

## **6.0 RELATIONS WITH INTERGOVERNMENTAL ORGANIZATIONS**

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## **6.0 RELATIONS WITH INTERGOVERNMENTAL ORGANIZATIONS**

### **6.1 Intergovernmental Oceanographic Commission**

The two organizations have a variety of joint projects that have been discussed under previous agenda items, including

- Global Ocean Ecosystem Dynamics (GLOBEC) Project
- Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB) Program
- International Ocean Carbon Coordination Project (IOCCP)
- Symposium on the Ocean in a High-CO<sub>2</sub> World

Bjørn Sundby attended the IOC General Assembly in June 2009 to represent SCOR, as the meeting dates were changed after Ed Urban and Wolfgang Fennel had made other plans for the meeting week. Sundby note that SCOR was well represented at the meeting, with Trevor McDougall giving the Bruun Memorial Lecture and Venu Ittekkot giving the Pannikaar Memorial Lecture.

### **6.2 North Pacific Marine Science Organization (PICES)**

#### **SCOR and PICES: Continuing Connections Report at the 2009 SCOR Executive Committee Meeting October 20–22, 2009 Beijing, People's Republic of China**

The North Pacific Marine Science Organization (PICES) is an intergovernmental scientific organization and its current membership includes Canada, Japan, People's Republic of China, Republic of Korea, the Russian Federation, and the United States of America. The Organization was established in 1992 to: (i) promote and co-ordinate marine scientific research in the northern North Pacific and adjacent marginal seas; (ii) advance scientific knowledge about the ocean environment, global weather and climate change, living resources and their ecosystems, and the impact of human activities on them; and (iii) promote the collection and rapid exchange of scientific information on these issues. Information on the Organization and its activities can be found on the PICES website at <http://www.pices.int>.

Continuing and extending collaboration between SCOR and PICES is based on the recognition that PICES could play an important role in bringing a North Pacific perspective to the global activities of SCOR, and that by participating in these activities, PICES could advance its own scientific agenda. PICES contributes to SCOR-sponsored international large-scale ocean research projects, to Ocean Carbon activities supported by SCOR, and several SCOR Working Groups. Drs. Wolfgang Fennel (President of SCOR) and Ed Urban (Executive Director of

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SCOR) are planning to attend the 2009 PICES Annual Meeting (October 23–November 1, 2009, Jeju, Republic of Korea) as observers to discuss ongoing and future collaborations between the two organizations. This report covers the period from the 2008 SCOR General Meeting (October 22-24, 2008, Woods Hole, U.S.A.) to the present.

### **LARGE-SCALE OCEAN RESEARCH PROGRAMS CO-SPONSORED BY SCOR**

By the invitation from SCOR, PICES was present at the Third SCOR Project Summit (March 30-April 1, 2009, Newark, DE, U.S.A.). The purpose of the meeting was to bring together representatives from large-scale international ocean research projects and organizations that sponsor such projects, to discuss common opportunities and challenges. Dr. Michael Dagg (PICES Biological Oceanography Committee Chairman) informed the participants on the level of interaction between PICES and SCOR-supported ocean research projects and, after the summit completion, reported to PICES on expectations by projects from intergovernmental organizations.

### **Global Ocean Ecosystem Dynamics project (GLOBEC)**

- The PICES Climate Change and Carrying Capacity (CCCC) Program provides a mechanism for integrating national GLOBEC research programs in the North Pacific and is a regional component of the international GLOBEC effort.
- Dr. Manuel Barange (GLOBEC Executive Director) attended the 2008 PICES Annual Meeting (October 2008, Dalian, China) as an observer, and briefed the CCCC Executive Committee on: (1) plans for the 2009 GLOBEC Open Science Meeting, (2) GLOBEC's synthesis and integration efforts, and (3) discussions within a GLOBEC-IMBER Transition Task Team on a way forward for international marine ecosystem science after the completion of GLOBEC. GLOBEC will be also present as an observer at the 2009 PICES Annual Meeting.
- Results from the CCCC Program will be included in several chapters of the GLOBEC Synthesis Book to be published in 2010. A special issue of *Progress in Oceanography* resulted from the PICES/GLOBEC Symposium on "*Climate variability and ecosystem impacts on the North Pacific: A basin-scale synthesis*" and published in June 2008 (Vol. 77, Nos. 2–3, pp. 83–268; Guest Editors: H. Batchelder and S. Kim) (April 19–21, 2006, Honolulu, U.S.A.) is also considered as a part of GLOBEC synthesis effort.
- PICES co-sponsored the Third GLOBEC Open Science Meeting (June 22–26, 2009, Victoria, Canada) by (1) providing travel support for invited speakers from the Pacific (\$10,000) and for early career scientists from PICES member countries (\$5,000), and (2) assisting in local arrangements for this event held at the location of the PICES Secretariat.
- PICES scientists were very active in submitting proposals for, convening and attending topical workshops held in conjunction with the Third GLOBEC Open Science Meeting. Brief reports from seven of these workshops were published in the July 2009 issue of PICES Press.

- Selected papers on krill presented at the Fourth International Zooplankton Production Symposium on “*Human and climate forcing of zooplankton populations*” held May 28–June 1, 2007, in Hiroshima, Japan, and co-sponsored by PICES, GLOBEC and ICES, will be published in 2009 as a special issue of *Deep-Sea Research II* (Guest Editors: W. Peterson and S. Kawaguchi).

#### **Ecosystem Studies of Subarctic Seas (ESSAS)**

- PICES and ESSAS, a regional program initiated by GLOBEC in 2005, share the goal of developing comparative studies of the sub-arctic seas and understanding how climate variability affects their productivity and ability to support sustainable commercial and subsistence harvests.
- Drs. Kenneth Drinkwater and George Hunt (ESSAS SSC Co-Chairmen) attended the 2008 PICES Annual Meeting as observers to (1) brief PICES Standing Committees on ESSAS activities for the past year and those planned for 2009–2010, and (2) discuss approaches for collaboration between ESSAS and PICES after the completion of GLOBEC. ESSAS and its U.S. component for the Bering Sea (BEST) had posters at PICES-2008 outlining general information and highlighting scientific objectives and recent activities of both projects. ESSAS and BEST will be also present as observers at the 2009 PICES Annual Meeting.
- Two joint PICES/ESSAS workshops on “*Status of marine ecosystems in the sub-arctic and arctic seas –Preliminary results of IPY field monitoring in 2007 and 2008*” and “*Marine ecosystem model intercomparisons*” were convened at the 2008 PICES Annual Meeting. The second phase of the workshop on “*Marine ecosystem model inter-comparisons*” will be held at the 2009 PICES Annual Meeting.
- By the request from ESSAS, PICES supported Dr. Enrique Curchitser, a member of PICES Working Group on *Evaluation of Climate Change Projections* to attend the 2009 ESSAS Annual Meeting (June 15–21, 2009, Seattle, U.S.A.).
- PICES agreed to provide organizational support for the ESSAS Open Science Meeting tentatively scheduled for June 2011 in Seattle, U.S.A. This support will include: maintaining the OSM website, handling on-line registration and abstract submission, compiling the book of abstracts, and arranging the logistics for the venue.

#### **Integrated Marine Biogeochemistry and Ecosystem Research (IMBER)**

- Issues of marine biogeochemistry and food webs are important components of the new integrative scientific program of PICES, FUTURE (Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Ecosystems). Interest was expressed by IMBER in inviting FUTURE to become a Contributing Project to IMBER and developing an MOU in this regard. This proposal will be discussed at the 2009 PICES Annual Meeting.
- IMBER was represented as an observer (by Dr. Hiroaki Saito, IMBER SSC member) at the 2008 PICES Annual Meeting and had a poster at this meeting outlining general

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information and highlighting scientific objectives and recent activities of the project. IMBER will be also represented as an observer (by Dr. Sinjae Yoo, IMBER SSC member) at the 2009 PICES Annual Meeting.

- IMBER co-sponsored the Topic Session on “*End-to-end foodwebs: Impacts of a changing ocean*” at the 2008 PICES Annual Meeting and agreed to co-sponsor (by supporting an additional invited speaker) the Topic Session on “*Outlooks and forecasts of marine ecosystems from an earth system science perspective: Challenges and opportunities*” to be convened at the 2009 PICES Annual Meeting.

### Surface Ocean-Lower Atmosphere Study (SOLAS)

- The main research area for collaboration between PICES and SOLAS has been impact of iron on biogeochemistry and marine ecosystems. PICES, through its Advisory Panel on the *Iron Fertilization Experiment in the Subarctic Pacific Ocean* (IFEP-AP; 1999–2007), and now through Working Group on *Iron Supply and its Impact on Biogeochemistry and Ecosystems in the North Pacific Ocean* (WG-22; 2007–present), has long been acting as a regional coordinator for these activities.
- Three international meso-scale iron enrichment experiments in the Subarctic Pacific were developed under the umbrella of IFEP-AP, and conducted between 2001 and 2004. The results of the first two experiments, **S**ubarctic **P**acific **I**ron **E**xperiment for **E**cosystem **D**ynamics **S**tudy (SEEDS-I) and **S**ubarctic **E**cosystem **R**esponse to **I**ron **E**nrichment **S**tudy (SERIES), were published in special issues of *Progress in Oceanography* (2005, Vol. 64, Nos. 2–4, pp. 91–324) and *Deep-Sea Research II* (2006, Vol. 53, Nos. 20–22, pp. 2005–2454), respectively. A special issue of *Progress in Oceanography* (Guest editors: A. Tsuda, M. Wells, M. Uematsu and H. Saito) from the SEEDS-II experiment will be published in 2009.
- It is expected that PICES Working Group on *Iron Supply and its Impact on Biogeochemistry and Ecosystems in the North Pacific Ocean* will work closely with various expert groups on ocean fertilization, including SOLAS Implementation Group 1 on *Biogeochemical Interactions and Feedbacks between Ocean and Atmosphere* and SCOR Working Group 131 on *The Legacy of in situ Iron Enrichment: Data Compilation and Modeling*.
- PICES was present as an observer at the inter-sessional technical Working Group meeting on ocean fertilization in the framework of the London Convention and Protocol in February 2009.
- SOLAS was represented as an observer (by Dr. Shigenobu Takeda, SOLAS SSC member) at the 2008 PICES Annual Meeting and had a poster at this meeting outlining general information and highlighting scientific objectives and recent activities of the project. SOLAS will be also present as observers at the 2009 PICES Annual Meeting.
- SOLAS was invited and agreed to co-sponsor (by supporting an additional invited speaker) the workshop on “*Natural supplies of iron to the North Pacific and linkages between iron supply and ecosystem responses*” to be convened at the 2009 PICES Annual Meeting.

**Global Ecology and Oceanography of Harmful Algal Blooms Program (GEOHAB)**

- Responding to interest in sharing information from active science and management HAB programs in each of its member countries, and to achieve the appropriate level of coordination and collaboration among these countries, PICES established, in 2003, a Section on *Ecology of Harmful Algal Blooms in the North Pacific*. Through this Section, PICES is collaborating with various international HAB programs, including GEOHAB and IPHAB (UNESCO-IOC International Panel on Harmful Algal Blooms).
- Since 2005, the PICES HAB Section has been convening an annual series of workshops, “*Review of selected harmful algae in the PICES region*”, to document the existing knowledge on the eco-physiology of HAB species that impact all, or most, countries in the North Pacific. The previous workshops, held in conjunction with PICES Annual Meetings, focused on *Pseudo-nitzschia* and *Alexandrium* (2005, Vladivostok, Russia), *Dinophysis* and *Cochlodinium* (2006, Yokohama, Japan), *Heterosigma akashiwo* and other harmful raphidophytes (2007, Victoria, Canada), and *Karenia* and *Prorocentrum* (2008, Dalian, China). The 2009 workshop will focus on cyst forming HAB species. These workshops are preceded by a ½-day or 1-day laboratory demonstrations on cell and toxin identification and detection methods/technique. We intend to continue this series, and GEOHAB is invited to play an active role in the future workshops.
- A Topic Session on “*Species succession and long-term data set analysis pertaining to harmful algal blooms*” was held at the 2008 PICES Annual Meeting, and a Topic Session on “*Mitigation of harmful algal blooms*” will be convened at the 2009 PICES Annual Meeting. Both sessions are directly related to GEOHAB activities.
- In June 2005, IOC and PICES signed a formal agreement to establish a partnership in systematically compiling, storing and presenting on-line, records on harmful algal events. A similar agreement was also signed between IOC and ICES. Event records are compiled and stored annually in the format specified in the **Harmful Algal Event Database (HAE-DAT)**. The HAE-DAT partnership is open to other appropriate and complementary regional organizations so as to achieve global coverage of HAE-DAT. Building a common data resource allows inter-comparison of HAB species composition and the magnitude of their environmental and economic impacts.

**OCEAN CARBON ACTIVITIES SUPPORTED BY SCOR**

**International Ocean Carbon Coordinated Project (IOCCP)**

- IOCCP is working on establishing international agreements on observation methods, best practices, data management, and data sharing that will lead to the joint development of global data products and synthesis activities documenting the ocean carbon cycle. PICES, through its Working Groups on *CO<sub>2</sub> in the North Pacific* (WG-13; 1998–2001) and *Biogeochemical Data Integration and Synthesis* (WG-17; 2002–2005), and now through the Section on *Carbon and Climate* (CC-S; 2006–present), has been long acting as a regional coordinator for these activities. The Section on *Carbon and Climate* provides

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clear channels of communication to IOCCP, and to large-scale IGBP programs such as SOLAS and IMBER.

- PICES and IOCCP co-sponsored the publishing of the “*Guide to best practices for ocean CO<sub>2</sub> measurements*”, as PICES Special Publication No. 3 and IOCCP Report No. 8 (Eds. A.G. Dickson, C.L. Sabine and J.R. Christian), in December 2007. The guide is available on-line from the CDIAC (Carbon Dioxide Information Analysis Center) Ocean CO<sub>2</sub> Program web-site in individual chapters or as a whole electronic document, and hardcopies are also available upon request from PICES and CDIAC. To increase the use of the Guide, volunteers are being sought to assist with translations of the Guide to languages other than English.
- IOCCP maintains the ocean acidification network website and assisted with the implementation of the SCOR/IOC/IAEA/IGBP International Symposium on “*The ocean in a high CO<sub>2</sub> world – II*” (October 6–8, 2008, Monaco). By the invitation of the organizers, PICES convened, jointly with ICES, a Theme Session on “*The effects of ocean acidification on fisheries and ecosystems*” at this symposium.
- One of major activities for the Section on *Carbon and Climate* is to create a synthesized database of water-column CO<sub>2</sub>-related parameters for the Pacific that has gone through a 2nd-level quality assessment (*i.e.*, corrections for the offset in parameters among cruises or stations by cross-over analysis, MLR analysis, internal consistency, etc.). A 2-day workshop on “*Carbon data synthesis*” to be held at the 2009 PICES Annual Meeting will be a major step forward in the implementation of this project.
- A special section resulted from the PICES-2007 Topic Session on “*Decadal changes in carbon and biogeochemical systems in the North Pacific*” was published in a regular issue of *Journal of Oceanography* in 2009.
- A Topic Session on “*Anthropogenic perturbations of the carbon cycle and their impacts in the North Pacific*” will be convened at the 2009 PICES Annual Meeting. This session is directly related to IOCCP activities.
- IOCCP will be represented as an observer (by Dr. Christopher Sabine, IOCCP SSC Chairman) at the 2009 PICES Annual Meeting and will address relevant PICES expert groups on potential areas for cooperation between IOCCP and PICES.

### SCOR WORKING GROUPS

#### **Working Group 125 on Global Comparisons of Zooplankton Time Series**

PICES strongly supported the formation of SCOR Working Group 125 on *Global Comparisons of Zooplankton Time Series* and agreed to provide funding for an Associate Member from the North Pacific (Dr. Harold P. Batchelder, Oregon State University, U.S.A.) to participate in its activities. Two meetings of SCOR WG 125 were held in conjunction with symposia co-organized by PICES, the 4th International Zooplankton Production Symposium on “*Human and climate forcing of zooplankton populations*” (May 2007, Hiroshima, Japan) and the International Symposium on “*Effects of climate change on the world’s oceans*” (May 2008, Gijón, Spain). This Working Group also convened a workshop on “*Zooplankton and climate: Response modes*

and linkages among regions, regimes, and trophic levels” in conjunction with the last Symposium.

**Working Group 131 on *The Legacy of in situ Iron Enrichment: Data Compilation and Modeling***

Activities of PICES Working Group 22 on *Iron Supply and its Impact on Biogeochemistry and Ecosystems in the North Pacific Ocean* are closely linked to the mandate of SCOR Working Group 131 on *The Legacy of in situ Iron Enrichment: Data Compilation and Modeling* to compile a database for open access of the completed iron-enrichment experiments. PICES is prepared to consider co-sponsoring a joint meeting of these groups to work out the details of bringing together the data sets in a way that will make preparation of the database possible.

**Proposed Working Group on *Patterns of Phytoplankton Dynamics in Coastal Ecosystems: Comparative Analysis of Time Series Observation***

PICES strongly supported the establishment of a proposed SCOR Working Group on *Patterns of Phytoplankton Dynamics in Coastal Ecosystems: Comparative Analysis of Time-Series Observations*. Analysis of long-term data sets has provided the basis for many important insights into the changes occurring in marine systems and, as the proposal indicates, there are many phytoplankton data sets from diverse parts of the globe that warrant a comparative examination. This examination will undoubtedly supply important information on teleconnections and other complex mechanisms operating in today’s changing ocean climate. It is expected that the suggested analyses will greatly improve our understanding of marine responses to climate change, natural or anthropogenic. The proposed Working Group is a logical methodological continuation of SCOR WG 125 and, if this Working Group is approved, PICES will nominate and support an Associate Member to serve on the group (Dr. Sinjae Yoo, Korea Ocean Research and Development Institute, Republic of Korea).

**Proposed Working Group on *Coupled Climate-to-Fish-to-Fishers Models for Understanding Mechanisms Underlying Low Frequency Fluctuations in Small Pelagic Fish***

PICES expressed strong interest in the establishment of a proposed SCOR Working Group on *Coupled Climate-to-Fish-to-Fishers Models for Understanding Mechanisms Underlying Low Frequency Fluctuations in Small Pelagic Fish*. The activities of this Working Group will complement the effort of the joint PICES/ICES Working Group on *Forecasting Climate Change Impacts on Fish and Shellfish* (WG-FCCIFS) established in 2008

([http://www.pices.int/members/working\\_groups/WG-FCCIFS/](http://www.pices.int/members/working_groups/WG-FCCIFS/)). WG FCCIFS is taking a global view of assessing the impacts of climate change on fish and shellfish. The focused efforts of the new SCOR Working Group will provide valuable information on the mechanisms underlying the response of small pelagic fish to changing climatic and oceanographic conditions. Knowledge of these mechanisms will form a basis for forecasting responses of these valuable fish resources to global warming. It will be important to have strong links between SCOR Working Group on small pelagics and WG-FCCIFS. As evidence of our support, PICES is prepared to finance an



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Associate Member to be, most likely, selected from the list of recommended Associate Members included in the Working Group proposal.

### **SCOR TRAVEL GRANTS**

PICES is very grateful for the continuing support from SCOR for scientists from countries with “economies in transition” to attend SCOR-relevant sessions/workshops at PICES Annual Meetings and international symposia initiated/co-organized by PICES. This year, SCOR provided a total of US\$10,000 for two events, the 2009 PICES Summer School on “*Satellite Oceanography for the Earth Environment*” (August 25–28, Seoul, Republic of Korea) and the 2009 PICES Annual Meeting (October 23–November 1, Jeju, Republic of Korea).

The following two requests are submitted for consideration of the SCOR Executive Committee for 2010:

- Travel support at the level of US\$5,000–7,500 is requested for scientists from countries with “economies in transition” from the Pacific Rim to attend SCOR-relevant sessions/workshops at the 2010 PICES Annual Meeting to be held October 22–31, 2010, in Portland, U.S.A., under the theme “*North Pacific Ecosystems Today, and Challenges in Understanding and Forecasting Change*”. The scientific program for this event will be finalized in October 2009 at PICES-2009.
- Travel support at the level of US\$5,000–7,500 is requested for early career scientists from countries with “economies in transition” to attend the international symposium on “*Climate Change Effects on Fish and Fisheries: Forecasting Impacts, Assessing Ecosystem Responses, and Evaluating Management Strategies*” to be held April 26–29, 2010, in Sendai, Japan (<http://www.pices.int/climatechange2010.aspx>). This symposium will provide a forum for scientists and policymakers to discuss the potential impacts of climate change on marine ecosystems and our uses of these ecosystems, and to consider the strategies that society can take to be prepared for anticipated impacts. An important product of the symposium will be a special issue of a peer-reviewed journal scheduled for publication in 2011, within the time-frames required for consideration by the Fifth Assessment of the Intergovernmental Panel on Climate Change (IPCC).

### 6.3 International Council for the Exploration of the Sea (ICES)



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Revised on 29 June 2009

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#### ICES Report on International Cooperation 2009

ICES international activities have two dimensions: international cooperation among institutions from the 20 member countries and cooperation of the ICES community with other international organizations/networks. The latter has recently, among others, been centred around the following issues:

- Climate change and impacts on ecosystems and fisheries: ICES and PICES have established a Joint Working Group on Forecasting Climate Change Impacts on Fish and Shellfish (WGFCCIFS) in order to develop forecasting abilities. A Working Group on Operational Oceanographic Products for Fisheries and Environment (WGOOFE) was established to develop service capacities for users of operational products from ecosystem observation. ICES has nominated experts to contribute to the 2012 Assessment Report (AR5) of the International Panel for Climate Change (IPCC). At the Annual Science Conference (ASC) 2009 to be held in Berlin, Germany, there are in total five theme sessions directly focused on climate and ocean change and the applied aspects for fisheries and environmental management;
- Arctic ecosystems: ICES has participated in the 2009 Arctic Science Summit Week in Bergen, Norway, and may serve on the panel of cooperating organizations for the Arctic Ocean Science Board (AOSC) which is developing into the Marine Science Standing Committee of the International Arctic Science Committee (IASC);
- Operational observations and modelling: cooperation with the Global Ocean Observation system (GOOS) is continuing (e.g. ICES-IOC Steering Group on GOOS). For developing ICES capacities in this field, see WGOOFE above;
- European Maritime Policy: ICES has become a key player in implementing the European Commission's Blue Book "An Ocean of Opportunity - an Integrated Maritime Policy for the European Union". This process includes creation of a strong marine/maritime science component within the created European Research Area and implementation of the European Strategy for Marine and Maritime Research which is to strengthen links between ICES and international innovation and industry organizations (e.g. European Aquaculture Technology and Innovation Platform, Waterborne Technology Platform).

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Other major international cooperation activities in 2009 include:

- Dynamics modelling, operational forecasting (ICES-IOC Working Group on Harmful Algal Bloom Dynamics);
- Fisheries technology (ICES/FAO Working Group on Fishing Technology and Fish Behaviour);
- Joint symposia and scientific conferences:
- A European Marine Sand and Gravel Group Conference (May 2009, Rome, Italy);
- A 2009 International Nutrients Scale System International Workshop (February 2009, UNESCO Headquarters in Paris, France);
- An ICES Symposium on Issues Confronting the Deep Oceans (April 2009, Azores, Portugal);
- An ICES-GLOBEC Symposium on “Marine Ecosystems: from function to prediction” (June 2009, Victoria, British Columbia, Canada);
- The Sixth International Conference on Marine Bioinvasions (August 2009, Portland, Oregon, USA);
- A Cephalopod International Advisory Council symposium on “The Effects of Environmental Variability on Cephalopod Populations” (September 2009, Vigo, Spain);
- An ICES Symposium on Rebuilding Depleted Fish Stocks - Biology, Ecology, Social Science and Management Strategies (November 2009, Warnemünde/Rostock, Germany).

## **6.4 Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP)**

### **First Meeting of GESAMP Working Group 38 The Atmospheric Input of Chemicals to the Ocean Tucson, Arizona, USA 10-14 December 2008**

The first meeting of the United Nations GESAMP Working Group 38, The Atmospheric Input of Chemicals to the Ocean, took place at the University of Arizona, Tucson, Arizona, USA from 10-14 December 2008. This meeting was organized and supported by the Global Atmosphere Watch (GAW) and the World Weather Research Programme (WWRP) of the World Meteorological Organization (WMO), with additional support from the ICSU Scientific Committee on Oceanic Research, the International Maritime Organization (IMO), the Swedish

International Development Agency, and the University of Arizona Working Group 38 was formed to address the following Terms of Reference:

- 1) Assess the need for the development of new model and measurement products for improving our understanding of the impacts of the atmospheric deposition of nitrogen species and dust (iron) to the ocean;
- 2) Review the present information on the atmospheric deposition of phosphorus species to both the marine and terrestrial environments, considering both natural and anthropogenic sources, and evaluate the impact of atmospheric phosphorus deposition on marine and terrestrial ecosystems. Consider whether such a review of any other substance would be useful.
- 3) Work with the WMO Sand and Dust Storm Warning and Assessment System and with the WMO Precipitation Chemistry Data Synthesis and Community Project to evaluate the needs of the marine community and assist in clearly articulating them in the development of these WMO efforts

During the meeting the Working Group addressed these three charges in detail. Charges 1) and 2) were addressed by gathering information for three separate papers that the working group is writing in the areas of phosphorus, nitrogen, sulfur, iron and organic matter deposition from the atmosphere to the ocean. The tentative titles of these three papers are

- “The Shifting Importance of Limiting Nutrients in the Surface Oceans”
- “SO<sub>2</sub>, NO<sub>x</sub> and their Impact on Ocean Acidification”
- “Atmospheric Organic Material and the Nutrients it Carries to the Ocean”

Three subgroups were formed to address these three topics, and detailed outlines and responsibilities for various parts of these documents were made. The co-authors of these 3 papers are working throughout 2009 gathering all the data and information necessary to complete the papers, with draft sections being written in this inter-sessional period. Working Group 38 will meet again during the week of January 11, 2010 at IMO in London to complete the discussions and prepare the papers for publication. Drafts of the papers will be available in London.

Charge 3) was addressed by the development during the meeting of two letter reports, including recommendations. These letter reports addressed the issues outlined in Charge 3) and were reviewed by GESAMP and submitted by GESAMP to WMO in April 2009.

GESAMP sincerely thanks SCOR for its support for this meeting of GESAMP Working Group 38, and we will continue to keep you informed of its activities.