Commonwealth Environment Research Facilities Program (CERF) Marine Biodiversity Hub

News and events

Deepest ever photographs of marine biodiversity in Australian waters

Scientists from CSIRO, the California Institute of Technology, and Woods Hole Oceanographic Institute have surveyed to 3000 m in the new Tasman Fracture Zone Commonwealth Marine reserve. Hard corals were found as deep as 2300 m and soft corals as deep as they went.

The Autonomous Benthic Explorer (ABE), an un-manned submersible, was used to photograph and survey marine features at depths to 3000 m – well over a kilometre deeper than has previously been studied in Australian waters. The ABE was deployed on six missions during a three-week cruise on the Southern Surveyor, reaching depths of 2960 m and taking over 6000 photographs of the sea floor. The photographs are still being analysed in detail, but they already indicate sites from which fossil and sub-fossil corals can be collected for paleo-oceanographic and climate reconstruction (a primary objective of the missions) and show a rich benthic community well beyond depths expected. Soft-corals, in a variety of taxa, were found as deep as ABE could dive, living in complete darkness and at temperatures of 1-2°C. Over 1500 coral samples were obtained from shallower depths (1000-1500 m), using dredges, to start analysing the age and growth of the reefs and begin paleo-climate analysis. Samples were also collected for genetic connectivity studies in the CERF hub. More samples, from greater depths, will be collected on a follow-up cruise in December 2008 using the US deep-sea vehicle, Jason. It is expected that Jason will sample to at least 4500 m, extending even further our information on biodiversity in these marine reserves.
**Google diving into 3D mapping of oceans**

Exploring the submarine world of canyons, mountains and valleys without getting your feet wet will soon be a reality. Famous for search engines and online mapping, Google has taken the plunge to create a new program; Google Ocean. A group of oceanography experts has been formed to advise Google on the creation of the three dimensional oceanographic map.

By compiling information from bathymetric data and high resolution images, Google Ocean will allow users to navigate through the depth and detail of the seafloor. The basic framework will enable additional information to be incorporated into the mapping application as more data is contributed by research institutions around the world. Currently only a small area of submarine topography has been mapped in any great detail. So, the project will not only combine the existing knowledge of the terrain below sea level, but highlight how much of the seafloor that still remains to be explored, providing an extremely useful and practical tool for oceanographic research.

**Biodiversity loss – it will make you sick**

A new generation of antibiotics, new treatments for thinning bone disease and kidney failure, and new cancer treatments, may all stand to be lost unless the world acts to reverse the present alarming rate of marine and terrestrial biodiversity loss, according to a new book, *Sustaining Life* by Eric Chivian and Aaron Bernstein of the Harvard Medical School.

Compounds from marine animals may hold secrets to the development of new kinds of safer and more powerful pain-killers (cone shells); treatments for macular degeneration (sharks); and peptides that appear to kill a wide range of bacteria (horsehoe crabs). But the experts warn that we may lose many of the land and marine-based life forms before we can learn their secrets, or, in some cases, before we know they exist. For example, the only two known species of gastric brooding frogs of the genus Rheobatrachus – so called because they raised their young in the stomachs – were thought to provide a new treatment for peptic ulcers after they were discovered in Australian rainforests in the 1980s, but they were eradicated before research could be completed.

**Biodiversity loss – it will make you poor**

The World Biodiversity Summit was held in Bonn, Germany, from 19 to 30 May this year. During the 12 day meeting, international scientists, politicians and heads of state gathered to discuss the current unprecedented loss of biodiversity.

Human activities have accelerated the extinction of plants and animals by 100 times the natural rate. The concern of this rapid biodiversity loss and commitment to action was echoed by representatives from countries around the world.

"Biodiversity is our economic foundation. We have a misdirected economic compass – we have arranged our economies in a way that they destroy their environmental foundations. We are burning money." (Achim Steiner, Executive Director of the UNEP)

The value of biodiversity for sustainable development and the disproportionate impact of biodiversity loss on the poorest of the world’s citizens was highlighted in a recent report (The Economics of Ecosystems and Biodiversity) by the Deutsche Bank.

Millions of Euros were pledged by European countries: for forest conservation and the “Life Web” initiative; and supporting developing nations to establish marine and land protected areas. Indonesia joined this initiative by announcing it would establish the world’s largest marine protected area by reserving 20 million hectares.

Acknowledging the importance to incorporate biodiversity conservation into corporate policies, members of the private sector also joined the campaign with commitments from 34 internationally active companies from Germany, Brazil, Finland, Japan, Switzerland and the United States.

The commitment made by the international community is underpinned by the recognition of the seriousness and urgency to take action to conserve biodiversity and reduce the rate of species decline. Described as an exceptional biodiversity challenge, ambitious targets have been set to substantially reduce the global loss of biodiversity within the next two years, while the European Commission is committed to stopping the loss of biodiversity in Europe by 2010.

**Australia’s marine biodiversity decline**

A recently published report identifies significant, broad-scale threats to Australia’s marine biodiversity and proposes key directions for a cross-jurisdictional national approach to addressing these threats.

A National Approach to Addressing Marine Biodiversity Decline was endorsed by the Natural Resource Management Ministerial Council on 18 April 2008.

The five significant, broad-scale threats to marine biodiversity identified in the report are climate change, resource use, land-based impacts, marine biosecurity and marine pollution. Eight key policy directions have been proposed to minimise these threats and to improve coordination and the capacity of governments to understand and respond to marine biodiversity decline.

The suggested key directions are:

1. Foster collaborative relationships amongst jurisdictions to ensure complementary responses to the causes of marine biodiversity decline.
2. Review and evaluate national coordination across jurisdictions of responses to marine biodiversity decline with respect to key threats.
3. Promote cooperative and complementary, ecosystem-based planning and management approaches across jurisdictions.
4. Work towards a nationally consistent marine and coastal biodiversity and fisheries monitoring and reporting framework with baseline/reference sites in and out of Marine Protected Areas.
Ten years ago we lost biological sampling magnitude reduction in the time spent.

better definition (Fig B) – a two-orders-of-area in under 5 minutes and with much
GA and CSIRO), we can map that same
by a consortium of agencies (DEWHA,
Ten years later, same (aging) ship, same
sample the deepwater environment.
(Fig A), but it was an evolution in how to
map that 1 km
fishers, and used the most advanced
to areas of contrasting seafloor by local
the marine system. We were directed
unparalleled opportunity to understand
the envy of the world. This gave us an
experts that makes Australian researchers
able to assemble a team of interdisciplinary
the marine habitat off southeast Australia. In
the mid 1990’s, I led a team mapping
marine biodiversity? As it turns out,
do we have of understanding
biosphere, but less than 5 percent
of Earth’s area, consist of
Oceans. They form seventy-one
at how little we know about our
knowledge of marine systems –
new genetic technologies for advancing
will improve at that rate though. We have
of the past 10 years. Other technologies
will explore the opportunities for future
improvements and engineers. In subsequent editions we
will almost certainly not be possible.

The opportunities for future
collaboration and options for building a
national monitoring capacity for our oceans.
You will hear more of IMOS in our next
Marine Biodiversity Newsletter and the next
Marine Matters will carry information on
monitoring of Australia’s marine biodiversity.
With IMOS’ prodigious sampling
capacity to provide for the long-term
Predictions of the CERF Marine Biodiversity
Program’s information collection capacity
impossible; progress in the next
years will be dramatic; progress in the
next 20 years is unimaginable.

5. Develop a targeted strategy to address
key gaps in knowledge of marine
biodiversity and improve access and
sharing of knowledge and data.

6. Improve the understanding of the
vulnerability of marine biodiversity to
climate change focusing on ecosystems
and species that are at particular risk.

7. Develop regional climate adaptation
policies and plans based on predictive
modelling and integrate them into
marine bioregional planning processes.

8. Progress the integrated management
of the coastal zone including monitoring
coastal marine biodiversity.

The report also identifies more detailed
priority actions to address climate change,
resource use and land-based pollution. The
report finds that integrated strategies for
action on marine biosecurity and marine
pollution exist and are being implemented
and therefore does not propose additional
actions relating to these threats. The report
proposes both new actions and actions
that require continuation and extension
of the current work of governments.

The report was prepared by the Marine
Biodiversity Decline Working Group
reporting to the Marine and Coastal
Committee. The Working Group
consisted of representatives from the
Australian, State and Northern Territory
governments, and CSIRO.

Perspectives
The Oceans –
our last frontier
by Hub Director, Nic Bax

It is easy to become discouraged
at how little we know about our
Oceans. They form seventy-one
percent of Earth’s area, consist of
more than 95 percent of the Earth’s
biosphere, but less than 5 percent
have been surveyed. What chance
do we have of understanding
marine biodiversity? As it turns out,
a lot better than even 10 years ago.

In the mid 1990’s, I led a team mapping
marine habitat off southeast Australia. In
typical Australian fashion we had been
able to assemble a team of interdisciplinary
experts that makes Australian researchers
the envy of the world. This gave us an
unparalleled opportunity to understand
the marine system. We were directed
to areas of contrasting seafloor by local
fishers, and used the most advanced
to map the seafloor with no human input. These
are just a few of the new technologies
being brought to bear on furthering our
knowledge of Australia’s oceans.

We came to the meeting with complementary
objectives: Gary to understand how to target
the prodigious information collection capacity
of IMOS at questions of national importance,
and myself to understand how to match the
basic understanding and detailed habitat
predictions of the CERF Marine Biodiversity
Hub with IMOS’ prodigious sampling
capacity to provide for the long-term
monitoring of Australia’s marine biodiversity.

You will hear more of IMOS in our next
Marine Biodiversity Newsletter and the next
Marine Matters Newsletter.

Progress in understanding the marine
environment in the last 10 years has
been unexpected; progress in the next
10 years will be dramatic; progress in the
next 20 years is unimaginable.
The power of genetics in marine biodiversity management

by Asta Audzijonyte, Monterey Bay Aquarium Research Institute, USA

The history of species and populations leaves traces in their genes. Analysis of genetic diversity therefore can provide information about the events that affected organisms tens, thousands or millions of years ago.

Indeed, molecular analyses have revolutionised our view on the extent and age of Earth’s biodiversity (i.e. plants and animals are just a tiny fraction of the total biodiversity) and intra-specific dynamics. For example, the main paradigm in marine ecology was that of open marine populations widely connected by dispersing larvae over thousands of kilometres. Yet, application of high resolution molecular markers and statistical approaches is now revealing a surprising amount of genetic structuring on geographical scales of tens or hundreds of kilometres, including in organisms thought to be highly dispersing. These findings have great implications in conservation attempts. If dispersal in marine populations is indeed limited, local population extinctions, perhaps commonly caused by human activities such as fishing, may not be easily balanced by new recruits.

There are at least two factors explaining the increasing role of genetics in marine ecology, systematics and conservation. First, and most importantly, genomic methodologies are for the first time providing access to a wide range of molecular markers in non-model organisms, and hence a broader and more realistic picture of how different forces of selection and neutral differentiation are acting on different parts of the genome. As genetics, based on one or two genes, is turning into genomics, i.e. analysis based on a large number of genes from across the entire genome, its power is increasing. Second, the flux of genomic data has been accompanied by new hypotheses and improved statistical approaches, incorporating computer simulations, and statistical predictions of dispersal and population structure. Finally, when it comes to marine populations, availability of extensive physical oceanographic data and advances in hydrodynamic ocean modelling is promoting development of tools for predicting dispersal and connectivity, which can now be used to generate hypotheses of genetic structuring. These, in turn, can be validated with actual data from the field.

Genetics can and does provide crucial information in marine biodiversity management. Models of marine reserves suggest that life history characteristics and dispersal potential are essential in predicting how a species will respond to protection. Yet, for most marine organisms dispersal distances are not known even to an order of magnitude. Given that observing dispersal of larvae directly is prohibitively difficult, use of population genomics is the most effective way to go. Recent technological and theoretical advances now makes population genomics well equipped to provide such answers. Genomic studies are now revealing several important features of wild populations, which must be taken into account when designing sustainable fisheries. First, not only many marine species are subdivided into subpopulations, but often these populations have local important genetic adaptations to specific conditions. Second, in a number of species only a very small proportion of adults contribute to each year’s reproductive output. This means that effective size population of reproducing population can be several orders of magnitude smaller than the actual population size, and that leads to faster then previously believed loss of genetic diversity in severely exploited species. Finally, recent research has demonstrated that strong selection imposed by exploitation (e.g. removing large individuals) eliminates their genes (e.g. responsible for fast growth) from populations and causes evolutionary changes. These changes may take thousands of generations to reverse. All these findings now start to shed light on the long-observed but poorly understood annual variability in reproductive success for marine populations.

Another powerful and growing application of genomic technologies is in the quick and accurate molecular identification of organisms and even their quantification. Genomic technologies can be more rapid than conventional morphological approaches, and are also suitable to identify eggs and planktonic larvae that cannot be distinguished through visual means. Application of genomic sensors is now in the early stages of allowing these identifications to be made in real time and in situ, without transporting samples to the laboratory. Possibly, such genomic sensors will be used routinely to study plankton samples or monitor invasive species in the not too distant future.

Genetics has already proven to be an irreplaceable tool in studies of natural systems, and recent technological and theoretical advances will improve the quality and extend its use. Surely, like every developing scientific field it does not and will not proceed without mistakes. Yet, the very fact that mistakes are being discovered and corrected indicates that our understanding of the processes governing nature’s genetic diversity is improving.

(“Asta Audzijonyte completed her PhD at the University of Helsinki, Finland in 2006. Her doctoral research was on molecular systematics, phylogeography and phylogenetics of aquatic organisms in boreal lakes, and Baltic and Caspian seas. In 2008, she started working at Monterey Bay Aquarium Research Institute (MBARI) studying population dynamics and connectivity of deep sea invertebrates. In November 2007, Asta visited Phillip England and Rasanthi Gunasekera at the CSIRO Marine Laboratories in Hobart en route to MBARI. She helped give a rapid start to the CERF Marine Biodiversity Hub project on connectivity of deep sea squats lobsters, and set the foundation for a productive relationship between MBARI and the CERF Hub in this research area. While in Hobart, she took part in a workshop describing genetic options and approaches to assist marine biodiversity management. The workshop was attended by researchers and managers from CSIRO, Department of the Environment, Water, Heritage and the Arts (DEWHA), Australian Antarctic Division, and the University of Montana.”)

The workshop was attended by researchers and managers from CSIRO, Department of the Environment, Water, Heritage and the Arts (DEWHA), Australian Antarctic Division, and the University of Montana.)
Decapod Crustacea of the continental margin of southwestern and central Western Australia

The first comprehensive characterisation of decapod fauna of the continental margin of southwestern Australia has been undertaken by hub researchers Gary Poore, Anna McCallum and Joanne Taylor from Museum Victoria. The collection included approximately 6,083 specimens representing 524 provisional species. Overall, 175 species (33%) were new to science. The report includes data on taxonomy and distribution associated with each taxon identified. The material will be available for loan to crustacean taxonomists worldwide.

Abstract


First results on the biodiversity of deep waters of the south-western Australia continental slope have now appeared in press. They are part of the project “Mapping benthic ecosystems on the deep continental shelf and slope in Australia’s South West Region to understand evolution and biogeography and support implementation of the SW Regional Marine Plan and Commonwealth Marine Protected Areas”. The project was mounted largely by the CSIRO Wealth from Oceans Flagship and Museum Victoria, with National Facility time provided by the Department of the Environment, Water Heritage and the Arts.

These results deal with decapod Crustacea of the continental margin of southwestern and central Western Australia (Thalassinidea). Seventy-seven families are represented. Coloured photographs of many species appear in the report. The material is available for study at Museum Victoria or on loan to crustacean taxonomists worldwide.

The data are the first comprehensive characterisation of the fauna of the continental margin of southwestern Australia. For comparison, Poore’s (2004) identification guide to southern Australian marine decapods includes 800 species and the Zoological Catalogue of Australia enumeration of all named Australian marine Decapoda (Dave, 2002a, b) listed 2077 marine species. The survey illustrates how little is known about the fauna of the continental margin of most of Australia. The eastern slope of NSW and Tasmania is best known. These collections are the first systematic samples from southern WA.

Overall, 175 species (33%) were new to science. This figure is based on a thorough review of the literature covering the fauna of Australia and the Indo-West Pacific. The number is probably an underestimate and is subject to further examination by taxonomic experts. Many of the so-called “new records” (88 species for Australia as a whole, 62 for WA and 69 for southern WA) may well prove to be new species, different from the similar species with which they have been identified. The highest percentage of new species was in Thalassinidea (83% of 23 species), much higher than the next most novel infraorders (50% of 127 species of Anomura and 31% of 227 species of Brachyura).

Many species were rare. Forty-two per cent (222 species) were found in just one of 127 samples and a further 17% (89 species) in only two samples. This is a common feature of exploration of this type and hints that the number of species yet to be discovered is much larger than anticipated.

New Palaemonoid shrimps from NW Shelf

A small collection of 9 species of palaemonoid shrimp from the Australian North West Shelf has provided one new genus, Pseudoclimenes holtthuisi, one new species, Apopontonia seticauda, and five species new to the Australian fauna.

This is the start of the taxonomic results to come from this survey of one of Australia’s least known areas of invertebrate marine biodiversity. The survey, mounted by CSIRO and Museum Victoria and supported by Department of the Environment, Water Heritage and the Arts complements the SW and central WA survey reported by Poore et al. above. Together, these two surveys sampled sites at every degree of latitude/longitude from Albany to the Kimberlies at 100 m and 400 m depth, with additional surveys around specific features and at 700 m and 1000 m in each Biogeographic Province. These data are forming the basis of several CERF hub research tasks.

CERF hub scientist wins best paper award

Tara Anderson (Geoscience Australia) and Mary Yoklavich (Southwest Fisheries Center, USA) won the 2007 Fishery Bulletin Best Paper Award for their article on multiscale habitat associations of deepwater demersal fishes off central California.

Their paper describes the response of fishes to demersal habitats at spatial scales ranging from centimetres (individual fish habitat) to kilometres (broad-scale assemblage habitats). This approach to resolving fish-habitat associations and habitat complexity over multiple scales is currently being applied to several management processes, including the designation of Essential Fish Habitats for west coast groundfish; groundtruthing coastwide seafloor habitat maps; the use of habitat characteristics as surrogates for fish species distributions in ecosystem-based management; and the implementation of California’s Marine Life Protection Act.


Publicising your work

Improve dissemination of your research results so that they are both more usable for policymakers, and help to communicate understanding of environmental issues to the general public. The European Commission’s Science for Environment Policy has established a news alert service in order to reinforce the links between science and policy.


Matthew McArthur:
Geoscience Australia – Surrogates Project

“I am excited to be involved in the CERF Surrogacy project and look forward to applying my skills generating data with accurate taxonomic information, functional information based on tested or observed behaviour and sufficient spatial coverage to test abiotic surrogates of diversity rigorously.”

Matthew studied for his BSc at Victoria University where he focused on marine biology. He began spending semester breaks at Museum Victoria where Drs Gary Poore and Robin Wilson taught him the basics of marine invertebrate taxonomy. Gary employed Matthew to process benthic grab samples during summer breaks and Robin supervised his honours project: a study of the taxonomy and feeding biology of an introduced polychaete in Port Phillip Bay. The skills he gained at the Museum secured him a position with the Victorian Marine and Freshwater Resources Institute where he was involved in surveys of exotic marine pests and environmental impact assessments. He then moved to Dunedin (NZ) to commence his PhD at the University of Otago and spent three years studying New Zealand’s southern estuaries with Dr Keith Probert. Matthew then took two years off from his studies to teach marine science at the Bay of Plenty Polytechnic in order to pay for a wedding in Detroit and a honeymoon in Africa and Europe. He returned to Otago in mid-2006 and submitted his thesis in mid-2007. He was offered the benthic ecology postdoctoral position at Geoscience Australia two days after his son was born so the last few months have involved much change and steep learning curves on many fronts.

His interest is in small marine invertebrates because their short lives and limited mobility make them sound candidates for sentinels of change in marine systems. The stumbling blocks he encountered in identifying the species collected during his PhD has him concerned about funding for taxonomy. The stumbling blocks he encountered in categorising the ecological role of those species convinced him that a lot of basic biology still needs to be studied to help us understand the gradients described by variation in species’ distributions.
Surveys

South-East coastal region of Tasmania, June 2008

Neville Barrett, Tasmanian Aquaculture and Fisheries Institute

One of the significant components of the hub Surrogacy project is examining the potential of high-resolution multibeam sonar bathymetry and backscatter data for defining seabed habitat features and the utility of these data as surrogates for patterns of biodiversity in coastal waters. Matching biological and multibeam sonar datasets are extremely rare in Tasmanian coastal waters. Therefore, targeted field studies were proposed within the CERF Hub to acquire closely matching datasets to test in detail whether there are useful surrogacy relationships between seabed physical characteristics and associated biological communities.

Several areas were nominated for these studies based on existing matching datasets and available project support. One of these was the SE coastal region of Tasmania, where high density biological data were already available from inshore reef systems, and logistic support was provided by the Tasmanian Aquaculture and Fisheries Institute (TAFI) vessel RV Challenger. In June, despite a few teething troubles with the new technology sonar, Geoscience Australia (GA) and TAFI completed the first stage of this study. This involved successfully mapping an area of coastal reef and exposed sediments in depths from 10 m to 80 m on the Tasman Peninsula, the deep sediment basin in Port Arthur, and a section of the drowned river valley of the Huon River where it joins the D’Entrecasteaux Channel. The overall performance of the multibeam system was excellent with respect to the resolution of seabed features, even though it is still in its testing phase, and quite exciting to watch, particularly when previously unknown reef systems appear on the screen, effectively in glorious 3D!

One unexpected feature of the Huon survey was the common occurrence of circular depressions in the seabed sediments, approximately 2 m deep and 30 m in diameter. Speculation rages as to whether they are 1) artefacts of marine farming activities, 2) feeding depressions created by giant rays, 3) slump features related to sediment compaction or 4) the marine equivalent of crop circles! A prize may be offered to the first correct prognosis (see above image). Many thanks to Ian and Cameron from Geoscience Australia for their long and tiring stints installing and operating the multibeam system, and to Matt and Jac, the Crew of RV Challenger, for keeping it all going despite winds up to 50 knots!

With some outstanding features successfully mapped, we can now confidently plan the next phase of the research. This will involve processing the multibeam backscatter signals to provide reliable data on textural characteristics of the seabed, and collating existing and collecting new biological data in the areas mapped. Both the desktop and field research will be underway shortly.

Conferences/Workshops

CERF Surrogates & Prediction workshop

Hugh Pederson and Vanessa Lucieer, Tasmanian Aquaculture and Fisheries Institute

The final week in May saw the first meeting of all participants working in the Surrogates and Prediction projects of the CERF Marine Biodiversity Hub. The workshop was hosted by the Cleveland (QLD) branch of CSIRO with participants from CSIRO, the Tasmanian Aquaculture and Fisheries Institute (TAFI), Australian Institute of Marine Science (AIMS) and Geoscience Australia (GA). The workshop brought together researchers from a wide range of disciplines and experience including the postdocs working across the two projects.

The first two and half days of the workshop focused on the work plan for the Surrogates project led by Brendan Brooke (Geoscience Australia) with sessions chaired by Matthew McArthur, Michael Hughes, Vanessa Lucieer, Brendan Brooke, and Andrew Heap. The sessions included updates on the progress of the literature review, available datasets, methods of testing physical surrogates, review of field survey progress and identifying linkages to the Predictions project.

The workshop for the Predictions project, led by Roland Pitcher (CSIRO), began mid-week with an overview of project tasks and the introduction of participants. Over the following two days, discussions took place on a wide range of topics including the review of available physical and biological datasets in the biomes of interest (shelf and slope habitats, temperate and coral reefs), analysis techniques, linkages with the Surrogates project and formulation of the biological surrogates literature review.

The workshop provided participants with a thorough insight into the structure, aims and connectivity of the two Hub projects, and a valuable opportunity to establish working relationships between the participants. The discussion in each
session resulted in a number of teams being formed and a series of action items put in place to address pressing issues. Teams will be convening over the coming months to resolve methodologies in the areas of biological data collection, spatial and statistical analysis, acoustic and physical parameter analysis, predictive modelling and ongoing literature reviews. Teams will be meeting prior to the Hub Annual Workshop in October 2008 where reports on the progress against the action items will be assessed.

GeoHab 2008, Alaska
Vanessa Lucieer, Tasmanian Aquaculture and Fisheries Institute

From 29 April to 2 May 2008, CERF hub researcher Vanessa Lucieer attended the 9th International GeoHab (Geological and Marine Habitat mapping) conference in Sitka, Alaska. Sixty-kilometre-an-hour horizontal rain welcomed the usual crowd of “Geohabbers” to Sitka airport, on a small reclaimed land strip in the Inner Passage. The remote location attracted 120 participants from 23 countries enabling an international update on research and ideas on marine habitat mapping projects. Vanessa presented a paper on ‘Assessing the robustness of a morphometric classification model’ which is related to her postdoctoral research in the Marine Hub. (This research describes a benthic morphometric classification model to produce a classification of the seafloor to identify features at multiple scales.)

The much awaited GeoHab book ‘Mapping the Seafloor for habitat characterization’ edited by Brian J. Todd and H. Gary Greene was proudly displayed at the registration desk of GeoHab 2008. The papers in this anticipated volume represent the “latest” results in the field of marine benthic habitat mapping, characterization and application. This volume is intended as a useful reference for mapping practitioners and as a supplement to students of marine habitat mapping. The book can be ordered online at www.gac.ca/publications/view_pub.php?id=190

The conference was sponsored by the Alaska Department of Fish and Game, the University of Alaska, and the Circum-Pacific Council. The theme of this year’s conference was Deep-sea Marine Benthic Habitats and High-seas Marine Protected Areas which attracted a wide variety of research topics. The book of abstracts can be downloaded from http://geohab.org/docs/geohab_sitka2008.pdf

The 8th GeoHab meeting will be held from 5 to 7 May 2009 in Trondheim, Norway, at the premises of the Geological Survey of Norway. The themes for the 2009 conference will include:

- Linking geology and biology – new developments in the use of proxies for ecosystem characterization
- Acoustic and statistical methods for substrate and biota classification and modelling
- Arctic habitats and climate change