

THE INTERNATIONAL OCEAN CARBON COORDINATION PROJECT (IOCCP)

A joint project of SCOR and IOC and an affiliate program of the Global Carbon Project.

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Ocean Acidification Networked launched by SCOR, IOC, IAEA-MEL, and IGBP

At the first Ocean in a High CO₂ World symposium, participants recognized that ocean acidification and its potential impacts on the marine ecosystem have not been adequately conveyed to the general public, or even to the broader scientific community. Recommendations from the first symposium included several education and outreach activities, including the development of a web-site for the international community to compile information and news. Following this recommendation, the symposium web-page was maintained and the IOCCP ocean carbon directory included information about ocean acidification along with its other news and information resources.

As ocean acidification gains more public attention and we move towards the 2nd Ocean in a High CO₂ World symposium, the sponsors agreed to develop a web-site dedicated to news and information resources on ocean acidification as well as ocean carbon sequestration issues. We are pleased to announce the launch of the Ocean Acidification Network at www.ocean-acidification.net, which we hope you will use as your central news and information source. Currently in the news on this site:

An Ocean Acidification Research Bill Introduced in the US Senate

A bill has been introduced to the US Senate by Senator Frank Lautenberg (D-New Jersey) that would establish an interagency committee to develop an ocean acidification research and monitoring plan and to establish an ocean acidification program within the National Oceanic and Atmospheric Administration.

US Scientists Testify before the Senate Committee on Commerce, Science, and Transportation

May 10th: Scott Doney, Richard Feely, David O'Conover, Lara Hansen, James Watkins, and Gordon Kruse provided testimony on the Effects of Climate Change and Ocean Acidification on Living Marine Resources before a United States Senate Sub-Committee.

Ocean Acidification: Back to the Future

A special session on ocean acidification will be held at the 97th annual meeting of the Geologische Vereinigung in Bremen Germany from 1-5 October. Organizers Jella Bijma and Ulf Riebesell encourage colleagues from fields including geochemistry, marine geology, geobiology, and paleoclimatology to participate and help make this a truly interdisciplinary session. Abstract deadline is June 15.

Scoping Workshop on Ocean Acidification Research

The US Ocean Carbon and Biogeochemistry program is soliciting input towards a workshop to promote collaborative research on Ocean Acidification. This workshop is being organized by Dr. Victoria Fabry and Dr. Chris Langdon.

Comments and recommendations for improving the site should be sent to the sponsors (Maria Hood, Ed Urban, Wendy Broadgate, and Jim Orr).

For more information: www.ocean-acidification.net

The IOCCP Web-Site is Renovated

After four years of accumulating information, maps, tables, documents, powerpoint presentations, images, and news, the IOCCP web-site has been renovated to update and streamline information and navigation. This may require users to update bookmarks to favorite pages. We hope you find the new site easy to use, and we encourage you to send us your comments.

For more information: Visit the web-site at: www.ioccp.org

The Ocean in a High CO₂ World – II : First Announcement

The Scientific Committee on Oceanic Research (SCOR), Intergovernmental Oceanographic Commission (IOC), International Atomic Energy Agency's Marine Environmental Laboratory (IAEA-MEL), and the International Geosphere-Biosphere Programme (IGBP) are convening the second symposium on *The Ocean in a High-CO₂ World* on **6-8 October 2008** in Monaco. The purpose of the meeting is to provide an interdisciplinary forum to assess what is known about ocean acidification and priorities for future research. The symposium will include both invited and contributed presentations. The meeting organizers seek contributions on relevant topics, including the following:

- Scenarios of ocean acidification
- Effects of changes in seawater chemistry on nutrient and metal speciation
- Ocean carbon system from deep-time to the present to the distant future
- Paleo-chemistry
- Mechanisms of calcification
- Impacts on benthic and pelagic calcifiers
- Physiological effects: From microbes to fish
- Adaptation and (micro)evolution
- Fisheries, food webs, and ecosystem impacts
- Biogeochemical consequences and feedbacks to the Earth system

- Economic consequences
- CO2 disposal

The symposium will include plenary presentations, discussion sessions on research priorities, and a poster session. Because of time limitations, most contributed abstracts will be presented as posters. Manuscripts based on presentations at the symposium can be submitted to a special issue of *Biogeosciences* and research priorities will be published separately for the benefit of ocean scientists and research program managers worldwide. Relevant dates include:

31 March 2008	Early registration and abstract submissions open
31 May 2008	Abstract deadline
31 July 2008	Early registration closes
31 August 2008	<i>Biogeosciences</i> opens for submissions to special section on "The Ocean in a High CO ₂ World - II"
6-8 October 2008	The Second Symposium on The Ocean in a High-CO ₂ World
7 November 2008	<i>Biogeosciences</i> closes for submissions to special section

The Planning Committee is chaired by James Orr of the Marine Environment Laboratories (MEL-IAEA) in Monaco and includes the following members: Ken Caldeira (USA), Victoria Fabry (USA), André Freiwald (Germany), Jean-Pierre Gattuso (France), Peter Haugan (Norway), Patrick Lehodey (France), Silvio Pantoja (Chile), Hans-O. Pörtner (Germany), Ulf Riebesell (Germany), and Tom Trull (Australia).

For more information: Visit the Symposium site: www.ocean-acidification.net / The Ocean in a High CO₂ World.

The Surface Ocean CO₂ Variability and Vulnerability Workshop Report Published

On April 11-14, over 100 scientists from 20 countries gathered at the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in Paris to review the current knowledge base and enhance international cooperation to resolve the magnitude, variability and processes governing ocean sources and sinks of carbon, from observations, process-based models and atmospheric and oceanic inversions.

New results were presented for a global air-sea CO₂ flux climatology and detection of decadal variations in oceanic partial pressures of CO₂ (pCO₂). Observations conducted over more than 20 years show the long term pCO₂ increase of surface waters is generally close to the atmospheric CO₂ increase, indicating relatively constant sinks. However, in recent years significant decadal changes in pCO₂ have been observed in some parts of the ocean, e.g. in the North Atlantic and Equatorial Pacific. But while trends can be detected in some areas, for many regions there are still no routine observations. Quantification of the decadal changes of the air-sea CO₂ fluxes has also been improved using atmospheric CO₂ data, especially for the vulnerable Southern Ocean, where oceanic data are sparse.

Following invited talks and poster presentations, the workshop participants broke down into three working groups to address issues of vulnerabilities in the ocean carbon – climate system, observation strategies required to address our largest unknowns, and needs for global and regional synthesis activities.

The workshop resulted in actions for developing joint synthesis papers, establishing a standard and well-documented global surface CO₂ data set, and producing a regular atlas of surface ocean

CO₂. Regional synthesis groups were formed to analyze the underlying causes for variability and vulnerability in the system and to develop plans for a sustained observing system.

This workshop was co-sponsored by the International Ocean Carbon Coordination Project (IOCCP), the Surface Ocean Lower Atmosphere Study (SOLAS), the Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) program, and the Global Carbon Project (GCP), and co-chaired by Bronte Tilbrook (CSIRO) and Nicolas Metzl (CNRS – France).

For more information: [Download the Report](#) (pdf 3.3Mb); [Download the EOS Meeting Summary](#); Visit the [symposium site](#) for poster abstracts, national activity reports, and powerpoint presentations.

Atlantic Ocean Carbon Synthesis Group Homepage Launched

In June 2006, the IOCCP and CarboOcean co-sponsored the Initial North Atlantic Synthesis meeting in Laugarvatn, Iceland, which brought together 23 participants from 9 countries with expertise ranging from hydrography, physical oceanography, surface pCO₂, ocean tracers (CFCs, O₂), numerical modelling and data management to determine the way forward for developing a synthesis of carbon and carbon related data from the Atlantic Ocean.

The meeting identified existing datasets, documented the plans and interests of individual research groups, established collaborations between groups based around key scientific questions, developed agreements on standard methodologies, and developed three working groups:

- North Atlantic (Chair: Are Olsen, Bjerknæs Center for Climate Research, Norway)
- Atlantic (Chair: Toste Tanhua, IFM-GEOMAR, Germany)
- South Atlantic / Southern Ocean (Chair: Mario Hoppema, Alfred Wegener Institute, Germany)

The work of these groups has continued over the last year, and in June of this year, CarboOcean launched a homepage for the group to provide continuous updates on progress, methods, data, and meetings.

For more information: Visit the site at: <http://www.carbon-synthesis.org>

Summary of the Ocean Carbon and Biogeochemistry Summer Workshop

The annual OCB summer workshop was held in Woods Hole, MA on July 23-26, 2007. This workshop provides a venue for researchers working on ocean carbon and biogeochemistry to share their latest work and discuss ways to better coordinate complementary research activities. This year there were between 160 and 180 participants plus others watching the live streaming video of the conference from their office computers. Each day of the meeting was focused around a central theme with a few plenary overview lectures in the morning and afternoon breakout sessions to discuss:

1. What are the key unknowns in this area?
2. What observations and/or modeling studies are needed to improve our understanding?
3. How reliable are current predictions? What are the major barriers to prediction?
4. What information does the scientific community need to provide for policy discussions?

5. How can OCB best contribute to progress in this area?

The first theme for this year was “The interplay between biotic structure and biogeochemical cycles”, with talks by Joe Vallino, Mak Saito, Deborah Bronk and Tatiana Rynearson. The talks covered modeling trophic structure, trace metal biogeochemistry and ocean carbon, the marine nitrogen cycle and plankton biogeography. The second theme was “Changing Ocean Biogeochemistry: The Prediction Challenge” with a strong emphasis on understanding ocean acidification. The speakers were Steve Murawski, Jeremy Blackford, John Dunne and Dave Siegel. The final theme was “Terrestrial / coastal ocean cross-boundary fluxes” with Arthur Chen, Walter Oechel, Sybil Seitzinger and Ajit Subramaniam speaking. The final half day of the workshop was devoted to a discussion of OCB priorities and how this US national program can best address the needs of the community.

For more information: Visit the OCB web-site at: <http://www.us-ocb.org/>.

Input solicited for OceanSensors08

An international workshop for marine scientists and sensor developers will be held from 7-11 April 2008 in Warnemunde, Germany.

Several national and international programs are presently developing advanced observing systems, which will eventually provide key environmental information on regional to global scales. Further, a variety of in situ platforms and enabling technologies are now quite well developed. These include moorings, profiling floats, AUV's, gliders, drifters, ships-of-opportunity, ferries-of-opportunity, and nodes attached to electromagnetic and fiber-optic cables.

However, only a limited number of chemical, biological, optical, video, acoustical, and meteorological sensors can presently be deployed from these platforms. Some of the current limitations include: lack of fundamental sensing technologies for key variables or rate measurements, biofouling of sensors and systems, power, data transmission bandwidth, durability in extreme atmospheric and oceanic conditions (i.e., hurricanes, typhoons, ice), reagent aging, size, and drag.

OceanSensors08 will address these challenges along with the clear and growing needs to develop, test, and proliferate large numbers of new multi-disciplinary oceanographic sensors and systems. The workshop is divided in four areas: Climate, Ecosystems, Hazards, and Cross-cutting issues and emerging technologies.

The conveners, Ralf Prien, Tommy Dickey, and Gwyn Griffiths, invite the community to provide input into the program and agenda.

For more information: Visit the workshop site at: <http://www.oceansensors08.org/>