Caribbean Marine Science

Official Newsletter of the AMLC Published Spring and Fall

Contents

Association News

From the Editors' desk

Greetings to all our members. We hope all had a wonderful Christmas and 2013 will bring joy and prosperity. We are sad to announce that this would be the last issue of our newsletter, a publication that has provided Association news, scientific discoveries, book releases, scientific meetings and summer course announcements to our members for over 20 years. When we took office back in 1999, the internet was not as accessible and comprehensive as it is today, so compilation of the information for the newsletter was done mostly via mail and/or telephone, the newsletter was printed, sorted out and hard copies were mailed to all members and institutions, a slow and time consuming process. We've come a long way since then. Most of the information is readily available and easier to compile, but you still have to look for it and put everything together. It has been a pleasure serving the Association and our members all these years. We appreciate your support.

In this last issue we include a profile of the Discovery Bay Marine Lab. and recent information on the pressing problem of ocean acidification, including a NSF report indicating that oceans may be acidifying faster today than in the last 300 MYA. Also included is a short report on a new study conducted by the University of Miami (RSMAS) in Glover's Reef challenging whether corals will benefit from marine reserves' protection, and a report on the value of Hawaiian reefs, that we hope, could serve to motivate our audience about thinking on the value of coral reef systems in our countries and around the Caribbean. Announcements for meetings, new books and Summer courses can be found in their respective sections.

Future Meetings of the AMLC

The 36th Scientific Conference of the ALMC will be hosted by Peter Gayle and The University of the West Indies, Mona Campus, and will be held at the Discovery Bay Marine Lab, Jamaica from 17 - 21 June, 2013. All the information and the call for abstracts is provided at the end of this Newsletter and in the AMLC webpage. The theme of this meeting is **Managing for Sustainability and Resilience: Challenges for CZM in the Caribbean.**

The 37th AMLC Scientific Meeting will be sponsored by the CARMABI Foundation and hosted by Dr. Mark Vermeij in Curaçao, Netherlands Antilles in 2015.

The 2014 Executive Board Meeting will be hosted by will be sponsored by the Mote Marine Laboratory (MML) and hosted by Dr. Michael Crosby in Sarasota, Florida, and the 2016 The AMLC Executive Board meeting will be sponsored by the Center for Marine Resource Studies, the School for Field Studies (SFS) and hosted by Dr. Heidi Hertler in the Turks and Caicos Islands.

AMLC List Server

The purpose of the AMLC list server is to facilitate communication and foster collaboration between and among our members. We hope all AMLC members will take advantage of this service – if you have any news, requests, or questions to distribute to the membership, just send a message to the email address below. On-line discussions among members concerning Caribbean marine issues are encouraged. Only AMLC members in good standing can post to the list. Messages not from a subscribed member will not be accepted. Current AMLC members are automatically subscribed with the list controlled by Dr. Sarah Manuel (smanuel@gov.bm), AMLC's Membership Director, and new members are added as they join The list server address is: members@lists.amlc-carib.org

Please send contributions for the Newsletters. Your Newsletter is an efficient way of sharing information about your projects, or even better, finding help or cooperation from other members of the Association.

Profile

The Discovery Bay Marine Laboratory (DBML)

The Discovery Bay Marine Laboratory is a facility of the University of the West Indies dedicated to supporting research and the teaching of biology, chemistry, ecology, geology, hydrology and geography. The facility also seeks to apply the knowledge gleaned to the management of the natural resources in Jamaica's coastal zone.

Located about 1 hour from the Montego Bay airport, DBML is situated on the water at Discovery Bay and is an excellent location for educational field trips, scientific research, seminars and workshops.

The DBML has excellent research facilities with wet and dry labs, boats suitable for SCUBA diving and the only Hyberbaric Chamber in Jamaica for the treatment of divers and others through re-compression. There are also residential buildings which can accommodate up to 40 students and 20 faculty with full catering services.

DBML was founded in 1965 by Professor Thomas F. Goreau (then based at SUNY) as a laboratory dedicated to research on the biology and geology of coral reefs and on the organisms inhabiting them. In 1969, Kaiser Bauxite Company donated the land for the current facility which was constructed by the University of the West Indies, Mona with funding from the Wolfson Foundation and CIDA.

The new DBML opened in 1970 with five research rooms, an instrument room, a library/seminar room, offices and a large wet lab. It was jointly operated by the UWI and Stonybrook University (New York) until 1975 when it became the sole responsibility of the UWI, Mona. At this time, the Lab became closely associated with the Department of Life Sciences but with its own staff and Director. It grew to be an integral part of the University, being the UWI's research arm on the North Coast of the island. When the Centre for Marine Sciences (CMS) was formed at the Mona Campus in 1990, DBML became part of the new Centre

Facilities

DBML is an excellent location for educational field trips, scientific research, seminars and workshops. There are two residential buildings. The larger of these is a dormitory block with 8 rooms, each holding four persons (each room has its own verandah and bathroom), a large dining room/sitting room/lecture hall and a fully equipped kitchen. The block also has 2 bedsitters, each with a kitchenette. The other residential building (the Flats) contains 6 apartments with either one, two or three bedrooms. Each flat has a bathroom, a living/dining room, a verandah and a kitchen. Bed linen, crockery, cooking utensils etc., are provided, but not towels.

Investigators usually opt to buy their own food and cook for themselves. However, catering for breakfast, lunch and dinner is provided for groups, upon request. Visitors with special diets are asked to indicate this on the usage application.

Wet lab

The main Laboratory building houses five research rooms, an instrument room, a library/seminar room, offices and a large wet lab. The latter is divided into *six* bays, each provided with electrical outlets, running salt and fresh water, and has a two-tier central wet table with twelve shallow and six deep tanks. Additional wet tables, as well as two flow-tanks (of 15 cm and 60 cm width) are available for experimental work. Two workshops provide technical support.

There are several computers available for general use, all with Internet access. Audiovisual equipment is provided for lectures and presentations. Printing, scanning and faxing facilities are also available. Group leaders, visiting scientists and students are encouraged to bring laptops, to take advantage of DBML's wireless network.

Diving and Boating

Prospective divers must possess certification from a recognized agency, have completed a dive medical within the last 12 months and may be required to demonstrate their diving skills in a checkout dive. The Laboratory's diving facilities are first class. Compressed air, nitrox and tri-mix (helium, nitrogen, oxygen) are available to qualified users, and there is an ample supply of scuba tanks. A double-lock recompression chamber backs up the diving safety program.

Aerial view of DBML

The docks

Main lab – water tables - aquaria and boat in dock.

Discovery Bay has a wide range of dive sites, whether you are a novice seeing the coral reefs for the first time, or are an experienced coral reef biologist. Most back reef sites are shallow and accessible to snorkellers. On both the West and East forereefs, we maintain permanent moorings in about 17m of water, providing safe access to the deep reefs. Diving groups may also go beyond the confines of the Bay, for example, to Rio Bueno where divers can investigate coral wall features or to Pear Tree Bottom where coral canyons support a wide variety of organisms.

There are several boats, of varying sizes and capacity, available for use by visitors and researchers.

Reservations

Please make reservations well in advance. DBML may not be able to guarantee the availability of facilities on short notice. A discount of 10% will be given on accommodation and lab fees if the bill is

paid 30 days before arrival. Space can only be confirmed when payment is received.

For booking and more information on requirements please go to:

http://www.uwimona.edu.jm/cms/index.html

General Interest

Oceans acidifying faster today than in past 300 million years

The oceans may be acidifying faster today than they did in the last 300 million years, according to scientists publishing a paper this week in the journal *Science*. "What we're doing today really stands out in the geologic record," says lead author Bärbel Hönisch, a paleoceanographer at Columbia University's Lamont-Doherty Earth Observatory. "We know that life during past ocean acidification events was not wiped out--new species evolved to replace those that died off. But if industrial carbon emissions continue at the current pace, we may lose organisms we care about--coral reefs, oysters, salmon."

The oceans act like a sponge to draw down excess carbon dioxide from the air. The gas reacts with seawater to form carbonic acid, which over time is neutralized by fossil carbonate shells on the seafloor. If too much carbon dioxide enters the ocean too quickly, it can deplete the carbonate ions that corals, mollusks and some plankton need for reef and shell-building. In a review of hundreds of paleoceanographic studies, the researchers found evidence for only one period in the last 300 million years when the oceans changed as fast as today: the Paleocene-Eocene Thermal Maximum, or PETM.

In ocean sediment cores, the PETM appears as a brown mud layer flanked by thick deposits of white plankton fossils. About 56 million years ago, a mysterious surge of carbon into the atmosphere warmed the planet and turned the oceans corrosive. In about 5,000 years, atmospheric carbon doubled to 1,800 parts per million (ppm), and average global temperatures rose by about 6 degrees Celsius. The carbonate plankton shells littering the seafloor dissolved, leaving the brown clay layer that scientists see in sediment cores today.As many as half of all species of benthic foraminifera, a group of one-celled organisms that live at the ocean bottom, went extinct, suggesting that deep-sea organisms higher on the food chain may have also disappeared, said paper co-author Ellen Thomas, a paleoceanographer at Yale University.

"It's really unusual that you lose more than 5 to 10 percent of species," she said. Scientists estimate that ocean acidity--its pH--may have fallen as much as 0.45 units as the planet vented stores of carbon into the air. "These scientists have synthesized and evaluated evidence far back in Earth's history," said Candace Major, program officer in the National Science Foundation's (NSF) Division of Ocean Sciences, which funded the research. "The ocean acidification we're seeing today is unprecedented," said Major, "even when viewed through the lens of the past 300 million years, a result of the very fast rates at which we're changing the chemistry of the atmosphere and oceans."

In the last hundred years, rising carbon dioxide from human activities has lowered ocean pH by 0.1 unit, an acidification rate at least 10 times faster than 56 million years ago, says Hönisch. The Intergovernmental Panel on Climate Change (IPCC) predicts that pH will fall another 0.2 units by 2100, raising the possibility that we may soon see ocean changes similar to those observed during the PETM.

More catastrophic events have happened on Earth before, but perhaps not as quickly. The study finds two other analogs for modern day ocean acidification--the extinctions triggered by massive volcanism at the end of the Permian and Triassic eras, about 252 million and 201 million years ago, respectively. But the authors caution that because ocean sediments older than 180 million years have been recycled back into the deep Earth, scientists have fewer records to work with. During the "Great Dying" at the end of the Permian, about 252 million years ago, about 96 percent of life disappeared.

Massive eruptions from what is known as the Siberian Traps in present-day Russia are thought to have triggered earth's biggest extinction. Over 20,000 years or more, carbon in the atmosphere rose dramatically.

Scientists have found evidence for ocean dead zones, and preferential survival of organisms predisposed to carbonate-poor seawater and high blood-carbon levels, but so far they have been unable to reconstruct changes in ocean pH or carbonate. At the end of the Triassic, about 201 million years ago, a second burst of mass volcanism associated with the break-up of the supercontinent Pangaea doubled atmospheric carbon and touched off another wave of die-offs. Coral reefs collapsed and an entire class of sea creatures, the eel-like conodonts, vanished.

On land, large plant-eating animals gave rise to meat-eating dinosaurs like *Tyrannosaurus rex* as the Jurassic era began. A greater extinction of tropical species has led some scientists to question whether global warming rather than ocean acidification was the main killer at this time. This study finds that the most notorious of all extinctions, the one that ended the Age of Dinosaurs with a falling asteroid 65 million years ago, may not have been associated with ocean acidification. The asteroid impact in present-day Mexico 65 million years ago released toxic gases and possibly set off fires that sent surges of carbon into the air.

Though many species of plankton went extinct, coral reefs and benthic foraminifera survived. In lab experiments, scientists have tried to simulate modern ocean acidification, but the number of variables currently at play--high carbon dioxide and warmer temperatures, and reduced ocean pH and dissolved oxygen levels--make predictions difficult. An alternative to investigating the paleo-record has been to study natural carbon seeps from offshore volcanoes that are producing the acidification levels expected by the year 2100.

In a recent study of coral reefs off Papua New Guinea, scientists found that during long-term exposure to high carbon dioxide and pH 0.2 units lower than today--at a pH of 7.8 (the IPCC projection for 2100)--reef biodiversity and regeneration suffered.

Ocean Acidification

In a related story published in the Washington Post, **Juliet Eilperin** interviewed Kris Holderied, who directs the National Oceanic and Atmospheric Administration's Kasitsna Bay Laboratory in Homer, Alaska. This southwestern Alaska town dubs itself the Halibut Fishing Capital of the World and fisherman are worry about the changing chemical balance of the ocean ("corrosive waters") and its impact on the fish. Holderied says " the ocean's increasing acidity is the reason fishermen stop me in the grocery store and ask, you're with the NOAA lab, what are you doing on ocean acidification?" . A common concern in many coastal communities that depend on the ocean for their subsistence and income.

The ocean absorbs enormous amounts (30 %) of the carbon dioxide produced by fossil fuel burning, which reacts with seawater to form carbonic acid lowering the water's pH. The sea today is 30 percent more acidic than pre-industrial levels. At the current rate of global worldwide carbon emissions, the ocean's acidity could double by 2100.

"What impact it is having on marine life, how this might vary by geography and species, and what can be done about it if humans do not cut their carbon output significantly are some of the difficult questions scientists and policymakers are seeking to answer". The decline in pH will likely disrupt the food web, all organisms that produce calcium carbonate shells, from microscopic plankton dwellers to mollusks and corals. The rates of CaCO3 deposition will decline on one hand, but these calcifying organisms will also face the problem of calcium carbonate dissolution in an acidic environment.

Gretchen Hofmann a professor of marine biology at the University of California at Santa Barbara , , has recruited everyone from sea-urchin divers to Bureau of Ocean Energy Management, Regulation and

Ocean acidification threatens U.S. fisheries: Human-generated carbon emissions are making the ocean more acidic, which has become a cause for concern to the fishing industry and scientists.

Enforcement officials to assess what is happening off the West Coast. NOAA has started tracking changes in the ocean's pH over time in eight coastal and coral reef ecosystems, from the Gulf of Maine to coastal Hawaii. They are also evaluating the impact of declining pH levels are changing chemistry of the water and how it is affecting more than two dozen commercially important species, such as red king crab, summer flounder and black sea bass.

Federal and state authorities are searching for ways to cope with a problem whose obvious solution — slashing global carbon emissions — remains elusive. A government panel is examining local contributors such as agricultural runoff, while federal officials and scientists are trying to determine which species may be able to adapt to more acidic seas and assessing what other protection could bolster fish populations under this pressure.

Under the advice of Charles David Keeling, who has been monitoring atmospheric CO_2 concentrations (the Keeling curve) since 1958, NOAA's senior scientist Richard Feely and his colleagues began monitoring carbon concentrations in the ocean, similarly to what Kelling did from a station in Hawaii's Mauna Loa. the way had charted atmospheric carbon starting in 1958. Feely conducted his first transect of the Pacific Ocean in 1982. By the late 1990s, scientists such as Joan Kleypas (National Center for Atmospheric Research) and others were showing that the sea's declining pH posed a threat to marine life. The initial assumption that acidity of the ocean would affect ecosystems around the world in a uniform way, by dissolving the biologically deposited calcium carbonate, was no showed to be incorrect. There is high variability in the pH levels within coastal areas and across oceans. Therefore, some areas the ocean could be more vulnerable and others may not be affected or show higher resilience.

Upwelling brings deep, cold, high nutrient waters from the deep ocean which spills over the continental shelf. Most of the highest productive fishing grounds are associated to these events. Cold waters can hold larger amounts of carbon dioxide. In the Pacific Northwest this water is increasingly acidic, killing oyster larvae that farmers are growing. Much of Alaska's waters already have lower pH levels, and the water that reaches the Arctic has been circulating around the planet, absorbing CO2 along the way.

Oyster farmers off the coasts of Washington and Oregon were the first to see how ocean acidification threatened their business. Lower pH levels were killing oyster larvae and threatening oyster cultures. Farmers working with Oregon State University and NOAA researchers, were able to prove it was the case, and now they time the intakes to reduce exposure of oysters to acidic water. A $500,000 - investment in pH-monitoring equipment saved the industry $34 million in 2011.

The trick is identifying which species are more vulnerable. This is a difficult task in the open ocean. According to NOAA supervisory oceanographer Jeremy Mathis, "It doesn't take much to push it past the thresholds we're concerned about." And last year, a team of researchers led by Oregon State University professor George Waldbusser found that the pH in the lower part of the Chesapeake Bay is declining at a rate that's three times faster than the open Pacific Ocean, partly because of increased nutrient runoff from farming and other activities. This stream of nutrients causes phytoplankton to take more carbon dioxide out of the upper Bay; as the plankton release CO_2 as they move to the lower Bay, it increases carbon concentrations and lowers the overall pH.

Six shellfish hatcheries in Virginia have used state funds to conduct their first year of water chemistry monitoring and hope to do more. Nutrient runoff from the land seems to contribute to the problem.

The die-off of oyster larvae in the Pacific Northwest has implications for oyster growers in places as far away as Homer, Alaska, since they traditionally buy their spat from Washington and Oregon farms. "We just can't rely on the Lower 48 anymore," said co-op manager Sean Crosby, whose group received $150,000 in federal funds over the past two years to start up and run the hatchery. "Even though we're not seeing ocean acidification in Kachemak Bay, we're feeling its effects."

Alaska and NOAA are jointly funding four buoys throughout the state to monitor pH levels, while other NOAA scientists are testing how species would likely gain from a lower pH because they thrive under those conditions, while others, including dungeness crab, would lose. These species interact with each other, which is why ocean acidification could have such large ripple effects. The highly vulnerable pteropods,

calcifying planctonic organisms, for example, can make up as much as 40 percent of the diet of Alaska's juvenile pink salmon.

Ocean acidification is becoming a common discussion amongst fidherman and aquaculture farmers because it could significantly affect their industry (loss revenues) and the availability of fish, shellfish and crabs we eat. Other species, such as purple sea urchins off California's coast, have shown some genetic capacity to adapt to more acidic conditions, in part because they are periodically exposed to corrosive waters.

Source: Juliet Eilperin,

New Study of Glover's Reef Challenges Whether Corals Will Benefit from Marine Reserves' Protection

The ability of marine reserves to replenish fish stocks has been studied extensively, but evidence of their ability to benefit shallow-water communities to thrive remains a mystery. A team of scientists from the University of Miami (UM) Rosenstiel School of Marine & Atmospheric Science recently tested whether 10 years of reserve designation has translated into positive impacts on coral communities in Glover's Reef Marine Reserve, Belize. Results from their surveys of 87 patch reefs both inside and outside the marine reserve showed no clear indication of reserve implementation benefiting coral cover, colony size or the abundance of juvenile corals.

The study, conducted by Brittany Huntington, Mandy Karnauskas and UM Professor Diego Lirman appears in the journal *Coral Reefs*. "We had hoped to find evidence of reserve protection benefiting the coral community as well as the fish community at Glover's Atoll. Unfortunately, the coral communities on protected reefs were in no better condition than the fished reefs," says Huntington. Rather, the scientists documented declines in the coral community both inside and outside of the marine reserve. These patterns of coral decline at Glover's Reef, including a shift in dominance from massive reef-building broadcasting species to smaller brooding species, and low numbers of juvenile corals were documented and seem reflective of regional patterns of coral decline in the Caribbean.

The scientists detected no difference in herbivorous fish abundances or the abundance of macroalgae dominating the reef between reserve and fished sites. This provides a potential explanation for the lack of cascading effects on the coral community.
"The macroalgae is faster growing than corals, dominating the available free space on the reef and impeding coral growth and survival," said Huntington. "Without greater numbers of herbivorous fishes in the reserve to consume the macroalgae that is dominating these reefs, corals have little chance at recovery."

The UM team also found that massive broadcasting coral species exhibited greater losses over time than their smaller-sized counterparts, suggesting that local management actions have not alleviated the trend of high mortality for these species.

"Glover's Marine Reserve provides a unique opportunity to learn more about how marine reserves impact coral and fish populations," says Karnauskas. "Reserves that are not designed and implemented specifically for the protection of the coral community may fail to provide benefits to these species."

Story Source: The above story is reprinted from materials provided by University of Miami Rosenstiel School of Marine & Atmospheric Science.

Hawaii's coral reef ecosystems worth $33.57 billion per year

A peer-reviewed study commissioned by NOAA shows the American people assign an estimated total economic value of $33.57 billion for the coral reefs of the main Hawaiian Islands.

"The study shows that people from across the United States treasure Hawaii's coral reefs, even though many never get to visit them," said Jane Lubchenco, Ph.D., under secretary of commerce for oceans and atmosphere and NOAA administrator. "It illustrates the economic value of coral reefs to all Americans, and how important it is to conserve these ecosystems for future generations."

"We are pleased that research is being done to look at the value of Hawaii's coral reefs, but before we consider any potential applications of the study we

will consult closely with local communities," said William J. Aila, Jr., chairperson of the Hawaii Department of Land and Natural Resources.

The study employed a scientifically developed national Internet survey of more than 3,200 households – a representative sample of all U.S. residents, not just Hawaii or coastal residents. From June through October 2009, the survey allowed the public to express its preferences and values for protection and restoration of the coral reef ecosystems around the main Hawaiian Islands. In this study, total economic value includes so-called passive use values, such as the willingness to pay to protect the coral reef ecosystem for future generations, as well as direct use values, such as snorkeling over a coral reef or consuming fish supported by coral reef ecosystems.

A panel of independent university and private scientists, from both Hawaii and the continental U.S., provided facts to the survey design team about the Hawaiian coral reef ecosystems and provided estimates of how the coral reef ecosystems would change in response to the two possible management options. The descriptions, including illustrations, of improvement to coral ecosystems gave survey respondents a clear understanding of what they were being asked to value and how the ecosystems would change as a result of the protection measures.
To estimate underlying values the public places on coral reef ecosystems, the study team presented survey participants with two specific measures to protect and restore coral reef ecosystems. One measure aimed at reducing effects to coral ecosystems from fishing, and another to repair reefs damaged by ships.

The main Hawaiian Islands consist of eight volcanic islands that range in age from active lava flows on the east side of the Big Island to seven million-year-old Kauai. Despite their economic significance, reefs near urbanized areas, such as Honolulu, Wailuku, and Kahului, have experienced increasing stress from ever-increasing population and other pressures.
The national survey was funded by NOAA and the National Science Foundation, and was designed to address the issue of Internet bias. The survey was conducted through two Internet panels; one recruited participants using controlled random digit dialing telephone surveys and the other using standard U.S. Bureau of the Census methods of randomly selecting households and going to each household to recruit participants via face-to-face interviewing.

NOAA will use this study to provide a reliable estimate of the value of the coral reef ecosystem around the main Hawaiian Islands. It also demonstrates that coral reefs provide valuable ecological services for U.S. residents, regardless of whether they actually use them. NOAA's mission is to understand and predict changes in the Earth's environment, from the depths of the ocean to the surface of the sun, and to conserve and manage our coastal and marine resources. Join us on Facebook, Twitter and our other social media channels.

http://coralreef.noaa.gov/hicoraleconval

Meetings & Workshops

American Geophysical Union's Meeting of the Americas. Cancun, Mexico, June 14-17, 2013.

Climate variability and change plays an important role in the health and sustainability of marine ecosystems. Marine resource managers must have a clear understanding of the ways in which the climate may be affecting the ecosystems under their stewardship. This understanding requires both a solid scientific foundation of the climatic behavior that drives ecological impacts, as well as vehicles for effectively transmitting that information to the managers who must utilize it.

To address these needs, we are pleased to invite abstracts for two topical sessions at the American Geophysical Union's Meeting of the Americas, to be held in Cancun, Mexico June 14^- 17, 2013. These sessions are "[U12]: Identifying and Quantifying Critical Climatic Conditions for Coral Reef Ecosystem Impacts", and "[IN02]: Methods for Integrating Climate Information into Marine Resource Management" -- session abstracts are provided below.Papers addressing emerging research on ecological climate impacts and complex climate-ecosystem interrelationships (e.g., range

shifts/extensions, multivariate behaviors, etc.), approaches for defining climate-related management questions, and innovative tools for connecting marine managers with relevant climate information are especially encouraged.Selected presenters may also be asked to contribute to special editions of topical journals.

Abstracts should be submitted electronically via the Meeting web site (**http://moa.agu.org/2013**) with a deadline of February 6^th .If you have any questions about either session, please do not hesitate to contact one of us.

8th International Conference on Coelenterate Biology. 1-5 December 2013, Eilat Israel.

It is our pleasure to announce that the 8th nternational Conference on Coelenterate Biology (ICCB) will be held in Eilat, Israel, from December 1-5, 2013.

The conference will encompass aspects of the biology of all cnidarian groups and ctenophores, including those occurring in pelagic and benthic environments, shallow to deep sea, and freshwater habitats in all regions. Sessions will be devoted to topics ranging from cellular biology, genomics and development, to life histories and reproduction, physiology, pathology, symbiosis and diseases, evolution, biogeography and taxonomy, ecology, and behavior, as well as environmental impacts including global change, toxicity and medical applications. Current and possible future developments in the field will be explored. Our goal is to advance the knowledge on cnidarians, exchange novel findings among peers and students and establish new collaborations.

We are confident that this conference will prove highly attractive, and that Eilat, the meeting's locality, with its splendid reefs and renowned sunny weather, will provide a perfect ambience.

Topics will include (but are not limited to):

- Biodiversity, Systematics and Phylogeny
- Coelenterates and Global change
- Ecology, conservation and Management
- Evolutionary developmental biology and behavior
- Genomics and proteonomics
- Pathogens and diseases
- Physiology, Biomineralization, Neurology
- Reproduction,life cyscles and development
- Symbiosis and coevolution
- Toxicology, nematocysts, biomedicine and culturing

Abstract deadline 15 July 2013

Please check the web page for registration and abstract submission instructions and for more information **www.iccb2013.com**

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International Congress for Conservation Biology Connecting Systems, Disciplines and Stakeholders. Baltimore, Maryland, USA. 21-25 July 2013

The full set of criteria, including submission instructions and guidelines for each proposal type, is available on the Call for Proposals page of the ICCB website (www.conbio.org/2013).

42nd Benthic Ecology Meeting. Georgia Southern University, March 20-23, 2013.

The 42nd Benthic Ecology Meeting will be hosted by Georgia Southern University at the Hyatt Regency Savannah, GA from March 20-23, 2013. The Benthic Ecology Meeting (BEM) is one of the largest scientific meetings for marine biologists in the USA. At the 2013 BEM we anticipate more than 600 registrants; a mix of the nation's top marine ecologists and up-and-coming graduate and undergraduate students.

Following BEM tradition, the 2013 meeting will be a four day event, kicking off with registration and a social Wednesday evening, scientific presentations Thursday - Saturday, and concluding with a Saturday evening banquet. A poster session will be held

Thursday evening, a film festival on Friday evening and a closing banquet on Saturday evening at the Hyatt. The 2013 Benthic Ecology Meeting will accept abstracts for oral presentations on the following
Just a reminder that the deadline for abstract submission and early registration for the 42nd Benthic Ecology Meeting is Feb. 4, 2013.

Session topics:

Anthropogenic Impacts
Behavior
Biodiversity
Chemical Ecology
Community Ecology
Conservation and Management
Ecosystem Functioning
Evolution
Fisheries
Genetic Connectivity and Metapopulations
Introduced Species Life History Strategies
Macroecology
Physical Processes
Physiological and Molecular Ecology
Reef Ecology
Recruitment/Larval Ecology
Restoration
Symbiosis
Trophic Relationships

For more information check out
http://ceps.georgiasouthern.edu/conted/bem.html

Courses

Tropical Training in Taxonomy (TTT). Smithsonian Institution. Panamá.

The Bocas Research Station and the TTT program run a series of courses to train students and biologists interested in biodiversity and taxonomy of tropical marine animals. The training we provide enables them to **(1)** efficiently collect and preserve material for subsequent taxonomic work, **(2)** roughly sort the material correctly to the level of family or genus (depending on the group), **(3)** have the tools to use existing keys or monographs to identify material to species, and **(4)** Learn basic techniques important for research on the biology of each group.
During the course each students becomes familiar with the Caribbean species. These courses also promote development of personal connections between taxonomists in different countries or regions and foster collaborations between scientists in developed and developing countries. These courses focus on groups of organisms that are of particular interest to biologists or that are in urgent need of taxonomic expertise.

2013 courses:

- Larval invertebrate diversity and function
- Systematics and biology of annelids

2014 courses:

- Biology of tropical hydrozoa
- Taxonomy and biology of tunicates
- Taxonomy and Systematics of tropic policlad flatworms

For more information go to:

http://www.stri.si.edu/sites/taxonomy_training/index.html

or contact Dr. Rachel Collins CollinR@si.edu

Fall/Winter Semester Program in the Caribbean. Global Change and Coral Reef Stress. Little Cayman Island, Central Caribbean Marine Institute (CCMI).

One of the most significant issues today revolves around the effects that global climate change will have on our world. This program is a semester-long opportunity for undergraduate students in the sciences and in liberal arts to earn 15 credits in the sciences while also gaining internship and field research experience. Students will be engaged in the ongoing climate-related research at the Central Caribbean Marine Institute's field station in Little Cayman. The field station has recently been awarded a major grant from the National Science Foundation to build a brand new wet laboratory facility to "Enhance the Capacity for Climate Change Research" and students in the program will have the opportunity to work both in the field and in the laboratory during their semester internship.

.- Earn 15 college credits and learn about a topic that is of the highest relevance to science and society

.- Applied Field and Laboratory Experience. Have an Internship at a field station under the mentorship of the faculty

.- Gain experience in the maintenance, calibration, and use of NOAA instruments. Get advanced SCUBA experience and certifications

.- Topics for learning and research include Climate Change including Ocean Acidification and Coral Bleaching, Marine Invasions including Lionfish, Ecological Interactions between major species, EDGE species research, Marine Protected Area and Conservation.

For additional information:
kfoster@reefresearch.org

To Register complete our online-registration form:
http://reefresearch.org

New Books

Sessile and Mobile Organisms from Rocky Shores in the Colombian Pacific: A visual Guide to their Identification. By S.D. Garcia Suárez, A. Acosta, E. Londoño-Cruz and J.R. Cantera.

This guide was recently published and is available for free and in pdf format for those interested. Contact L.A. Acosta **[laacosta@javeriana.edu.co]** Please include your name, institution and correspondence address.

Change of Address

MOVING? To ensure that you continue to receive *Caribbean Marine Science*, notification of upcoming AMLC meetings and other AMLC information, please fill out the following change of address form and mail it to the address below, or send the information by e-mail to Sarah Manuel at the e-mail address below.

Dr. Sarah Manuel
Sarah Manuel, Ph.D.
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Name & Title _____

Institution/Association _____

Address _____

_____

_____

Telephone _____
FAX _____
E-mail_____

Dues

Individual membership dues for 2009-2010 are $25.00 due in June 2009. You can make your payment with Dr. Laurie Richardson (treasurer) or Dr. Aldo Croquer (Membership Director), whom can be contacted by e-mail at: amlc.membershipdirector@gmail.com or at their personal e-mails in page 16. If you attended the Dominica meeting, your membership fee for the two years (2009-2010) was included in the registration fee. If you did not attend the meeting, please remit your dues as discussed here. You may also help AMLC with a donation membership contribution if you wish; the schedule for these is presented below. Student dues are still $5 per year.

The AMLC can accept credit card payments online at www.amlc-carib.org. for AMLC dues. A 5% service charge will be added to credit card payments. Checks must be in U.S. dollars, from U.S. banks (or a U.S. dollars bank draft), made out to "AMLC", and sent to Laurie Richardson (address on next page).

Name & Title

_____

Institution/Association

_____

Billing Address _____

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FAX _____

E-mail_____

Scientific interests _____

_____

Membership Options: Student (US$5.00)_____ Regular (US$25.00)____Sponsor(US$30.00)___ Sustaining Member (US$50.00)_____ and Patron (US$100.00)_____.

My check (bank draft) is enclosed for US$_____ OR Please charge US$_____ to my Visa ( ) Mastercard ( ) (Charge will include an additional 5% to cover handling expense)

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AMLC Background & Goals

The Association of Marine Laboratories of the Caribbean (AMLC) was founded in 1957 by marine researchers with interests in the marine science of the tropical Atlantic and Caribbean. Founded primarily as a scientific organization, the strength of the AMLC lies in the diversity of its member laboratories and the extensive expertise of its membership. Institutional, individual scientist and student memberships are available.

Biannual AMLC scientific meetings are hosted by member laboratories actively conducting marine research in the Caribbean. The host laboratory arranges facilities for research presentations, and logistical arrangements. The AMLC has no designated official language so researchers are free to make their presentations in their native language.

Caribbean Marine Science, published twice per year in English and Spanish, is the newsletter of the AMLC and informs members of AMLC activities, pertinent events, and relevant research.

The purpose of the AMLC is to advance common interest in the marine sciences by:

a. Assisting and initiating cooperative research and education programs
b. Providing for a for exchange of scientific and technical information
c. Fostering personal and official relations among members
d. Publishing the proceedings of scientific meetings and a newsletter

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Contributions to the AMLC Newsletter:

All members of the AMLC (individual and laboratory) are encouraged to send relevant news items at any time, to the newsletter. Relevant news items include, but are not limited to: new facilities, faculty/staff changes, positions available, research programs and initiatives, publications of general interest, awards, visiting scientist opportunities, and education programs. Submitted items should be sent to the AMLC newsletter office by the end of March for inclusion in the Spring-Summer issue, and by the end of October for the Fall-Winter issue.

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Association of Marine Laboratories of the Caribbean
36th Scientific Conference

Managing for Sustainability AND Resilience: Challenges for CZM in the Caribbean

17 - 21 June 2013
Discovery Bay, Jamaica
The University of the West Indies, Mona Campus

The 36th Scientific Conference of the Association of Marine Laboratories of the Caribbean (AMLC) will be hosted by the Discovery Bay Marine Laboratory, University of the West Indies, in Jamaica. The AMLC Scientific Conference is held every 2 years and is attended by international scientists, managers, professionals, and students whose interest is focused on marine resources and the related issues relevant to the greater Caribbean region. Activities include a complete science program, poster exhibits, social events and field trips. A unique feature of this year's meeting will be two **Panel Discussions** that will focus on the secondary themes noted below and involve regional environmental agency managers as well as environmental consultants, scientists and representatives from the private sector. There will be simultaneous English-Spanish interpretation at this meeting.

This meeting seeks to serve as platform to initiate and facilitate the expansion of regional and interdisciplinary collaborations throughout the Caribbean. We welcome submissions relating to marine science in the **Greater Caribbean** region.

Contributions in the following topical areas are encouraged:

Connectivity, including habitat linkages between coral reefs, mangroves and sea grass, larval distribution patterns, spawning aggregations, land-sea interactions, biological oceanography.

Global and Regional Issues, including global warming, regional patterns of coral bleaching and disease, physical oceanography, remote sensing, GIS, coastal processes, natural disturbances, pollution, sedimentation.

Resource Management, including MPAs, ecosystem approaches to coastal management, fisheries, aquaculture, conservation, monitoring and assessment, social economics, public awareness.

Ecology, including ecology, behavior, reproduction, diseases, invasive organisms, food web dynamics, reef resilience, deep coral reefs, species inventories and range extensions, and habitat mapping.

A special attempt will be made to involve Caribbean environmental managers and upper-echelon decision makers in the conference to broaden the scope, future role, and impact of the AMLC in the region. In addition to the above topics, we especially encourage submissions addressing the following issues:

i. The panacea of mitigation in coastal zone development - changing the paradigm of coastal zone management in the Caribbean

ii. Principles of interconnectivity - the true economic and social cost of coastal zone development in Caribbean countries

iii. The challenge of translating scientific knowledge into effective management practices

iv. Trans-boundary marine science as a vehicle for improving International partnerships

v. Coastal Restoration - Caribbean challenges

Other topics will be considered subject to session time limitations.

ABSTRACT SUBMISSIONS

The Association of Marine Laboratories of the Caribbean (AMLC) is now accepting abstract submissions for its scientific meeting scheduled for 17-21 June 2013 in Jamaica. Abstracts may be submitted online; the submission deadline is 30 April 2013.

To submit an abstract, go to AMLC homepage at www.amlc-carib.org and scroll to the bottom of the page to click on "Meeting Information."

Questions, please contact AMLC President and Host Dr. Peter Gayle peter.gayle@gmail.com

We are looking forward to a well attended and very interesting meeting. We hope to see YOU there.