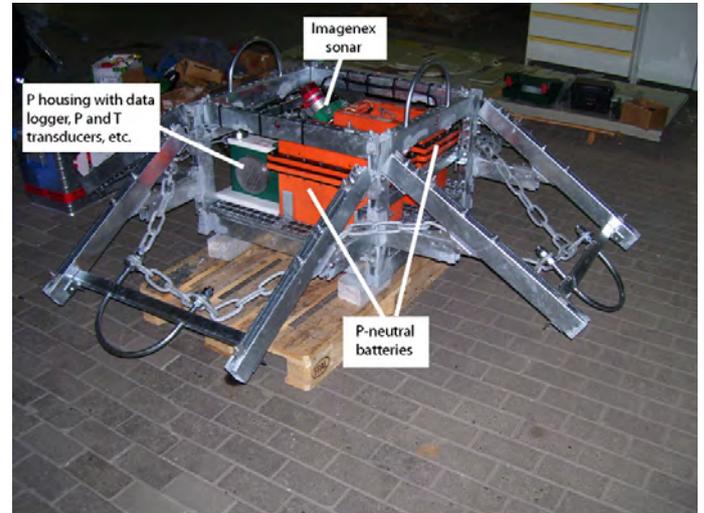
New observatory technologies to monitor gas hydrate stability

The Norwegian Margin off Svalbard bears massive gas hydrates that are suggested to be metastable as a function of seasonal temperature variations. At the uppermost part of the continental slope, above the gas hydrate stability zone, various methane emission sites were previously detected as acoustic plumes in echosounder recordings. New investigations interpret the gas emission by methane from hydrate decomposition due to an increase in water temperature of 1°C during the past 30 years, which causes a downward movement of the upper boundary of the gas hydrate stability zone by 38 m.

Albeit a natural trigger, the induced temperature changes may be similar in effect to those induced by gas hydrate exploitation using warm water, as is currently discussed by several parties with a strong interest in mining methane from seafloor gas hydrates. In order to assess the amount of gas that may be released even from moderate increase in temperature, cruise MSM41 with German RV *Maria S. Merian* (5-31 August 2014) will set out to drill 5 double boreholes using the mobile drilling system MeBo to sample hydrates for the first time in this area. Chemical analyses of the samples and physical parameters will be measured that will allow definition of the phase boundary very precisely. Two of the MeBo holes will be equipped with recently developed borehole observatories that monitor pore pressure, temperature and tilt, which would be good indicators for gas hydrate and sediment deformation processes. In addition, we will deploy two recently developed trawl-safe moorings for quantification of gas hydrate dissociation.

As the main component, the moorings host an Imagenex 881 circumference sonar system that may be used for both bedform monitoring and gas bubble quantification. This system has been mounted at an upward-looking angle of approximately 30° and is programmed to scan a window of 160° only. In addition, P-neutral seafloor batteries as well as a data acquisition system and additional transducers to measure pressure, temperature and electric conductivity are placed within the frame. Changes in pressure and temperature, and more importantly freshening of the seawater as well as increasing amounts of methane bubbles, will enable us to identify and quantify gas hydrate instability over time. The systems will be initially deployed for one year, but future visits in 2015 and 2016 are envisaged to cover three full seasons. Given that the majority of the components are available off-the-shelf, this system represents an affordable way to monitor gas hydrate destabilisation processes, induced by either natural or man-made processes.

For further details regarding the expedition please visit: https://www.marum.de/en/RV_Maria_S._Merian_MSM_41-1_05.08.-31.08.2014_Reykjavik_-_Longyearbyen.html



Above: Trawl-safe mooring for gas hydrate stability monitoring, equipped with sonar system, P, T and el. Conductivity transducers. Top: Naked frame with batteries, electronics, etc. Bottom: assembled system with PVC plating for protection. Below: The German vessel RV *Maria S. Merian*.



Sampling activities on the Palinuro Seamount (Tyrrhenian Sea, central Mediterranean)

CoNISMa, in collaboration with the Institute for Marine Sciences CNR-Bologna (Italy), has recently completed field activities on the Palinuro seamount (Tyrrhenian Sea, central Mediterranean) during the “Marbeep” cruise aboard RV *Urania* (13-25 June 2014, Napoli-Messina, Italy). The Palinuro seamount is one of the study areas selected to examine the effects of an anthropogenically-mediated disturbance event (rock drilling) that occurred a few years ago and, thus, to assess the ecosystem resilience and recovery. Since the environmental/faunal conditions before the disturbance event are not available, CoNISMa used an After-Multi Controls / Multi Impacts sampling design to characterise the recovery of ecosystem functions through the analyses of key ecological processes (e.g. organic matter degradation) and faunal (microbes to macrofauna) response in terms of abundance and diversity. Previous investigations carried out on the top of the Palinuro seamount revealed that the seafloor is largely covered by unconsolidated fine-grained sediments. Using independent deployments of an oceanic box corer, CoNISMa has collected sediment samples to assess ecological functions and the diversity and community

structure of benthic organisms at impacted and undisturbed nearby sites. Two sites affected by the disturbance event and four control sites have been successfully sampled at ca. 650 m depth on the Palinuro Seamount.



Above left: CoNISMa people working on the box corer used for the sampling activities on the top of Palinuro Seamount. Above right: Sorting of macrofaunal samples on the deck of the R/V *Urania*.

JPI Oceans Pilot Action on Ecological aspects of deep-sea mining

A proposal to the European Commission’s JPI Oceans Pilot Project initiative to investigate the ecological aspects of deep-sea mining has been positively evaluated. The project, coordinated by Matthias Haeckel at GEOMAR, is anticipated to start in January 2015 for a period of three years, and will involve 25 partner institutions from 9 countries. The programme revolves around three cruises aboard the new German research vessel *Sonne*, which will provide a total of 112 days of ship time in the Pacific in 2015.

The principal aims of this project are to investigate the likely effects of commercial polymetallic nodule extraction from the seabed. The expeditions aboard the RV *Sonne* will visit the DISCOL (DISturbance and re-COLonisation) Experimental Area off the coast of Peru where a seafloor disturbance experiment was carried out in 1989, and various European exploration license areas in the Clarion-Clipperton Fracture Zone. Work will focus on expanding knowledge on the following likely impacts on deep-sea ecosystems:

- Direct bottom disturbance by nodule collector systems;
- Indirect influences through re-sedimentation of the plume;
- Impact of discharge of waste waters from mining operations;
- Long-term effects on species composition during and after re-colonisation.

The pilot action will enable scientists and policy makers to better assess the impact of deep-sea mining activities. In the long term this will then allow policy makers to define a better legal framework for deep-sea mining activities.

Partners in the proposal are currently awaiting outcomes of bids to their national funding schemes that will support their participation in this programme. The first cruise aboard RV *Sonne* is currently anticipated to start in March 2015, with further ship time planned later in the summer of 2015.

SPC-EU Deep Sea Minerals training workshop in the Pacific

On 13-16 May 2014, a regional training workshop on “*Fiscal Regime and Revenue Management of Deep Sea Minerals Activities*” was held in Rarotonga in the Cook Islands. The workshop was jointly organised by the SOPAC Division of the Secretariat of the Pacific Community (SPC) through the SPC-EU Pacific Deep Sea Minerals Project and the International Monetary Fund (IMF) and hosted by the Cook Islands Government. The workshop’s objectives were:

1. Information-Sharing: to inform Pacific-ACP States’ national financial policy and law-making entities and stakeholders, by providing participants with:

- sufficient understanding of DSM deposits and operations;
- a realistic view of the likely financial benefits for a State engaging in DSM, and suggested mechanism for maximising and managing these sustainably;
- case studies and suggested models for fiscal regimes and revenue management schemes, with advice on their relative merits;
- networking opportunities between participants, experts and presenters on DSM financial issues.

2. Forward-Planning: to provide Pacific-ACP States an opportunity to assess capacity gaps in relation to DSM financial management, and to identify opportunities for future regional working, or collaboration with third parties, to fill these gaps.

3. Regional DSM Financial Framework: to provide the DSM Project and PFTAC with a mandate and terms of reference to produce a draft Pacific Islands Regional DSM Financial Framework (for review and approval by the Pacific-ACP States, and subsequent publication).

Sybille van den Hove (MEDIAN) was invited to contribute to the workshop as a representative of MIDAS. In her presentation entitled: “*Integrating socio-economic and environmental aspects into decision-making about DSM*” she introduced the

MIDAS project and the socio-economic research done under the HERMES and HERMIONE projects. She then reflected on values, decision making under conditions of uncertainty and ignorance, irreversibilities, the precautionary principle and ethical dilemmas.

Workshop participants included representatives from governments from Pacific Island Countries (the Cook Islands, Federated States of Micronesia, Fiji Islands, Kiribati, Nauru, Papua New Guinea, Palau, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, and Vanuatu), representatives from other countries (New Zealand and Mauritius), NGOs, the Deep Ocean Stewardship Initiative (DOSI), academia, the private sector, the International Monetary Fund, the World Bank and the Secretariat of the Pacific Community. The workshop included an open session with Cook Islands citizens and civil society representatives.

The SPC-EU DSM project aims at helping Pacific Island countries to improve the governance and management of their deep-sea minerals resources through improved legal frameworks, increased technical capacity and effective monitoring systems. A primary objective is to support informed and careful governance of any deep sea mining activities in accordance with international law, with particular attention to the protection of the marine environment and securing equitable financial arrangements for Pacific Island countries and their people. The SPC-EU DSM Project is also working to encourage and support participatory decision-making in the governance and management of national deep sea minerals resources. It is funded by the European Union and managed by SOPAC, the Applied Geoscience & Technology Division of the Secretariat of the Pacific Community, on behalf of 15 Pacific Island Countries.

Workshop proceedings and presentations are available at: <http://www.sopac.org/dsm/index.php/regional-meetings-and-trainings>.



Participants at the SPC-DSM workshop in Rarotonga

20th Session of the International Seabed Authority, Kingston, Jamaica, 7-25 July 2014

David Billett, Deep Seas Environmental Solutions Ltd

The International Seabed Authority (ISA) met for its 20th Annual Session in July 2014. In common with previous years, the Legal and Technical Commission (LTC) met first to discuss a number of issues before making recommendations to the ISA Council, the decision-making body of the ISA. The LTC met in closed sessions to discuss new applications made for mining licences and some draft regulations for the exploitation of deep-sea minerals. The LTC also reviewed the Annual Reports to the ISA by contractors. These are now becoming extensive documents of 150 pages or so, making a busy time for reading and review. The LTC also discussed what is meant by 'effective control by sponsoring states', issues of contractors attaining a 'dominant position' in the exploitation of minerals in 'The Area' (the seabed in areas beyond national jurisdiction), issues relating to the operation of 'The Enterprise' (the creation of a company or joint enterprise operated by the ISA on behalf of all nations), data management by the ISA Secretariat, and the Environmental Management Plan (EMP) for the Clarion Clipperton Zone (CCZ) in the equatorial eastern Pacific. The latter issue was discussed in open session of the LTC following the opening

of the ISA Assembly and Council sessions on Tuesday 15 July. It attracted a large participation of members of the Council and 'Observers' to the ISA, including contractors and NGOs.

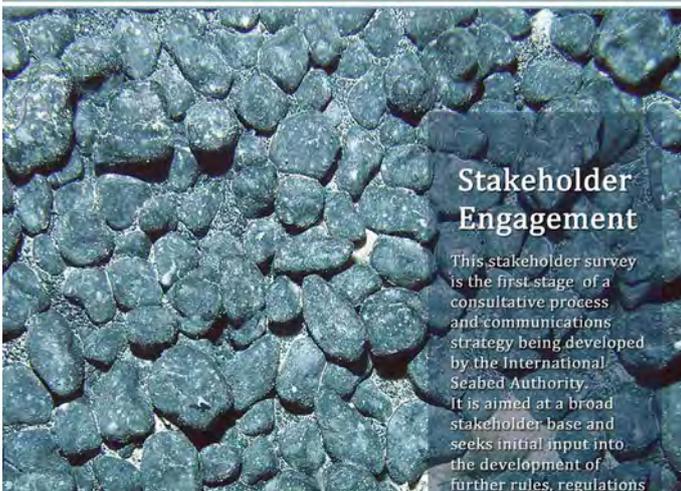
Seven new applications for exploration licences were awarded by the ISA, including three new licences for polymetallic nodules in the CCZ (UK Seabed Resources Ltd for a second area, the Cook Islands in association with G-Tec Sea Minerals BV, Belgium, and Ocean Minerals Singapore); two for polymetallic sulphides (Government of India, and Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), Federal Republic of Germany, both on the Central Indian Ocean Ridge), and two for cobalt-rich ferro-manganese crusts (The Russian Federation in the western equatorial Pacific and Companhia de Pesquisa de Recursos Minerais (CPRM), Brazil for the Rio Grande Rise in the southern Atlantic).

The creation of draft regulations for the exploitation of deep-sea minerals in The Area is a complex task but is progressing well. The LTC is in the advanced stages of drawing up a framework for the regulations which lists all the main issues and identifies those that may take detailed discussions in order to be resolved. The stakeholder survey (left) conducted by the ISA and to which the MIDAS Consortium responded was a key document in highlighting many issues. The responses to the stakeholder survey are available on the ISA web pages (<http://www.isa.org.jm/>). They give a good impression of the many issues being discussed by the LTC.

The open session on the Environmental Management Plan for the CCZ was a 'mixed bag'. In my opinion there are some exciting new data being supplied by contractors to the ISA on the distribution of species across the CCZ that reinforces the need for large-scale spatial planning to conserve biodiversity across the vast expanse of the CCZ. Data are now being generated across a variety of spatial scales from a few tens of km to thousands of km, showing a variety of patterns for different taxa. I had the opportunity of describing the work of MIDAS in the open session and highlighted the way in which scientists working for contractors to the ISA are combining efforts, notably between Germany, France, UK and Belgium in the CCZ, and between Russia, France and Portugal (not yet a contractor to the ISA) on the Mid Atlantic Ridge. These joint efforts are vital for setting up and refining regional environmental management plans.

In addition to the LTC discussions on the EMP for the CCZ, The Netherlands introduced a paper on the wider

Developing a Regulatory Framework for Mineral Exploitation in the Area



Stakeholder Engagement

This stakeholder survey is the first stage of a consultative process and communications strategy being developed by the International Seabed Authority. It is aimed at a broad stakeholder base and seeks initial input into the development of further rules, regulations and procedures to be drawn up by the International Seabed Authority.



application of EMP regional planning in areas where the ISA had issued licences for exploration (see www.isa.org.jm/files/documents/EN/20Sess/Council/ISBA-20C-13.pdf). This would include mid-ocean ridges in the Atlantic (see above) and Indian oceans (China, Korea, India and Germany) and seamount clusters in the western equatorial Pacific (China, Japan and the Russian Federation). It is expected that regional EMPs would be agreed before any exploitation of mineral resources in these areas would occur. Clearly EMP plans have to be based on certain degree of scientific knowledge and applying the Precautionary Approach, highlighting the importance of independent science-led research in MIDAS and the need for continued coordinated and focused research beyond the MIDAS project. To assist in the development of regional management plans the UK Government proposed that greater planning might be achieved by engaging in collective agreements with regional seas organisations, such as the Oslo Paris Commission (OSPAR) for the Northeast Atlantic Ocean (see www.isa.org.jm/files/documents/EN/20Sess/Council/ISBA-20C-15.pdf).

The initial 15-year contracts awarded to the first 'pioneer contractors' for the exploration for polymetallic nodules will come to an end in 2016. It is expected that most of the contractors, if not all, will apply for a 5-year extension to their contracts. The LTC raised the issue with Council on how the contractual obligations of the contractors might be measured

in assessing progress, and therefore if a contract extension should be awarded. The LTC has been tasked in drawing up guidelines at its next meeting in February 2015. The Council will then decide on a document to be issued to contractors in July 2015. Applications for contract extensions should be submitted 6 months in advance, so the first applications for these are expected in September 2015. Assessment of contracts in the previous 15 years might include delivery of data to the ISA, including all environmental data. The ISA Secretariat may have a big job in validating the data before it is made available. If all six pioneer contractors submit their data at the same time this may cause some difficulties for the ISA Secretariat. The Council has been discussing whether interim contract extensions of 1 year might be introduced.

For further details of discussions at the ISA search their web pages under Annual Sessions/20th Session for press releases of the day-by-day decisions and for the official papers set before the LTC Council and Assembly. In particular the Summary Report to the Council by the Chair of the LTC highlights several interesting issues (www.isa.org.jm/files/documents/EN/20Sess/Council/ISBA-20C-20.pdf).

If you have any questions about the ISA work then do not hesitate to contact me and I will see if I can help.
david.billett@deepseasolutions.co.uk

New faces: welcome to MIDAS!

Jeff Ardron, University of Southampton



'Better late than never', I find myself going back to university for part-time PhD study at Southampton. Many thanks are due to the MIDAS colleagues who encouraged me to make the transition. I look forward to working with you all more closely in the coming months.

As we are all well aware, deep-sea mining (DSM) is once again in the international limelight. However, unlike the near-universal optimism that accompanied the first predicted 'boom' 35 years ago, this time round serious social and environmental questions are being asked. In particular, there is concern that like offshore petroleum extraction and land-based mining, DSM could potentially become a 'resource curse'

for developing nations, with associated environmental and social harms, rather than the desired opportunity for economic development.

In cooperation with MIDAS, the Institute for Advanced Sustainability Studies (IASS, Germany, where I am a Senior Fellow), and other partners, this research project will: a) start out by learning from experiences on land and in offshore petroleum development, with a focus on considering the potentially positive role that transparency could play in the good governance of DSM, and b) working with stakeholders and partners, identify good practices that would inform discussions on the development of transparency standards.

I will remain active in DOSI and GOBI, and hope to increase my engagement in INDEEP. No sleep for the wicked... Please feel free to contact me if you are interested in this project:
jeff.ardron@iass-potsdam.de

New faces...Welcome to MIDAS!

Amaya Menendez, NOC / University of Southampton



Amaya has recently started a MIDAS-funded PhD in the Graduate School of the National Oceanography Centre in Southampton. Working with Dr Rachael James, Prof. Steve Roberts, Dr Doug Connelly and Dr Kate Peel, Amaya will apply her knowledge of geochemistry to the study of seafloor deposits likely to be enriched in the rare earth elements (REEs). These

resources potentially include deep-sea clays, polymetallic nodules, polymetallic crusts and sulphides. Amaya will undertake detailed geochemical and mineralogical studies, to investigate the geological processes that lead to enrichment of the REEs, such as sedimentation rate, mineral precipitation and preservation, effects of sediment winnowing and basement tectonics. In addition, she will assess the potential consequences of different REE extraction and recovery techniques for the environment, through a series of laboratory-based leaching experiments.

Virginie Riou, IMAR / University of the Azores

Virginie was recently appointed as a post-doc fellow at the IMAR centre of the University of the Azores, to study the effects of sedimentation on key benthic organisms resulting from prospective deep-sea mining activities (mine tailings) in the Azores region.

Virginie has specialised in the adaptation of aquatic organisms to extreme conditions, and their biogeochemical consequences. She obtained her PhD in 2010 on the role of filter-feeding on the nutrition of the symbiotic hydrothermal vent mussel *Bathymodiolus azoricus*, under the joint supervision of the universities of Brussels (Vrije Universiteit Brussel) and of the Azores (Universidade dos Açores) within the frame of the European FP7 MoMARnet RTN. After an initial post-doctoral contract with the French CNRS institute in Montpellier to study the effect of insecticides on teleostean fish adaptation to salinity increases (ECLIPSE project), she received a EUROFLEETS grant for her project DIAPICNA in 2011. This project aimed at evaluating the importance of nitrogen fixation and primary production in the Azores Current at the sea surface close to the deep sea Mid-Atlantic Ridge hydrothermal vents. Concurrently during the last three years within the French IRD institute

Amaya is a geologist specialising in geochemistry, petrology and mineralogy. She finished her Bachelor's Degree in Geology at the University Complutense of Madrid in 2011 and then pursued MSc studies in geochemistry at the University of Copenhagen. Her MSc thesis involved geochemical, mineralogical and volcanological studies of a series of tephra layers and volcanic materials at Red Crater, (Tongariro Volcanic Centre, Taupo Volcanic Zone, North Island, New Zealand). The aim of the project was to establish a possible link between the exposed dyke and the ash deposits which were preserved at the crater rim, based on their chemical signatures and their physical characteristics. This allowed her to reconstruct the sequence of events in the late phreatic explosive phase of the crater (1926), as well as providing a better understanding of the nature of the event which, in turn, could be an analogue for the recent (August and November 2012) eruption in the nearby Te Maari vent.

Amaya looks forward to meeting the MIDAS team at the first annual meeting in the Azores in October.

in Marseille, she developed FISH probes for the detection of marine nitrogen fixing cyanobacteria in oligotrophic areas, and established procedures for the systematic validation of newly designed probes for the detection of marine picoeukaryotes and dinoflagellates (FISHBOX project).



Virginie will now be taking part in the MIDAS project, integrating a multidisciplinary team from the IMAR centre of the University of the Azores in Horta, Portugal. She will be working in tight interactions with specialists in hydrothermal vent trophic ecology (Ana Colaço), ecotoxicology (Inês Martins), immunology and gene expression (Raul Bettencourt) and cold-water coral physiology (Marina Carreiro-Silva). Together, they will be looking at the impact of sediment chemistry and fluxes combined to the effect of hydrostatic pressure, on two benthic invertebrates: cold-water corals and deep sea hydrothermal vent mussels.

MIDAS First Annual Meeting: Azores, 20-24 October 2014



The first annual gathering of the MIDAS Consortium partners will take place in the Azores on 20-24 October 2014. All MIDAS partners are expected to attend this meeting, at which progress and results from our first year's work will be presented and strategies and logistics for the next year's work will be planned.

The meeting will take place at the Terra Nostra Garden Hotel, nestled amongst botanical gardens and geothermal pools in the Furnas Valley on the island of San Miguel in the Azores.

The meeting will comprise a series of plenary sessions, keynote talks and poster sessions. MIDAS partners can register for this meeting using the online conference registration service in the Partners' Area of the MIDAS website.

The call for abstracts for both poster and oral presentations is now open, and presentations are welcome from all MIDAS partners. Please follow the instructions below when preparing your abstract:

- Please prepare your abstract as a Word document - no PDFs please!
- Abstracts should not exceed 1 side of A4.
- Please include a full list of authors and indicate which of the authors is the presenter.
- Clearly indicate whether your abstract is for consideration as an oral or poster presentation
- Abstracts should be submitted by email to Vikki Gunn at vikki.gunn@seascapeconsultants.co.uk no later than Friday 5 September 2014.

Other upcoming meetings, workshops and conferences

International Marine Conservation Congress 2014 (IMCC3) Glasgow, UK, 14-18 August 2014

A dedicated MIDAS symposium session will take place on Sunday 17 August, with presentations from Dan Jones, Chris Hauton, Kristina Gjerde, Ana Colaço, Andrew Sweetman and Stefanie Kaiser. See www.conbio.org/mini-sites/imcc-2014.

UMI 2014: Harvesting Seabed Mineral Resources in Harmony with Nature. Lisbon, 21-28 September 2014

The objective of this UMI is to consider how commercial interests in deep-sea minerals can be managed alongside marine conservation needs, using careful environmental stewardship and policy formulation for the development of seabed mineral resources. A number of MIDAS partners will give presentations. See www.underwatermining.org

First MIDAS Science-Policy Panel meeting, Brussels, 28 November 2014

The objective of the MIDAS Science-Policy Panel meeting is to ensure that our results are brought promptly to the attention of policy makers in a forum where they can be discussed with all interested parties. The SPP will begin with presentations of new findings from MIDAS followed by open discussions on the development of policy to accommodate deep-sea exploitation whilst maintaining good environmental status. Invited attendees at each panel meeting will include senior policymakers, stakeholders from industry and NGOs, representatives of international organisations, and leading scientists.

The MIDAS newsletter is published quarterly. The deadline for articles for the autumn 2014 issue is Friday 17 October - please email vikki.gunn@seascapeconsultants.co.uk