



Upcoming Events/Meetings:

CoML Scientific Steering
Committee (SSC) Meeting
February 10-12, 2010
Goa, India

AAAS Annual Meeting
February 18-22, 2010
San Diego, CA

Ocean Sciences 2010 Meeting
February 22-26, 2010
Portland, OR

Ocean Leadership Board of
Trustees Meeting and Public Policy
Forum
March 10-12, 2010
Washington, D.C.

Ocean Research & Resources
Advisory Panel (ORRAP) Meeting
March 15-16, 2010
Washington, D.C.

CoML Explorers Report on the Deep Sea World Beyond Sunlight

In late November, the Census of Marine Life (CoML) released its findings about life in the deep sea. CoML scientists have inventoried an astonishing abundance, diversity and distribution of deep sea species that have never known sunlight. These creatures somehow manage to live in a frigid, black world to depths of up to 5,000 meters below the ocean surface. Deep-towed cameras, sonar and other technologies revealed a diverse collection of species ranging from crabs to shrimp to worms.

Life living in the deep sea requires one or more of the following: swift currents to supply food; abundant food at shallower ocean depths which settles to the seafloor or where deep animals can migrate; alternatives to photosynthesis for food. Most species have had to adapt to diets based on meager droppings from the sunlit layer above (known as marine snow), while others, such as the "wildcat" tubeworm, have to feed on bacteria that break down oil, sulfur and methane, the sunken bones of dead whales and other seemingly implausible foods.

The amazing discoveries are the result of five of CoML's 14 field projects that are dedicated to the study of life in the deep ocean realms. These projects are critically important as the number of marine life observations drop dramatically with increasing depth, due in part to the difficulty of sampling such remote areas.

CoML's release received global coverage, including interviews on CNN International, Reuters TV, and the BBC. There were 64 original print stories, including 26 cover pieces, and nearly 900 online stories on web sites such as MSN, YouTube and National Geographic. The story was reported in 17 languages and reached 51 different countries. ★

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Clockwise: An odd transparent sea cucumber. Photo courtesy of Larry Madin; 'New' Dumbo (*Grimpoteuthis* sp.). Photo courtesy of David Shale; A bizarre, elongated orange animal identified as *Neocyema*. Photo courtesy of David Shale.

CoML Deep Sea field projects:

COMARGE (Continental Margins Ecosystems): *Continental margins*

MAR-ECO (Mid-Atlantic Ridge Ecosystem Project): *Ridge running down the mid-Atlantic*

CenSeam (Global Census of Marine Life on Seamounts): *Submerged mountains rising from the seafloor*

CeDAMar (Census of Diversity of Abyssal Marine Life): *Muddy floor of ocean plains*

ChEss (Biogeography of Deep-Water Chemosynthetic Systems): *Vents, seeps, whale falls and chemically-driven ecosystems found on the margins of mid-ocean ridges and in the deepest ocean trenches*

To learn more about the findings, please read the full press release at:

<http://coml.org/press-releases-2009>



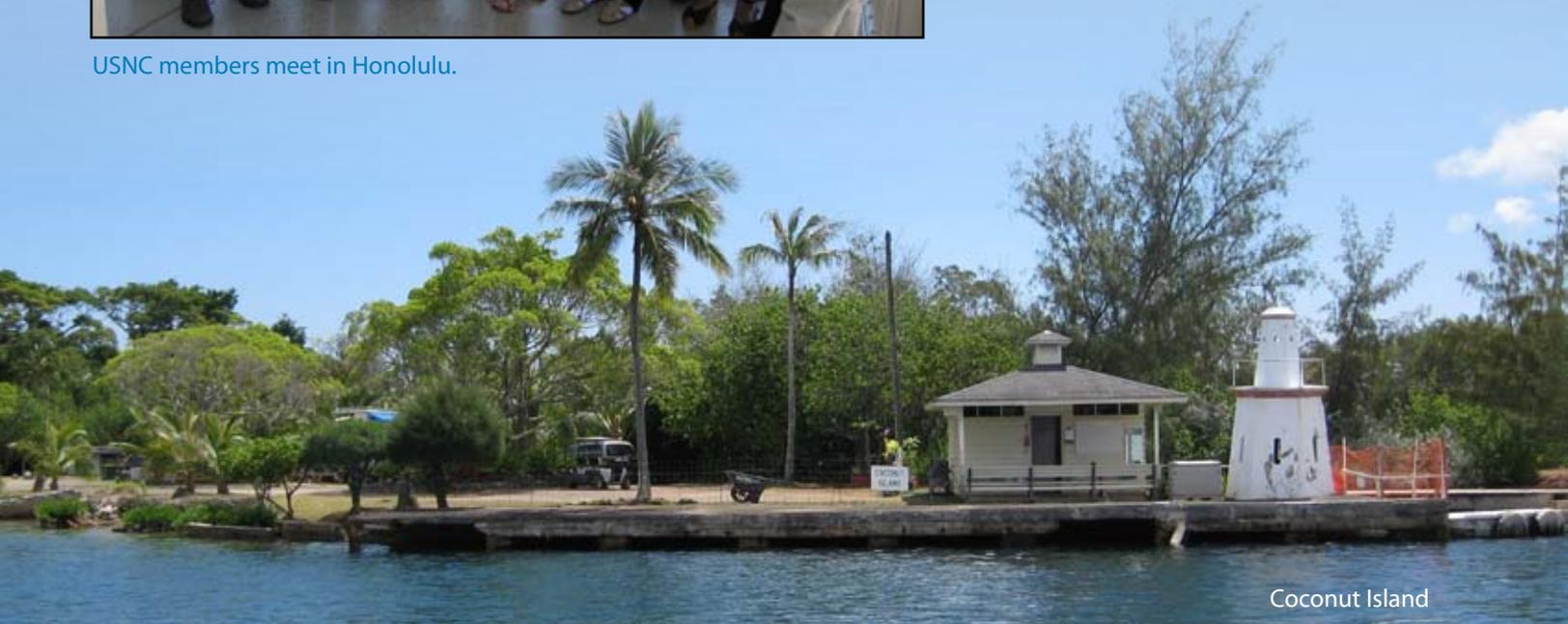


USNC Meets in Hawaii

The U.S. National Committee (USNC) held its fall meeting in late September in Honolulu, Hawaii. The main discussions of the meeting focused on the ongoing international and U.S. synthesis activities, the long term view of CoML and its legacies and the USNC's continued interactions with government and agency activities, including the recent Interim Report of the Interagency Ocean Policy Task Force. Members of the CoML Census of Coral Reef Ecosystems (CReefs) project presented their research, the use of Autonomous Reef Monitoring Structures (ARMS) and their plans for synthesis products that will contribute to the CoML celebration events in October 2010. On September 23rd, the USNC members received a tour of the Hawaii Institute of Marine Biology on Coconut Island. The tour began with an informative stop at the Marine Mammal Research Program Lab where research is conducted on dolphin and whale bioacoustics and their response to anthropogenic noise. The USNC will meet again in April 2010 at the Consortium for Ocean Leadership offices in Washington, D.C. ★



USNC members meet in Honolulu.



Coconut Island



Education Corner

MAR-ECO Takes a Deep Sea Odyssey

The U.S. CoML program office has always admired and appreciated the educational efforts of the Mid Atlantic Ridge Ecosystems (MAR-ECO) project of the Census of Marine Life. MAR-ECO places an emphasis on making sure their exciting research is also functional for formal and informal education and policy oriented audiences. The MAR-ECO team recently met from October 20-22, 2009 in Norway for its final all-project workshop.

The workshop presented an opportunity for MAR-ECO scientists to discuss results and plan for their involvement in the 2010 Census of Marine Life celebratory events in London. MAR-ECO also hosted a large-scale meeting with university and high school students. The event, held in English, included four popular science discussions, live music, a slide show and many other interactive elements. Titled "2009 A Deep Ocean Odyssey," the event was broadcasted via the web on the MAR-ECO website for the international public. To experience the event yourself through recordings of talks, video of the slideshow and other elements, visit www.mar-eco.no/learning-zone/2009_a_deep_ocean_odyssey. ★

2009 A Deep Ocean Odyssey
Kristiansand, Norway 21 oktober 2009, 12:00-15:00 Hrs W.EuropeTime

Listen to popular science talks:

- *History of the blue planet;*
- *Green food and giants of the mid-ocean surface;*
 - *Coping with vastness, darkness and hunger;*
 - *Bottom-dwellers on peaks and plains;*
- *Searching wide and far (deepwater technology)*

Enjoy especially:

- New stunning images of deepwater animals
- New music played by live band
- Informal exchanges between scientists and students

Organisers: MAR-ECO (co-ordinated by the Institute of Marine Research & Univ. of Bergen, Norway) in co-operation with the University of Agder (Inst. of IKT, & Inst. of Music).
Moderator: Dr Nicola King, Univ. Aberdeen; Composer of music: Steffen Flasnes; Sculptor: Ms Anne Edvardsen.

MAR-ECO www.mar-eco.no

CENSUS OF MARINE LIFE www.cml.org

EDUCATION LINK OF THE QUARTER

Have you ever wanted to pilot your own submersible through the deep sea? MAR-ECO, a CoML project that studies the patterns and processes of the ecosystems of the northern mid-Atlantic, allows visitors of their website the opportunity to become a virtual deep sea explorer. The interactive menu allows you to learn more about the MAR-ECO project and specific oceanic phenomenon such as vertical migration and the use of camouflage by marine organisms. Users can explore the oceans' surface, twilight zone, dark zone and sea floor. Each realm is inhabited by unique and interesting life including fish, whales, plankton and jellyfish. Visit the MAR-ECO deep sea explorer site at www2.imr.no/mareco/MARECO.html and learn more about the life in the Atlantic Ocean. ★





SSC Meets in Monaco, Previews *Oceans*

As the CoML community works toward the release of the first Census of Marine Life in October 2010, more energy and excitement can be felt at each meeting of CoML scientists, committees and project teams. The October 10-12, 2009 meeting of the CoML Scientific Steering Committee (SSC) was no exception. The SSC met in Monaco and was privileged to take part in the events surrounding an early screening of the Galatée film *Oceans*. Since the beginning of the filming process, Galatée has utilized CoML researchers and leaders as scientific advisors for the film. Galatée crew members even took part on CoML cruises. A scientific symposium was held at the Musée Océanographique the night before the screening, where SSC members Myriam Sibuet and Patricia Miloslavich spoke about CoML. The screening of *Oceans* was held during the Awards Ceremony of the Foundation Prince Albert II of Monaco at the Grimaldi Forum. The SSC meets again in February 2010 in Goa, India. ★



(L-R) Jacques Cluzaud, Jacques Perrin, Prince Albert II of Monaco and the emcee of the evening on stage after the preview of *Oceans*.



The SSC in Monaco with *Oceans* Director Jacques Perrin and other members of the Galatée team.

USNC Member, Daphne Fautin, Lectures on Wild Science

Dr. Daphne Fautin, USNC member and professor of ecology and evolutionary biology at Kansas University (KU), presented on "The Census of Marine Life: What Lives in Our Oceans and Where?" as part of the KU Natural History Museum's Wild Science lecture series on December 2, 2009. Held periodically throughout the academic year, the series offers a chance for the public to ask researchers questions in an informal setting.

Dr. Fautin spoke about CoML tracking and DNA technologies and responded to questions by contrasting the capabilities of manned, unmanned and tethered submersible technologies. She also presented on some of her own research and touched on the dead zone at the mouth of the Mississippi River to show the immediate connection between the U.S. "heartland" and the ocean.

There was a great turnout for her presentation. Attendees continued to linger and ask questions even as the lights were being shut off. One journalism student asked why a census of marine life had not been conducted before and Dr. Fautin responded that CoML was a novel idea and she was unsure there had ever been a 'Census of Terrestrial Life' conducted either! ★



Dr. Daphne Fautin in the field in Singapore.

Seven Questions with Ian Poiner

As a regular feature of the U.S. CoML Newsletter, we ask a member of the CoML Community seven (or so) questions. This edition features an interview with Ian Poiner, Chair of the CoML Scientific Steering Committee (SSC) and Chief Executive Officer of the Australian Institute of Marine Science.

Melissa Brodeur: On November 23, 2009 CoML released its latest findings about the deep sea – a world beyond sunlight (see Cover Story). Can you tell us a little about the findings?

Ian Poiner: The release featured results from five of the 14 CoML field projects. The five focused on the deep sea. They found many new species that live in the largest, but least known, habitat on Earth. The deep sea is a place of extremes, high pressure, mostly cold (except for the hot vents) and no light. These characteristics created the perception it would be a place of

the physical, chemical and biological process that sustains life in the deep sea are unknowns but knowables. But we still need to better address the great challenges of abundance and distribution information.

MB: What did you find most interesting about the discoveries?

IP: This is a very difficult question to answer as the projects made so many new and interesting discoveries. Many of the deep sea species are different from their shallow water relatives. Not only are they strikingly beautiful but they do some weird and wonderful things to live in these habitats. There is a diversity

“The threats of climate change again highlight the need to address our lack of knowledge about the biodiversity of the deep sea.”

–I. Poiner

low biodiversity with the odd, weird but wonderful animal adapted to living in an extreme environment. We knew there were some areas rich in biodiversity, such as the hot vents and sea mounts. The deep sea benthic and pelagic habitats are not only the largest habitats on the earth, but also very rich in life. This is the most important finding from the projects. They discovered a great diversity of species evolved to live in these extreme habitats. The other key finding is there is still so much to be discovered. A more complete inventory of what lives there and a better understanding of

of adaptations to the cold, dark and high pressure conditions and variable food sources. The result is intriguing life history strategies that enable deep sea species to sustain themselves using, for example, marine snow, whale carcasses or novel chemo-trophic means. The Lamellibrachia tubeworm feeding on bacteria decomposing oil is just one example that raises so many questions. So if I had to make a decision, understanding how animals have adapted to sustain themselves in the deep sea is probably the most interesting aspect of the discoveries for me to date.



MB: How did the researchers study such a deep area?

IP: The ocean can be a difficult and unforgiving place to work. It's a place of extremes and long sea expeditions are tough on most scientists. This is especially true for deep sea biologists as they are operating from ships in remote and exposed parts of our oceans. Seeing and sampling the depths of the ocean is also a great challenge, which has led to many innovative technologies in optics, acoustics, remotely operated vehicles, autonomous underwater vehicles, submarines and smart sensors to mention a few. Even the more traditional sampling tools, such as dredges and trawls, require great skill and special gear. For example, the cable connected to a deep sea dredge or trawl needs to be 2-3 times the depth of water to be sampled. So sampling 5,000 meters deep requires 10-15 kilometers of cable. Researching the deep sea is a difficult and expensive business and this is one reason why the Earth's largest continuous ecosystem and largest habitat for life is also the least studied.

MB: Why is the deep sea important?

IP: The earth is 70 percent ocean and the deep sea benthic and pelagic habitat is the largest continuous habitat for life on our planet. It is also the least studied

(continued on next page)



Seven Questions with Ian Poiner continued...

and understood. These facts in themselves are reasons why studying the deep sea is important. CoML has shown it is not a barren, lifeless place, rather a place full of life. We live in a time of rapid and accelerating environmental change so understanding the deep sea and its rich biodiversity is important if we are to understand global change, adapt to it and where necessary, develop solutions to mitigate the risk of unwanted outcomes. The deep sea is also a place of potential wealth generation through industries such as seabed mining; oil, gas and possible methane extraction; fishing; and the discovery of novel compounds and other bio-products. All industrial development should be environmentally sustainable and appropriately regulated but the lack of knowledge and inadequate governance arrangements are the two greatest risks to sustainable industries in the deep sea.

MB: Does global climate change affect the deep sea?

IP: Climate change is affecting the oceans through a number of

mechanisms, including increasing sea water temperatures and pH, and changes to current regimes. Many of these changes are 'surface phenomena' but there will be impacts on the deep sea. The ocean conveyor belt—which allows cold, dense waters to sink to the deep ocean and nutrient-rich waters to rise in both the Northern and Southern Hemispheres—will slow

*"CoML has shown
[the deep sea] is not a barren,
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—I. Poiner

in response to climate change. This is likely to impact the deep sea as well as the productivity of the shallow ocean. With a changing ocean there is likely to be changes to trophic networks, which will also impact deep sea biodiversity. The threats of climate change again highlight the need to address our lack of knowledge about the biodiversity of the deep sea.

MB: On a less serious note, if you were stuck in a submersible (which I have heard you liken to the trunk of a car), who would you most like to be stuck inside with you?

IP: Given my size... someone small!

MB: Is it true that you have swum in each of the oceans?

IP: One of my goals in life is to swim in all the world's Oceans and Seas. I have swum in four of the five oceans with the Arctic still to happen. Excluding land locked seas, and depending on your definition of a sea, there are about 100 of them in our oceans. To date I have swam in 40 but being a person of the tropics with a low tolerance to the cold my challenge is the seas of the colder parts of our oceans but from a selfish perspective could be one of the few benefits of a warming ocean!

Do you want to know more about Ian Poiner and CoML's findings in the deep sea? Check out this video of Ian being interviewed on CNN: www.oceanleadership.org/2009/new-marine-life-discovered/. ★

OBIS-USA Featured in Access

OBIS-USA, the U.S. regional node of the international Ocean Biogeographic Information System (OBIS), is featured in the cover story of the Fall 2009 issue of *Access*, the quarterly newsletter of the National Biological Information Infrastructure (NBII). NBII hosts OBIS-USA, the "one-stop shop" for biogeographic data collected from U.S. waters and oceanic regions. The article, 'NBII Marine Data and Functionality Increase Dramatically in OBIS-USA' can be read online at www.nbii.gov/images/uploaded/8496_1257351207768_Access_Fall_09.pdf.

To learn more about OBIS-USA, please visit <http://obisusa.nbii.gov>. ★



Clione limacina (Sea Angel).
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Upcoming Events for the Census of Marine Life: “The CoML West Coast Swing”

Come join CoML at the 2010 American Association for the Advancement of Science (AAAS) and Ocean Sciences meetings as we host two sessions highlighting our findings, technologies and the applications of our research.



CoML Symposium at the 2010 AAAS Meeting

February 18-22, 2010 – San Diego, CA

One Fish, Two Fish, Red Fish, New Fish: Society Needs Marine Biodiversity Research

Friday, February 19, 2010 • 8:30 AM to 11:30 AM
San Diego, CA, San Diego Convention Center, Room 17A

Join the Census of Marine Life for a lively session that will explore the areas in which research, technology and discoveries from marine biodiversity research can benefit society. Our speakers will include:

- Dr. Ellen Prager, Earth2Ocean, Inc. and Aquarius Reef Base (Moderator)
- Dr. Huw Griffiths, British Antarctic Survey
- Dr. Jason Hall-Spencer, University of Plymouth
- Dr. Ron O’Dor, Dalhousie University and the Consortium for Ocean Leadership
- Dr. Dirk Steinke, University of Guelph
- Ms. Kristina Gjerde, The International Union for Conservation of Nature (IUCN)
- Dr. Shirley Pomponi, Harbor Branch Oceanographic Institute

For more information, please see www.coml.us/Dev2Go.web?Anchor=conferences_aaas2010.

CoML Session at the 2010 Ocean Sciences Meeting

February 22-26, 2010 - Portland, OR

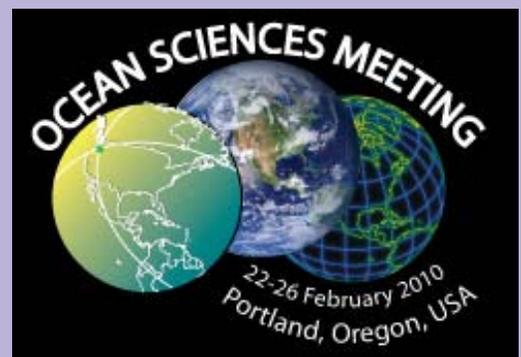
Session BO34C: The Census of Marine Life: Understanding Marine Biodiversity for Better Ocean Management

Wednesday, February 24, 2010 • 3:30 PM to 5:30 PM
Portland, OR, Oregon Convention Center, Room D137

With the ten-year Census of Marine Life program concluding in 2010, this session will focus on novel approaches to marine biodiversity research, biological technologies ready for implementation in observing systems, data and statistical models, and CoML results that can assist in implementing sound ocean resource management.

Chaired by Kristen Yarincik, International CoML Program Manager, and Michael Feldman, U.S. CoML Program Manager.

For more information, please visit www.coml.us/Dev2Go.web?Anchor=conferences_oceansciences.





Check out our Video Clip of the Quarter!

Dr. Sylvia Earle on the Colbert Report



www.colbertnation.com/the-colbert-report-videos/252641/october-13-2009/sylvia-earle

USNC Member Dr. Sylvia Earle made an appearance on the Colbert Report on October 13, 2009. Dr. Earle stressed the importance of doing all we can to protect and restore our ocean. She also discussed her new book *The World is Blue: How Our Fate and the Ocean's Are One*.

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- Ms. Penelope Dalton • University of Washington, Washington Sea Grant, Seattle, WA
- Dr. Sylvia Earle • Conservation International, Oakland, CA
- Dr. Daphne Fautin • University of Kansas, Lawrence, KS
- Dr. Daniel Finamore • Peabody Essex Museum, Salem, MA
- Dr. Mark Fornwall • U.S. Geological Survey, Kahului, HI
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*For member's biographies visit our website at: www.coml.us/dev2go.web?anchor=CoML_us_leadership

Sign up to receive this and other newsletters by visiting: lists.oceanleadership.org/mailman/listinfo



Happy Holidays from the USNC Program Staff!

Mike, Melissa, Heather, Maureen, Gregg, Jason, Mel, and Bob