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7.1 International Council for Science (ICSU)

7.1.1 International Geosphere-Biosphere Programme (IGBP)

Fennel



Wendy Broadgate, Deputy Director, Natural Sciences, IGBP

IGBP and SCOR have strong collaboration, co-sponsoring two major international projects IMBER and SOLAS as well as jointly sponsoring several IGBP Fast Track Initiatives and a SCOR Working Group. IGBP, SCOR and IOC are together sponsoring the Third Oceans in a High-CO₂ World symposium, in Monterey, California, 24-27 September 2012. The symposium is expected to attract 500 ocean acidification experts and will include discussions on the economics and management implications of ocean acidification.

Below are some other short updates from IGBP.

Planet Under Pressure

The London conference (26-29 March), sponsored by the global-change programmes and the International Council for Science (ICSU), attracted 3000 scientists, decision makers, business representatives, journalists and others; well above the expected 2500. Over 400 articles in the mainstream media have been published worldwide in over 20 languages and the conference still reverberates in the media, online discussions and policy circles. A key outcome was the publication of the first State of the Planet Declaration. 150 science and technology centers for the public and schoolchildren worldwide held Planet Under Pressure related events reaching a further 12,000 people.

The UN Secretary General Ban Ki-moon addressed the conference via video: "I welcome the State of the Planet declaration issued today by the Co-chairs of this conference. Its timing, two months before the UN Conference on Sustainable Development, could not be better. Rio+20 is a major opportunity to advance the policy science interface."

Planet Under Pressure marks a turning point in international Earth-system research towards a focus on global sustainability. The new Future Earth initiative, mentioned elsewhere in this bulletin, was discussed intensely during the conference. The conference also hosted the first major science-policy dialogue on the concept of new universal sustainable development goals. This World Cafe was one of many participatory sessions under the banner "Bridges to the Future".

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Catch some of conference highlights:

Presentations on you tube: <http://www.youtube.com/user/PlanetUnderPressure?feature=watch>
www.planetunderpressure2012.net

Future Earth

Following successful dialogues at the Planet Under Pressure conference, the Future Earth initiative was officially launched at the UN's Rio+20 summit, 20-22 June. The initiative aims to bring together IGBP, DIVERSITAS and the International Human Dimensions Programme under one umbrella, Future Earth: research for global sustainability. Currently, it is planned that the World Climate Research Programme will have observer status in the new initiative. Plans are underway to have an interim Future Earth governing body in place by the beginning of 2013 and a secretariat by mid-2014.

More information: <http://www.icsu.org/future-earth/>

Welcome to the Anthropocene: 700,000 hits

As part of the Planet Under Pressure conference's outreach strategy IGBP and partners launched a beta version of the first educational website on the Anthropocene. www.anthropocene.info. The site also includes a three-minute data visualization of the Anthropocene that has gone viral with over 700,000 hits to date. More interactive content will be developed in the next 12 months.

3-minute film, Welcome to the Anthropocene: <http://vimeo.com/39048998>

Anthropocene: the geology of humanity

The latest issue of Global Change is now out featuring articles on the Anthropocene (by new IGBP chair James Syvitski), urbanization and the re-insurance industry.

<http://www.igbp.net/news/features/features/anthropoceneanepochofourmaking.5.1081640c135c7c04eb480001082.html>

PAGES perspectives newsletter

The latest issue of the PAGES newsletter, co-edited by IGBP science editor Ninad Bondre, is a departure from the past (no pun intended). Each palaeo-centric article is complemented by an article with a current or future perspective.

<http://www.pages-igbp.org/news/523-latest-pages-newsletter/523-latest-pages-newsletter>

7.1.2 World Climate Research Programme (WCRP)

Wainer

WCRP update for SCOR GM 2012

This document presents to SCOR an update on WCRP research on the role of ocean in climate. More information on WCRP activities is available from the renewed WCRP Web site (<http://www.wcrp-climate.org>) and the Climate Variability and Predictability (CLIVAR) project Web site (<http://www.clivar.org>).

WCRP Open Science Conference and Strategic Planning

WCRP organized the very successful Open Science Conference entitled “Climate Research in Service to Society” that was held in Denver, USA, in October 2011 and attracted more than 1900 scientists and stakeholders, many of them oceanographers, from 86 countries. An important message from speakers at the conference was the need for actionable science.

Based on the outcomes of the OSC, the WCRP JSC identified the scientific and programmatic challenges for the next decade for the WCRP to be: (1) prediction of the Earth System bridging the physical climate system with biogeochemistry, the social sciences, and human dimensions; (2) making use of the opportunity, provided by new satellite observations, to make a quantum leap in understanding of clouds and aerosols and their contributions to climate sensitivity; (3) skillful climate information on regional scales, embodying the so-called “seamless prediction” paradigm; (4) quantifying uncertainty in climate predictions; (5) predicting how natural modes of climate variability will modify the “forced” anthropogenic component of climate change over the coming years to decades; (6) determining the predictability of polar climate, especially given the potential opening of the Arctic and international negotiations regarding increased commercial traffic for shipping and extraction of natural resources; (7) understanding the causes of extreme events, and enabling attribution studies in near real-time; (8) improving predictions and assessments of future sea-level variability and change on regional scales, which will require knowledge of not only cryospheric and thermospheric contributions but also how gyre circulations, storm tracks, and tidal amplitudes will change; and (9) training and empowering the next generation of climate scientists from all regions of the world.

In addition, the Joint Scientific Committee (JSC) of WCRP considered current grand challenges for the Programme. A Grand Challenge is a highly specific barrier preventing progress in a critical area of climate science that enables the development of targeted research efforts with the likelihood of significant progress over 5-10 years, and with measurable performance metrics. A Grand Challenge should bring the best minds to the table, building and strengthening communities of innovators that are collaborative and, perhaps, extending beyond “in-house expertise”. It can capture the public’s imagination: teams of world-leading scientists working to solve pressing challenges can offer compelling storylines to capture the interest of media and the public. The list of WCRP Grand Challenges is given below:

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- Provision of skilful future climate information on regional scales (including decadal and polar predictability)
- Regional Sea-Level Rise
- Cryosphere response to climate change (including ice sheets, water resources, permafrost and carbon)
- Improved understanding of the interactions of clouds, aerosols, precipitation, and radiation and their contributions to climate sensitivity
- Past and future changes in water availability (with connections to water security and hydrological cycle)
- Science underpinning the prediction and attribution of extreme events

Avenues of addressing them were discussed at the JSC 33rd Session in Beijing, China (16-20 July 2012).

WCRP is working closely with its sister programmes such as the International Geosphere–Biosphere Programme, the International Human Dimensions Programme for Global Change Research, and other Global Environmental Change research programmes to assist ICSU with its future visioning and programme planning for environmental research and applications. This process is likely to result in some major reorganization of the global change research coordination activities sponsored under the auspices of ICSU. The new 10-year international research initiative "Future Earth – research for global sustainability" will focus on the knowledge for responding effectively to the risks and opportunities of global environmental change and for supporting transformation towards global sustainability in the coming decades. WCRP has three Sponsors, and its goal in the coming years will be to contribute significantly and strategically to main initiatives of these Sponsors, namely to the Research, Modelling and Prediction Pillar of the Global Framework for Climate Services, closely associated with WMO, to the "Future Earth", closely associated with ICSU, and the High-level objective "Mitigation of the impacts of and adaptation to climate change and variability" and sustained ocean observation initiatives of IOC of UNESCO.

WCRP and SCOR

WCRP and SCOR Secretariats work in close contact. The current scope of cooperation between the WCRP and SCOR involves joint co-sponsorship of the SOLAS Project, SCOR/WCRP/IAPSO Working Group 136 on Climatic Importance of the Greater Agulhas System that is organizing a Chapman Conference on its subject (with the support of AGU, on 8-12 October 2012 at Stellenbosch, Western Cape, South Africa), and the Global Ocean Ship-based Hydrographic Investigations Program (GO-SHIP) cosponsored by the IOC-SCOR International Ocean Carbon Coordination Project (IOCCP) and CLIVAR. WCRP and SCOR cosponsored the second IOC/ICES/PICES International Symposium "Effects of Climate Change on the World's Oceans" (Yeosu, Republic of Korea, 15-19 May 2012). Through the CLIVAR and Climate and Cryosphere (CliC) projects, WCRP contributes to the development of the SCOR-cosponsored Southern Ocean Observing System (SOOS).

Ocean Observations

Ocean observations continue to be an important focus of WCRP projects. New measuring techniques such as gliders and integrated physical and biogeochemical sensors are continuously

being tested and refined in WCRP international field programmes. For instance, the New Guinea Coastal Undercurrent and its variation has been a major gap in ENSO diagnosis and the link between extra-tropics and tropics. CLIVAR is now addressing this gap through the use of ocean gliders. These autonomous instruments provide a relatively inexpensive means to produce time-series measurements. Ultimately, it is expected that this sort of instrument will become part of a sustained ocean climate observing system. WCRP works closely with GOOS through the Ocean Observations Panel for Climate to design such a system.

The utility of ocean measurements is continuously being enhanced through the efforts of the WCRP CLIVAR Global Synthesis and Observations Panel (GSOP) that is working to create the best possible syntheses of in situ ocean observations, satellite measurements, and model outputs. Such ocean synthesis products are needed to understand sea-level changes in the context of climate change and variability and to measure changes in the meridional overturning circulation that could lead to rapid climate change. They also form the basis for assimilation of ocean observations into climate prediction systems and, in particular, those to be used for decadal prediction. Synthesis products that include information about carbon will help us to understand and monitor the role of the ocean as a carbon sink. This effort, coordinated by WCRP and involving representatives from all the major modelling centres around the world, will provide key information about the state of the ocean to a wide range of users, including climate prediction centres (through the Global Framework for Climate Service), commercial entities interested in exploiting ocean resources and policy makers anxious to know the fate of the world's carbon.

Multi-decadal ocean warming and acidification have impacts on marine ecosystems with severe socio-economic consequences. Given the value of ocean ecosystems to human health and welfare, it is important to understand the links between ocean and climate variability, and marine physical processes and their impact on marine ecosystems. The OceanObs'09 Conference, of which WCRP was a sponsor, highlighted the urgent need to fully integrate physical, chemical, and biological observations in the ocean observing system. The CLIVAR/IOC-GOOS Indian Ocean Panel is pioneering the implementation of such integrated measurements on the Indian Ocean equatorial buoy array. The WCRP CLIVAR project is working with its sister projects and, in particular, SCOR-cosponsored IMBER, to develop a scientific strategy that will enhance our ability to study the ocean in a holistic sense. The 2012 session of the CLIVAR Scientific Steering Group was held jointly with the Scientific Steering Committee of IMBER (La Paz, Mexico, 11-14 June 2012).

Ocean / climate / Earth System modelling and prediction

WCRP is pursuing a vigorous modelling programme designed to improve our ability to understand and predict phenomena that are of relevance to society, such as anthropogenic climate change, and the seasonal to decadal climate signal like the El Niño/Southern Oscillation (ENSO), the Indian Ocean Dipole, and monsoons.

Through its Climate Model Intercomparison Project-5 (CMIP5) WCRP provides the framework for advancement of climate change modelling research, improving climate projections and creating the basis for assessing climate change and variability in support of the next WMO/UNEP Intergovernmental Panel on Climate Change Fifth Assessment Report (AR5). As a part of the

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CMIP5, WCRP is also exploring the potential of decadal predictions that could provide useful information for development of adaptation strategies. The effects of climate anomalies are felt locally, and in response to the growing requirement for regional climate information, the WCRP has initiated the Coordinated Regional Downscaling Experiment (CORDEX). This project involves scientists and stakeholders in each region of the world and has a large capacity building component. WCRP will be working to make use of CORDEX regional products for the Transboundary Water Assessment Project and has entered into discussions with the UNESCO concerning their utility in assessing the impact of climate change on World Heritage Sites.

The CLIVAR Working Group on Ocean Model development with the CLIVAR / CliC / SCAR Southern Ocean Panel are preparing a Workshop on Sea-Level Rise, Ocean/Ice Shelf Interactions and Ice Sheets (Hobart, Australia, 18-20 February 2013).

Sea-level

Significant advances are taking place in the research on and assessment of sea-level variability and change. It has become possible to obtain, for the first time in the history of science, evaluations of various factors contributing to the sea-level rise that sum up to the values that are very close to observed in situ and by satellite observations in the second half of the 20th century. Most recent results concern the role of terrestrial water storage and use in global water balance. It is possible to state, therefore, that the instrumentally observed changes in sea level can now be quantitatively explained by modern climate science. The updated assessment of the expected global mean sea level in the 21st century will be reported in 2013 through the report of the Working Group 1 in the AR5. WCRP is also focussing international sea-level research on studying the regional variations in sea-level change, which are very significant and therefore important for coastal zone management.

Capacity development

Capacity building is high priority for WCRP, and the Programme is developing a strategy for education, training, and capacity development. WCRP is sponsoring active engagement of many early-career scientists in its activities, with particular emphasis on scientists from least-developed and developing countries, to facilitate growth of the diverse future workforce needed to meet the increasingly complex scientific challenges in the future. For example, in 2011 WCRP offered travel grants to more than 200 early-career scientists and graduate students to attend its Open Science Conference. More than 400 of the 1,900 participants in the Conference were from developing countries. WCRP sponsored a meeting (Jakarta, Indonesia, 12-13 March 2012) aimed at developing an effective monitoring programme for the Indonesian Throughflow that brought together scientists from around the world with Indonesian oceanographers from a half dozen different concerned institutions to develop a joint plan to monitor and improve our understanding of this critical link between the Pacific and Indian Oceans. CLIVAR regularly co-sponsors the ClimeCO summer workshops with SCOR-cosponsored IMBER. The theme of this year's event (Ankara, Turkey, on 23-28 July 2012) is Earth System models and human-nature interactions in the marine world. The WCRP CLIVAR's American Monsoons project regularly organizes training workshops on different aspects of climate, including the role of ocean observations in climate research. WCRP is sponsoring a series of workshops in regions around the world to train scientists and practitioners in the use of

regional climate model outputs under the auspices of its CORDEX project, which has identified Africa as its initial priority area.

7.1.3 Scientific Committee on Antarctic Research (SCAR)

Wainer

The major joint activity between the SCOR and SCAR since last year has been the SCAR/SCOR Southern Ocean Observing System (SOOS) activity. Following publication of the SOOS Initial Science and Implementation Strategy early this year,¹ a Scientific Steering Committee was established for the project (it met in Salt Lake City, Utah, USA in February), a project office was opened in Australia, and the SOOS Web site (see <http://www.soos.aq/>) and *SOOS Update* (see following) were launched.

SCAR is setting up Ocean Acidification Action Group, chaired by Richard Bellerby, Bjerknes Centre for Climate Research, Norway. The Action Group will:

- define our present understanding of the contemporary rates and future scenarios of Southern Ocean acidification;
- document ecosystem and organism responses from experimental perturbations and geological records;
- identify present and planned observational and experimental strategies;
- identify gaps in our understanding of the rates and regionality of ocean acidification;
- define strategies for future Southern ocean acidification research.

The above workplan will be performed in consultation with existing global ocean acidification efforts (e.g SOLAS/IMBER Sub Group 3, US Ocean Carbon Biogeochemistry and the SCAR ICED and the SCAR Oceanography Expert Group).

Members

- Richard Bellerby, Norwegian Institute for Water Research, Norway (Chair)
- Kurihara Haruko, University of the Ryukyus, Okinawa, Japan
- Claire Lo Monaco, IPSL, Paris, France
- Nikki Lovenduski, University of Colorado, Boulder, USA
- Ben McNeil, Climate Change Research Centre, University of New South Wales, Australia
- Philip Tortell, University of British Columbia, Vancouver, BC, Canada

¹Rintoul, S.R., M.D. Sparrow, M.P. Meredith, V. Wadley, K. Speer, E. Hofmann, C. Summerhayes, E. Urban, and R. Bellerby (eds.). 2011. *The Southern Ocean Observing System: Initial Science and Implementation Strategy*. Scientific Committee on Antarctic Research and Scientific Committee on Oceanic Research.

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Progress so far

- Consultation with existing global ocean acidification efforts (e.g SOLAS/IMBER Sub Group 3, US Ocean Carbon Biogeochemistry and the SCAR ICED and the SCAR Oceanography Expert Group.)
- SCAR OA Action group meeting on ocean chemistry and plankton interactions was held in Tromsø, Sept 27-29 in conjunction with the “Acidification in aquatic environments” workshop.
- Town Hall meeting at the XXXII SCAR and Open Science Conference in conjunction with the OA session
- Currently a literature search is underway. Writing to begin in autumn 2012. Report submitted in SCAR Open Science conference in 2014
- A second group meeting will be held in conjunction with the High CO₂ meeting in Monterey in September 2012.

Work plan

- OA session and AG Town hall meeting in Portland July 2012
- Author meeting at High CO₂ meeting, Monterey Sept 2012
- Full author list complete by sept 2012
- Sketch of each chapter complete by December 2012
- Sketch sent out for wider consultation with appointed experts January 2013
- Writing/review workshop in China/Hong Kong late summer 2013
- Writing complete by December 2013
- Printing completed by Spring 2014
- Presentation of report SCAR meeting summer 2014

7.2 Affiliated Organizations

7.2.1 International Association for Biological Oceanography (IABO)

Costello

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7.2.2 International Association for Meteorology and Atmospheric Sciences (IAMAS)

Coustenis



International Association of Meteorology & Atmospheric Sciences 2012 Report (www.IAMAS.org)

IAMAS is one of the eight associations dealing with the Earth system and its environs that make up the International Union of Geodesy and Geophysics (IUGG). The scope of IAMAS includes the atmospheres of the Earth and other planets. IAMAS is made up of ten International Commissions (IC) and one Committee (C..) that play a major role in carrying through IAMAS activities. The ten ICs cover (alphabetically) *Atmospheric Chemistry and Global Pollution* (ICACGP), *Atmospheric Electricity* (ICAE), *Climate* (ICCL), *Clouds and Precipitation* (ICCP), *Dynamical Meteorology* (ICDM), the *Middle Atmosphere* (ICMA), *stratospheric Ozone* (IOC), *Planetary Atmospheres and their Evolution* (ICPAE), *Polar Meteorology* (ICPM), and *atmospheric Radiation* (IRC). The *Committee on Nucleation and Atmospheric Aerosols* (CNAA) brings together scientists covering the following subject areas: Nucleation Theory & Experiment; Tropospheric and stratospheric aerosols; Cloud Drop and Ice Nucleation and Aerosol-Climate Interactions.

Many of these commissions play international leadership roles in their specialty areas [see www.iamas.org/Commissions.html]. This set of commissions provides an important supplement and extension to the leadership and research role of the *World Meteorological Organization* (WMO), which is the intergovernmental entity with a comparable scientific scope to IAMAS; for example, the IOC entered into a *letter of agreement* with WMO for the establishment of an ad hoc expert team that will assess ozone absorption cross sections used in atmospheric observations.

a) IUGG Union Commission on Climatic and Environmental Changes

In the past year, IAMAS has proposed a new commission and has been fully involved in the preparation of the commission: CCEC.

Considering the proposal from the initiative group led by IUGG Past President Tom Beer, and taking importance of the scientific topics into account, the IUGG Executive Committee decided to establish the Union Commission on Climatic and Environmental Change (CCEC) in order (i) to promote the

advancement of the scientific understanding of climatic and environmental change, (ii) to boost research in reducing uncertainties in climate and environmental models, (iii) to define criteria for collaborative trans-disciplinary research on climate and environmental change, (iv) to fulfill the objectives of IUGG and its associations, (v) to provide an all-Union perspective on climatic and environmental change, and (vi) to make available the knowledge and insights developed through scientific research to the benefit of society and planet Earth, including considerations of the science of global change, related vulnerability and impacts, and potential responses.

The IUGG Executive Committee appointed 14 experts to compose the Executive Committee of CCEC with Tom Beer (Australia) as Chair of the Commission, Jianping Li (China, also ICCL Executive Secretary) as Vice Chair, Keith Alverson (USA, also former ICCL president) as Secretary-Treasurer, and 10 members of the committee representing Union Associations. IAMAS will be happy to continue to be involved in this commission.

- b) The IAMAS Bureau and members are actively preparing for the DACA-13 (Davos Atmosphere and Cryosphere Assembly 2013) meeting, where many interesting (over 40) symposia will be held.

To face today's key challenges of global environmental change it is essential to cooperate at the interface between atmospheric and cryospheric sciences, and to pay attention to the complex interactions between these two vulnerable components. The International Association of Meteorology and Atmospheric Sciences (IAMAS) and the International Association of Cryospheric Sciences (IACS) will welcome scientists from both fields to the Davos Atmosphere and Cryosphere Assembly DACA-13 in Switzerland in July 2013. The conference will bring together some 1200 scientists from both fields to present and discuss the latest research in separate and joint sessions. A large variety of topics will be covered, from ice-sheet modeling to extreme climate events, from solar UV radiation to avalanche formation and permafrost. DACA-13 will be held from July 8 to 12 in the mountain resort of Davos. IAMAS scientists and all interested parties are encouraged to subscribe via the official website <http://www.daca-13.org/>.

- c) The IAMAS Business meeting will be held in Paris, France during the 15 and 16 of November 2012.

The first day of the meeting will be devoted to discussions of collaboration with IAMAS partners and other associations and of the IAMAS contribution to future meetings, for example, regarding the general assemblies in 2013 (DACA-13) and 2017. We invite you to participate and contribute to these discussions. The second day will be devoted to IAMAS internal affairs and is reserved for the Bureau and invitees.

All the information related to IAMAS is now forwarded to its members through an information letter prepared and distributed by the Bureau and in care of Assistant Secretary General Jenny Lin.

Submitted by Athena Coustenis, IUGG/IAMAS representative to SCOR [27 August 2012]

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7.2.3 International Association for the Physical Sciences of the Ocean (IAPSO)

Smythe-Wright



IAPSO Report to SCOR 2012

The International Association for the Physical Sciences of the Oceans (IAPSO) is one of eight Associations of the International Union of Geodesy and Geophysics (IUGG), which in turn, is one of the Unions of the International Council for Science (ICSU).

IAPSO has the prime goal of "promoting the study of scientific problems relating to the oceans and the interactions taking places at the sea floor, coastal, and atmospheric boundaries insofar as such research is conducted by the use of mathematics, physics, and chemistry." IAPSO works mainly through (1) biennial scientific assemblies; (2) working groups; (3) Commissions; (4) Services; and (5) Web site information. Of special importance to IAPSO is to involve scientists and students from developing countries in the activities. For more information see <http://iapsio.iugg.org/>

IAPSO EC MEMBERS FOR 2011-2015:

President:	Dr. Eugene Morozov (Russia)
Secretary General:	Prof. Johan Rodhe (Sweden)
Past President:	Prof. Lawrence Mysak (Canada)
Treasurer:	Dr. Fred Camfield (USA)
Vice President:	Dr. Isabelle Ansorge (South Africa)
	Dr. Denise Smythe-Wright (UK)
EC Members:	M.Sc. Silvia Blanc (Argentina)
	Prof. Toshiyuki Hibiya (Japan)
	Dr. Chris Meinen (USA)
	M.App.Sc. Ken Ridgway (Australia)
	Dr. Satheesh Shenoi (India)
	Dr. Stefania Sparnocchia (Italy)

Activities in 2011/2012

The main IAPSO activities in 2011 were the planning and the carrying through of the IUGG General Assembly 2011 in Melbourne. There were 7 IAPSO-led symposia and 3 joint symposia reflecting the most interesting oceanographic research. Despite the long and expensive travel for

most potential delegates, about 300 scientists found their way to Melbourne. One highlight during the Assembly was the Prince Albert I Memorial Lecture by Dr. Trevor McDougall, the 2011 Winner of the Prince Albert I Medal. Dr. Towhida Rashid from Bangladesh was awarded the Eugene LaFond Medal for her presentation "Holocene relative sea level change in Bangladesh". This medal is awarded to an ocean scientist from a developing country making a presentation (poster or oral) in a IAPSO-sponsored or co-sponsored symposium at the IUGG or IAPSO assemblies

IUGG holds General Assemblies every fourth year. In 2015, the General Assembly will be held in Prague. On 22-26 July 2013, the three IUGG associations IAHS (hydrology), IAPSO, and IASPEI (seismology) will join in an "in-between-assembly" in Gothenburg, Sweden. IABO (International Association for Biological Oceanography) is co-sponsoring one of the symposia during the assembly. The total scientific program is posted on the conference Web site: <http://www.iahs-iapso-iaspei2013.com/>. In 2012, one of the main IAPSO activities was focused on the preparation of the joint assembly. The themes of symposia are agreed:

Joint symposia

Land-sea interaction
Global hydrological cycles
Sea level changes and flooding
Large amplitude waves, Tsunamis, submarine slides

IAPSO-only symposia



P01: General topics of ocean physics and chemistry
P02: Baltic and other regional seas
P03: Ocean Mixing
P04: Eastern and Western Boundary currents
P05: Arctic Ocean
P06: Southern Ocean
P07: Biogeochemistry of the oceans
P08: Thermohaline circulation and deep currents
P09: North Atlantic

Almost all conveners and co-conveners are appointed and general themes of the future symposia are being collected.

IAPSO is announcing applications for the Albert I medal for outstanding research in physical and chemical oceanography. These applications should be submitted six months before the assembly and then the appointed Albert I Committee will decide who will be the winner. Then the medal is minted in Monaco and the winner will be awarded in Gothenburg. The winner will be asked to give a memorial lecture.

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Over the past few years, IAPSO jointly sponsored together with SCOR a number of working groups, namely WG 121: Ocean mixing; WG 127: Thermodynamics and equation of state of seawater; WG 129: Deep ocean exchanges with the shelf (DOES), WG 133: Ocean Scope, and WG 136: [Climatic Importance of the Greater Agulhas System](#). These WGs present their reports directly to SCOR. WG 127 has recently developed a new International Thermodynamic Equation of Seawater -2010 (TEOS-10). It was adopted by the Intergovernmental Oceanographic Commission (IOC).

 Eugene Morozov	 Johan Rodhe
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7.3 Affiliated Programs

SCOR-Affiliated Projects and Programs

SCOR sponsors many, but not all, of the major international ocean research projects and programs. Some projects not co-sponsored by SCOR can gain benefits from association with SCOR, such as (1) increased visibility; (2) participation in SCOR activities, such as project coordination meetings and annual SCOR meetings; (3) opportunities to provide comments on working group proposals and membership; (4) access to national SCOR contacts; and (5) opportunities to apply for SCOR funding for travel of scientists from developing countries and countries with economies in transition to their workshops and symposia. In 1995, SCOR developed the option of formal affiliation of relevant projects/programs with SCOR. Unlike projects sponsored by SCOR, affiliated projects and programs receive funding from organizations besides SCOR and do not need staff support from SCOR.

SCOR's role in relation to affiliated projects and programs is one of advice and regular review. SCOR gives advice about appropriate balances on the projects' steering committees and adequate rotations of these committees to renew the committees' memberships regularly. SCOR's national contacts can be used to find new members in regions where there is a need, or to entrain new countries into projects. SCOR can also provide an independent mechanism for the review of planning documents such as science or implementation plans.

Application for SCOR Affiliation

Application to SCOR for program affiliation should be initiated with a proposal of 2 to 5 pages, sent to SCOR at least three months before an annual SCOR meeting. The proposal should include an outline of the program's science plan, the terms of reference, current membership of the steering committee, and rotation procedures and schedule. The proposal for SCOR affiliation should also address the following criteria, accepted at the 1995 SCOR Executive Committee meeting (see *1995 SCOR Proceedings*). The Executive Committee agreed that in order to become a SCOR-affiliated project/program, an activity must

- be truly international, with a committee membership that rotates on a regular basis;
- show evidence of existing financial and/or organizational support;
- demonstrate a benefit from SCOR affiliation;
- have a scientifically well-integrated theme;
- show that it is in SCOR's interests to establish this affiliation;
- be of broad scale and global importance;
- show, as appropriate, that any scheme of membership dues includes some nominal level so as to encourage the widest possible international participation by all countries; and
- be willing to adhere to the SCOR Publication Policy.

After a program is affiliated with SCOR, annual reports are required, and scientific presentations may be requested at any annual SCOR meeting, as a basis for the decision on continuing the

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relationship between SCOR and each project/program. The Chair of each affiliated project/program serves as an ex-officio member of SCOR as a Scientific Rapporteur (see SCOR Constitution, paragraph 4). Continued affiliation with SCOR depends on the project meeting the guidelines specified above, and maintaining high scientific quality and adequate rotations of committee members and chairs.

Reports to SCOR

Annual reports to SCOR should answer the following questions and present any additional information that the project/program would like to transmit to SCOR:

- What scientific accomplishments have been achieved by the project/program in the past year?
- How has the project's steering committee membership changed in the past year?
- What is the financial status of the project?
- What is the status of the project's secretariat?
- What are the plans for the scientific development and implementation of the project over the next two to three years?
- How is the project interacting with and contributing to other SCOR activities?

In addition, projects/programs should communicate regularly with their SCOR Executive Committee Reporter regarding their activities and progress.

7.3.1 International Marine Global Change Study (IMAGES) (affiliated in 1995)

Compton

IMAGES (International Marine Global Change Study) is a program of Past Global Changes (PAGES), a core project of the International Geosphere-Biosphere Programme (IGBP), and is affiliated with SCOR. IMAGES was initiated to respond to the challenge of understanding the mechanisms and consequences of climatic changes using oceanic sedimentary records. The overriding IMAGES science issue is to quantify climate and chemical variability of the ocean on time scales of oceanic and cryospheric processes; to determine its sensitivity to identified internal and external forcings, and to determine its role in controlling atmospheric CO₂. In order to achieve these scientific objectives, IMAGES proposes to coordinate a global program to collect and study marine sediment records to address three fundamental questions:

1. How have changes in surface ocean properties controlled the evolution of global heat transfer through the deep and surface ocean and thereby modified climate?
2. How have changes in ocean circulation, ocean chemistry, and biological activity interacted to generate the observed record of atmospheric pCO₂ over the past 300 kyr?
3. How closely has continental climate linked to ocean surface and deep-water properties?

Chair:

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I. Hall	UK	B. Opdyke	AUSTRALIA
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E. Jansen	NORWAY	V. Ramaswamy	INDIA
Z. Jian	CHINA	J. Rogers	SOUTH AFRICA
N. Kallel	TUNISIA	J. Sopaheluwakan	INDONESIA
H. Kawahata	JAPAN	T. Stocker	SWITZERLAND
K.L. Knudsen	DENMARK	A. Völker	PORTUGAL
D. Kroon	NETHERLANDS		

Director: Ralph Schneider

Executive Committee Reporter: John Compton

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7.3.2 InterRidge - International Ridge Studies (affiliated in 1996)

Compton

Terms of reference:

- To build and maintain an interactive international ridge-research community
- To identify, through InterRidge working groups and the workshops and conferences they organize, the most compelling questions in ridge research and develop program plans to address these questions
- To continue to develop scientific, technical and logistical co-operation among nations and to strengthen international foundations for innovative research.
- To provide current information about research activities through the InterRidge website and *IR News*.
- To encourage participation of smaller oceanographic countries and individual scientists from non-seagoing countries.
- Through education and outreach, to communicate the importance and excitement of ridge research to the general public and decision makers worldwide.
- To act as a representative body for international ridge scientists in policy discussions.

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Colin Devey	GERMANY	Rolf Pedersen	NORWAY
Nicole Dubilier	FRANCE	K.A. Kamesh Raju	INDIA
Jérôme Dymant	USA	Nobukazu Seama	JAPAN
		Steve Scott	CANADA

Coordinator: Debbie Milton

Executive Committee Reporter: John Compton

2012 InterRidge Update for SCOR

The InterRidge (IR) programme office is in its final year at the National Oceanography Centre, Southampton, UK. It is led by a multidisciplinary team: Bramley Murton (IR Chair, marine geology, geochemistry) and Jon Copley (IR Co-Chair, marine ecology, specialising in chemosynthetic ecosystems). The Office Coordinator is Debbie Milton, whose background is in physical geography and education.

A proposal to host the InterRidge Office led by Prof John Chen (School of Earth and Space Sciences, Peking University, Beijing) and Dr Jiabiao Li (Second Institute of Oceanography, Hangzhou) was approved at the recent InterRidge Steering Committee meeting held in St. Petersburg, Russia (2-3 June 2012). From January 2013, John Chen will be InterRidge Chair, with Jiabiao Li as Co-Chair. Both have long and well-established careers in marine science and mid-ocean ridge research. The move to the University of Peking in Beijing, China, is extremely exciting: as a relatively recent full member of InterRidge, China has made rapid advances in ridge-crest studies and is investing strongly in new technologies, including a manned submersible. Also, the InterRidge Steering Committee has been augmented in 2012 by the return of Canada and Portugal as Associate Members.

InterRidge (<http://www.interridge.org>) promotes interdisciplinary, international studies of oceanic spreading centres by creating a global research community, planning and coordinating new science programmes that no single nation can achieve alone, exchanging scientific information, and sharing new technologies and facilities. InterRidge is also dedicated to reaching out to the public, scientists and governments, and to providing a unified voice for ocean ridge researchers worldwide. An increasing role for InterRidge is our involvement in compiling information and advice for policy makers. This includes meetings and workshops where protocols for codes of scientific conduct for studying chemosynthetic environments, and identifying sites of special scientific interest, are proposed and discussed. InterRidge also has formal links with the United Nations Environment Programme and informal links with the Integrated Ocean Drilling program and the International Seabed Authority.

InterRidge: Third Decadal Plan: 2014-2023

Throughout 2012, InterRidge has been developing its Third Decadal Plan statement. It identified six major areas for focus in the coming years:

- 1) Mid-Ocean Ridge Tectonic and Magmatic Processes
- 2) Seafloor and Sub-Seafloor Resources
- 3) Mantle Controls
- 4) Ridge-Ocean Interactions and Fluxes
- 5) Off-axis Processes
- 6) Past, present and future of hydrothermal vent ecosystems

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InterRidge Working Groups

Working Groups are the principal mechanism for achieving the InterRidge programme, their main function being to identify new areas of high-priority scientific research. Each Working Group has clear goals and a timescale in which to achieve them (approximately 5 years). InterRidge supports those scientific projects which would benefit from IR coordination by convening group meetings, community-wide workshops, symposia, and theoretical institutes. The resulting reports represent a synthesis of international and interdisciplinary efforts to define scientific questions and a methodology of addressing them. There are currently seven active IR Working Groups in 2012.

New InterRidge Working Groups in 2012:

Arc-Backarc Systems

(Chair: Maria Seton)

Objective: Convergent margins, where oceanic lithosphere is subducted into the mantle, form the key interface for large-scale chemical and thermal recycling amongst the ocean, crust, mantle, and atmosphere. Intra-oceanic convergent margins typically produce a forearc-island arc-backarc sequence within an extensional stress regime and contain a disproportionate number of hydrothermal vents per unit area. The working group hopes to foster a holistic approach to address fundamental questions about intra-oceanic arc and backarc basin processes by examining the long-term and short-term evolutionary cycles using geochemical, hydrothermal, biological, tectonic, and subduction dynamics approaches. In addition, they aim to bridge the gap between geologists who study onshore, accreted island-arc and back-arc systems and marine geoscientists who study in-situ backarc systems. The working group seeks to bring together experts from both the observational and modeling communities to facilitate the linkage between surface processes and the deep earth.

Circum-Antarctic Ridges

(Co-Chairs: Anne Briais, Jian Lin, Sung-Hyun Park)

The scientific objectives of the CAR working group are to improve our knowledge on the following issues:

1. How heterogeneous is the mantle? What is the role of mantle heterogeneities in the variability at the axis, compared to that of mantle temperature? Where and how should we collect samples to improve our understanding of mantle heterogeneities?
2. How do the three large mantle domains (Atlantic, Indian, and Pacific) interact as they meet under the Circum-Antarctic Ridges?
3. How do ridge processes vary with time? A few off-axis observations reveal significant evolutions in time, but off-axis surveys and sampling are still too rare.
4. How uniform are chemosynthetic ecosystems along the CAR? Do they constitute a

unique biogeographic province?

5. What is the role of Fe released at hydrothermal vents on the global budget?

Oceanic Detachments Faults

(Co-Chairs: Pablo Canales, Javier Escartin)

Objective: Since their identification in the early 1990s, extension along oceanic detachment faults has been recognized as a fundamentally distinct mode of seafloor spreading that does not result in a classical Penrose model of oceanic crustal structure. This type of spreading is characterized by formation of oceanic core complexes; tectonized and heterogeneous lithosphere; extensive exposure of gabbro and serpentinized mantle at the seafloor; some of the largest hydrogen-rich, deep-sea hydrothermal systems and mineral deposits; and large diversity in the deep-sea and subsurface biosphere.

South Mid-Atlantic Ridge Targeted Exploration (SMART)

(Chair: Colin Devey, Germany)

The aims of the SMART Working Group are:

1. Collate and combine information already available from recent and older cruises to establish a thorough "State of the art" of Southern MAR studies. For this work active participation of scientists from many countries working toward this common goal is essential - a core strength of InterRidge.
2. Provide focus for the international coordination of further South Atlantic exploration, specifically aiming to identify and then fill gaps in our knowledge of this relatively unexplored region. The group will convene a workshop to produce a project plan of how to explore the SMAR thoroughly in the next 5-10 years, defining and prioritizing goals, identifying cruises needed.
3. In a larger framework, the South Atlantic Basin as a whole is an important yet relatively little-explored ocean region. We expect the SMART WG to provide a seed to establish basin-scale studies within the framework of bodies such as SCOR. This could spearhead international efforts to use the Atlantic Basin as a test-bed for collection and synthesis of, for example, the phylogeographic history of chemosynthetic faunas (vent and seep) from the Arctic to the Antarctic and to study gene flow. These efforts, in collaboration with mapping, physical oceanographic studies, studies of reproductive biology and larval distributions, and modeling efforts would make important contributions to science and to management of resources associated with chemosynthetic ecosystems.

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Other InterRidge Office Activities in 2012

In 2012, InterRidge applied for, and was successful in being awarded \$45,000 from the ISA Endowment Fund, to continue the annual funding of three early-career scientists from developing countries. InterRidge also awarded four Fellowships from InterRidge funds. All Fellowships are designed to encourage international collaboration on any aspect of ridge-crest science.

InterRidge has overseen the establishment of its Cruise Travel Bursary scheme. This has enabled ten early-career scientists to make new collaborations with established scientists, with InterRidge paying their travel and hotel costs. Details at: <http://www.interridge.org/cruisebursary>.

For more information about IR's activities and national updates, please visit the IR Web site (<http://www.interridge.org>) and recent newsletters (<http://www.interridge.org/IRNewsletter>), or contact the IR Office (coordinator@interridge.org) for a hard copy of the 2012 *InterRidge News*, which will be published in Nov. 2012.

7.3.3 International Ocean Colour Coordinating Group (IOCCG) (Affiliated in 1997)

Volkman

International Ocean-Colour Co-ordinating Group (IOCCG)

Report of Activities 2011 - 2012

Venetia Stuart (IOCCG Project Scientist)

1. Background

The International Ocean-Colour Co-ordinating Group (IOCCG) was established in 1996 to develop consensus and synthesis at the world scale in the subject area of satellite ocean colour radiometry (OCR). The group promotes communication and co-operation between the various international space agencies that provide ocean-colour data and the user community (e.g., research scientists, program managers). The IOCCG is an Associate Member of the Committee on Earth Observation Satellites (CEOS) and has been an Affiliated Program of SCOR since 1998. This affiliation to SCOR is critical in that it provides an avenue for obtaining funding from U.S. agencies such as NASA. The IOCCG greatly appreciates the efficient and professional manner in which the NASA funds are managed by SCOR. In addition, the IOCCG has been strengthened by having visible links with one of the major international non-governmental organizations in the marine sphere.

The IOCCG has a wide-ranging mandate—the group addresses scientific issues through a number of scientific working groups, it is involved in capacity building in both developing and developed countries, and helps to ensure the continuity of the ocean-colour data stream through the CEOS Ocean Colour Radiometry-Virtual Constellation (OCR-VC). The group is currently chaired by David Antoine (LOV, Villefrance, France) and the IOCCG Project Office is located at the Bedford Institute of Oceanography, Canada, staffed by Project Scientist, Venetia Stuart.

2. Scientific Working Groups

Scientific activities are carried out by specialized scientific working groups established by the IOCCG to investigate various aspects of OCR and its applications. The end product of these working groups is the preparation of a monograph on the topic, which is published in the highly acclaimed *IOCCG Report Series* (12 reports published to date). These reports are always in high demand by scientists, managers, and students from around the world and are frequently used as a teaching tool in training courses. The reports are often printed by a space agency as their contribution towards IOCCG activities, as many agencies find it difficult to transfer funds directly to IOCCG. This arrangement works well, although occasionally the publication of a report may be delayed to accommodate the agency's fiscal constraints. Over the past performance period the two reports listed below were prepared for publication: Report 11 was printed by JRC, and Report 12 should be printed by NOAA shortly.

- IOCCG Report 11 (2011): *Bio-Optical Sensors on Argo Floats*, edited by Hervé Claustre (LOV, France). Bio-optical sensors on Argo floats can provide high-density, biogeochemical data at relatively low cost and are a promising avenue for calibration/validation of satellite ocean colour data. The WG examined the scientific and strategic challenges of designing a program based on Argo float technology. The WG proposed three types of floats: the CAL-VAL float for validation, the BIO-ARGO float for biogeochemistry plus validation, and the Carbon-Explorer float for a complete range of biogeochemical measurements, including carbon.
- IOCCG Report 12 (2012): *Ocean-Colour Observations from a Geostationary Orbit*, edited by David Antoine (LOV, France). Geostationary ocean colour imagers have significantly improved temporal sampling compared to polar orbiting ocean colour sensors, and they may also have improved spatial and spectral sampling, which will greatly enhance our ability to monitor and assess the dynamics of the coastal ocean. This report reviews science questions that can be addressed via ocean-colour observations from a geostationary orbit, provides a summary of current and planned GEO ocean-colour missions, examines the complementarity of low-Earth and geostationary orbits, lists requirements, and promotes inter-agency cooperation to help coordinate activities.

A number of other scientific working groups are in various stages of deliberation, as outlined below.

2.1 WG on Mission Requirements for Future Ocean-Colour Sensors

This working group is co-chaired by NASA Scientists Chuck McClain, Gerhard Meister, and Paula Bontempi and was established because of the rapid advancement of ocean-colour sensor technology over the past decade, and the range of new applications and science questions that can be addressed by ocean colour radiometry. It is now possible to measure more complex ocean variables, as well as physiological features of phytoplankton using OCR, leading to more stringent requirements for the new generation of ocean radiometers. The working group has established the minimum basic radiometric and sensor requirements (including radiometer design and characterisation, system requirements, data product and processing requirements) for detailing global observations of the ocean's chemistry and biology from space. The final report is at an advanced stage of editing and should be published by the IOCCG toward the end of the year/early next year.

2.2 WG on In-flight Calibration of Satellite Ocean-Colour Sensors

This working group, chaired by Robert Frouin (Scripps Institution Oceanography, USA), was established several years ago, but has been on hold due to other commitments of the Chair. The goals of the working group are to review techniques for radiometric calibration of ocean-colour sensors while they operate in orbit and to provide recommendations on how to meet calibration requirements for science applications. The report from this WG will complement the *Missions Requirements* report so it is critical that it is published in a timely fashion. For this reason, ESA

(European Space Agency) has agreed to assign a research scientist to help write the missing sections (solar, lunar and spectral calibration; other radiometric considerations such as transfer to orbit, polarization and linearity). It is anticipated that a full draft report will be available before the next IOCCG Committee meeting.

2.3 Joint GEOHAB/IOCCG WG on Harmful Algal Blooms

This is a joint working group between the IOCCG and GEOHAB (IOC-SCOR), and is chaired by Stewart Bernard (CSIR, South Africa). The main goal of the WG is to provide a resource that improves communication between the satellite ocean colour community and the *in situ* HAB scientific community. Ocean colour techniques and products provide a powerful and cost-effective way of observing many HAB outbreaks. Case studies, classified by impact rather than by type of HAB or algorithm used, will form a valuable component of the final report by demonstrating ocean-colour utility and performance for specific bloom/ecosystem examples. The second working group meeting was co-sponsored by IOCCG and SCOR and took place in Milan, Italy (6-8 December 2011). At the meeting, the group reviewed inland/cyanobacterial case studies, eutrophication detection, community dynamics, ecological classification as well as *Alexandrium* examples. The two primary deliverables of the working group are an IOCCG/GEOHAB monograph published in the *IOCCG Report Series*, followed by a special issue in a peer-reviewed journal (potentially *Marine Ecology Progress Series*). The group aims to complete the first draft of the report this year.

2.4 WG on Ocean Colour Remote sensing in Polar Seas

This working group is co-chaired by Marcel Babin (University of Laval, Canada), Kevin Arrigo (Stanford University, USA), and Simon Bélanger (University of Québec, Canada). In light of the spectacular impacts of climate in polar ecosystems, a vastly improved understanding of polar environments is required, based on an intensive observation program. *In situ* observations from ships are difficult in the inaccessible Arctic Ocean, but ocean colour remote sensing may be an appropriate tool to monitor polar marine ecosystems at relatively low cost. The use of ocean colour remote sensing in polar regions is, however, impeded by a number of difficulties and intrinsic limitations including the prevailing low solar elevations, the impact of ice on remotely sensed reflectance, the deep chlorophyll maximum (DCM), the peculiar phytoplankton photosynthetic parameters, the optical complexity of seawater (especially over the Arctic shelves), and persistence of clouds and fog. The working group is investigating many of these issues in the Arctic and Antarctic oceans. The group held its first meeting in Quebec City (10-11 November 2011) where an outline of the report was drafted. Contributors of each chapter have been communicating via regular conference calls. A second meeting of the working group will be held in San Diego (August 2012) where they will assess ocean colour algorithms which can be successfully used in high-latitude waters, as well as the current atmospheric correction schemes. They also plan to make recommendations to space agencies and the scientific community on algorithm development and future research avenues.

2.5 WG on Phytoplankton Functional Types

This working group, chaired by Shubha Sathyendranath (Plymouth Marine Laboratory, UK), is establishing the relevance of identifying phytoplankton functional types (PFTs) from ocean colour radiometry measurements. The group is reviewing existing techniques and algorithms used to detect PFTs from marine reflectance and they are comparing the results of the various algorithms on selected case studies and at different scales (regional vs. global). They are also examining how PFTs derived from ocean colour can be used for the validation and improvement of global biogeochemical models. A lot of progress has been made on the monograph over the past year and a complete draft of the full report is expected by the end of this year. The group will meet opportunistically at the Ocean Optics 2012 meeting (8-12 October 2012, Glasgow, Scotland).

3. Ensuring Continuity & Consistency of the OCR Data Stream

3.1 OCR-Virtual Constellation (OCR-VC)

IOCCG is an associate member of the CEOS, whose role is to coordinate all Earth observation satellites, including ocean colour satellites. Through CEOS, the IOCCG established the Ocean Colour Radiometry-Virtual Constellation (OCR-VC) to help provide a long time series of calibrated ocean-colour radiances to assess the impact of climatic changes on coastal waters and open seas, using measurements obtained from multiple satellites. All space agency representatives serving on the IOCCG Committee fully support the OCR-VC and are taking a leadership role in the activities.

3.2 INSITU-OCR Network

Within the OCR-VC framework, the IOCCG established the INSITU-OCR network (*International Network for Sensor InTercomparison and Uncertainty assessment for Ocean Colour Radiometry*) to promote a concerted inter-agency effort working towards consistency and accuracy in the development of Essential Climate Variables (ECVs) from multiple missions. Under the guidance of the IOCCG, various space agency representatives came together to draft a series of recommendations on activities critical to ensuring high accuracy and consistency among products from present and future ocean colour missions. These recommendations were consolidated in a White Paper, and call for thoughtful consideration by space agencies contributing to the OCR-VC in view of achieving the final goal of developing consistent long-term Climate Data Records. Key recommendations address:

- i. space sensor radiometric calibration, characterization, and temporal stability;
- ii. development and assessment of satellite products;
- iii. *in situ* data generation and handling; and

- iv. information management and support.

Special consideration was also given to traceability, application, and accessibility of the necessary *in situ* measurements, which are a fundamental element of any ocean colour mission. The White Paper will be printed by IOCCG in the near future and will be distributed to space agencies representatives on the IOCCG Executive Committee.

3.3 Standing Working Group on ECV Assessment

The IOCCG Committee recognized that it is important to have an independent assessment of essential climate variables (ECVs) outside of space agencies, so a Standing Working Group on ECV Assessment was recently established. The ultimate goal of this international scientific expert group is to undertake a critical comparison of available ocean-colour ECV data products and provide guidance on the generation of better, long-term OCR climate data records. All space agencies on the IOCCG Executive Committee are expected to support this working group with dedicated resources. The group is currently co-chaired by James Yoder (Woods Hole Oceanographic Institution, USA) and Nicolas Hoepffner (JRC, Italy) and has representatives from all the major space agencies with an interest in ocean colour.

Fully characterized, global ocean-colour radiometry ECV products are very valuable inputs for climate studies. However, existing products generated by different instruments or space agencies lack consistency and exhibit small but consistent biases that need to be resolved. It is therefore critical that the various ECV products produced by different agencies are validated and inter-compared to establish confidence limits for the establishment of a long and coherent time-series of global ocean-colour ECV products. Furthermore these datasets need to be assessed not only with regard to each other and independent ground-truth, but also with respect to the target requirements as defined by GCOS.

4. Capacity Building Initiatives

Since its inception, the IOCCG has played an important role in training and capacity building on a global scale, which is clearly within the objectives of the group. Over the past decade, training activities have focussed primarily on capacity building in developing countries, intended to give participants useful practical skills. This is still an important focus of the IOCCG, and this year the IOCCG co-sponsored the *NOWPAP/PICES/WESTPAC Joint Training Course on Remote Sensing Data Analysis*, held in Vladivostok, Russia (8-12 October 2011). In addition, the IOCCG will sponsor a number of students from Africa to attend a training course on “*Methods and Applications of Remote Sensing in African Coastal and Regional Seas*” to be held in Morocco later this year (5-16 November 2012).

This year, another training initiative was added to the existing program which took the form of an advanced Summer Lecture Series, dedicated to high-level training in the fundamentals of ocean

optics, bio-optics and ocean colour, focussing specifically on current critical issues of concern in ocean colour science. The IOCCG recognizes the need for well-trained researchers to make progress in the next decade, concentrating their efforts on important unresolved issues. The first IOCCG Summer Lecture Series “*Frontiers in Ocean Optics and Ocean Colour Science*” took place in Villefranche-sur Mer from 2 to 14 July 2012, and judging by the students’ appraisals, the course was a resounding success. A total of 106 applications were received from highly motivated and well-qualified students. Seventeen students were eventually selected to attend the course, which consisted of a series of lectures delivered by 13 distinguished lecturers, with sufficient time allocated for in-depth discussions. The course was invaluable for the students’ current research as well as their future careers, and was of a very high standard. Because of the overwhelming interest in the course and the excellent feedback from the students, the IOCCG has resolved to conduct such training courses every two years, funding permitting.

5. International Ocean Colour Science Meeting

The IOCCG Committee recognises that it is important to maintain consultation and interaction with the broader ocean colour user community to help the IOCCG in its oversight role and to expose critical issues of concern. For this reason, the IOCCG Committee decided to hold regular international ocean colour community consultation meetings every other year, starting in 2013. A proposal was submitted through SCOR to the NASA Research Announcement ROSES (Research Opportunities in Space and Earth Sciences) to support this meeting. In addition, EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites) have offered to co-sponsor the meeting. Planning is still at an early stage, but the first International Ocean Colour Science meeting is scheduled to be held in the Frankfurt area, Germany from 6 to 8 May 2013. The symposium will be organized by the IOCCG and co-sponsored by EUMETSAT and NASA. The meeting will provide a forum for discussion of various topics related to ocean colour radiometry, including algorithms, calibration/validation, ocean colour applications, and generation of ocean colour products for climate research, amongst others. Members of the IOCCG Executive Committee (i.e., representatives from each of the space agencies with an interest in ocean colour) will also be present to discuss issues related to ocean colour data from their respective agencies, as well as long-term agency plans and areas of cooperation. The meeting is expected to attract ocean colour scientists from around the world thus helping to bring together the users and providers of ocean colour data for in-depth discussions of detailed requirements for ocean colour products and services. The Symposium will highlight a number of different components through invited keynote speakers, splinter sessions, poster sessions, and open-floor discussions. Although the overall goal is to provide a forum to develop a strong voice for the ocean colour user community, the meeting will also offer an opportunity to interact and collaborate with other ocean colour scientists. The full program will be finalized in the next few months.

6. Project Management and Coordination

6.1 Annual IOCCG Committee Meeting

The IOCCG Committee meets once each year to coordinate the activities of the group as a whole, review the progress of the various working groups, discuss plans for the year ahead, and propose new working groups and training initiatives. The IOCCG Executive Committee also meets at this time to discuss financial matters. Last year, the IOCCG Executive Committee also met in Villefranche-sur-Mer from 8 to 9 September 2011 to discuss a number of important developments (INSITU-OCR White Paper, a roadmap for producing Climate Data Records, the concept of a Community Consultation Meeting and Standing Working Groups). The annual IOCCG Committee meeting took place from 28 February to 1 March 2012 at the University of Udayana (Denpasar, Indonesia), and was hosted by the Center for Remote Sensing and Ocean Sciences (CreSOS). The minutes of the meeting are available on the IOCCG website at: http://www.ioccg.org/reports/Minutes_17_final.pdf. The next IOCCG Committee meeting is scheduled to take place in Quebec City, Canada from 5 to 7 February 2013.

6.2 Outreach

The IOCCG uses a variety of outreach information schemes to reach the global user community, including newsletters, training courses, brochures, reports, and information sessions at conferences and workshops. The informative and up-to-date IOCCG website (see <http://www.ioccg.org>) provides a wealth of information on data sources, software, training opportunities, conferences, an extensive bibliography, employment opportunities, and status of current and future ocean-colour sensors. In addition, a quarterly electronic newsletter is distributed to more than 1,000 subscribers, keeping the ocean-colour user community informed of important events, research activities, training initiatives, and mission status news. Furthermore, the *IOCCG Reports* are distributed free of charge to the user community.

7.0 Current IOCCG Membership

The IOCCG Committee consists of members drawn from space agencies as well as the scientific ocean-colour community, and are selected to reflect a balance of both providers and users of ocean-colour data, as well as geographical location and area of scientific expertise. The term of service is usually three years, except for members of the Executive Committee (representatives of sponsoring agencies), whose nomination is governed by a space agency appointments. Rotation of members is being implemented according to a roster: three members marked with an asterisk (*) were appointed after the last Committee meeting and five members are expected to rotate off the committee next year (two from USA, two from Japan and one from Russia).

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IOCCG Committee Members (2011/2012)

Ahn, Yu-Hwan	-	Korea Ocean Research and Development Institute, Korea
Antoine, David (Chairman)	-	Laboratoire de Physique et Chimie Marines, France
Bernard, Stewart	-	University of Cape Town, South Africa
Bontempi, Paula	-	NASA HQ, USA
Chauhan, Prakash	-	ISRO, India
Crevier, Yves	-	Canadian Space Agency, Canada
DiGiacomo, Paul	-	NOAA, USA
Doerffer, Roland	-	GKSS, Germany
Dowell, Mark	-	JRC, Italy
Dutkiewicz, Stephanie	-	MIT, USA
Geldman, Gene*	-	NASA HQ, USA
Greb, Steven	-	Wisconsin Department of Natural Resources, USA
Ishizaka, Joji [#]	-	Nagoya University, Japan
Kampel, Milton	-	INPE, Brazil
Kwiatkowska, Ewa*	-	EUMETSAT, European Union
Lambin, Juliette	-	CNES, France
Mao, Zhihua	-	Second Institute of Oceanography, China
Murakami, Hiroshi	-	JAXA EORC, Japan
Pozdnyakov, Dmitry	-	NIERSC, Russia
Regner, Peter	-	ESA/ESRIN, Italy
Sathyendranath, Shubha	-	NCEO Representative, UK
Tanaka, Tasuku	-	Yamaguchi University, Japan
Yoder, James (Past-Chair)	-	Woods Hole Oceanographic Institution, USA
Zibordi, Giuseppe*	-	JRC, Italy

8.0 List of IOCCG Sponsors

Activities of the IOCCG are supported by contributions from various national space agencies as well as other organisations listed below, and upon infrastructure support from SCOR. Representatives from these funding agencies are members of the Executive Committee.

- CNES (Centre National d'Etudes Spatiales, France)
- CSA (Canadian Space Agency)
- DFO (Department of Fisheries and Oceans, Canada)
- ESA (European Space Agency)
- Helmholtz-Zentrum Geesthacht (Germany)
- INPE (National Institute for Space Research, Brazil)
- ISRO (Indian Space Research Organisation)
- JRC (Joint Research Centre, EC)

- KIOST(Korea Institute of Ocean Science and Technology)
- NASA (National Aeronautics Space Administration)
- NCEO (National Centre for Earth Observation, UK)
- NOAA (National Oceanic and Atmospheric Administration)
- SIO (Second Institute of Oceanography, China)

The Bedford Institute of Oceanography (DFO, Canada) provides in-kind support (office space, computer, informatics support, fax, phone and postage). SCOR provides logistic support and manages the NASA funds.

7.4 Other Organizations

7.4.1 Partnership for Observation of the Global Oceans (POGO)

Fennel



Partnership for Observation of the Global Oceans (POGO) Progress Report, August 2012

1. Coordination of Ocean Observations

1.1. GEO Task “Oceans and Society: Blue Planet”

POGO has been a participating organisation in the Group on Earth Observations (GEO) since it began in 2005. The “Oceans and Society: Blue Planet” Task is a new GEO Task that was proposed by POGO for inclusion in the 2012-2015 GEO Work Plan, and formally accepted by the GEO Plenary in Nov 2011. This was a major step towards a better representation of ocean observations within GEO. The Task brings together many ocean observation initiatives already present within GEO, and seeks to add new ones to the GEO portfolio. This comprehensive initiative has four main components: C1 Global Ocean Information Coordination and Access; C2 Operational Systems for Monitoring of Marine and Coastal Ecosystems; C3 A Global Operational Ocean Forecasting Network; and C4 Applications of Earth Observations and Information to Sustainable Fishery and Aquaculture Management.

POGO is convening a kick-off Symposium for the Task to be held on Ilhabela Island, Sao Paulo State, Brazil, from 19 to 21 Nov 2012. The Symposium will take place just prior to the GEO-IX Plenary (Foz do Iguacu, Brazil, 22-23 Nov 2012). It will highlight each of the Task components through special sessions on their programme elements (e.g. GOOS and the Framework for Ocean Observing, biological observations, GODAE, SAFARI, ChloroGIN, Capacity Building, and Operational Oceanography in Brazilian Regional Waters). The agenda has been prepared, and most speakers confirmed, and a call for poster abstracts has been issued.

1.2. Support of other programmes (GACS, SOOS, OceanSITES)

As part of its mission to advocate for a complete, sustained global ocean observing system, POGO promotes, supports and/or sponsors certain initiatives that are working to further this goal. As an advocate for the inclusion of biological observations in the Global Ocean Observing System (GOOS), POGO has supported the development of the Global Alliance of Continuous Plankton Recorder Surveys (GACS). POGO was represented at the GACS kick-off meeting held in Plymouth in Sept 2011, and maintains a close relationship with the GACS Board of

Governance. GACS was included on the agenda at POGO-13, and is on the agenda for the “Oceans and Society: Blue Planet” Kick-Off Meeting. POGO also supports this programme, and its expansion to developing countries, through its capacity building efforts (see below).

POGO has also endorsed the Southern Ocean Observing System (SOOS) since its inception, and continues to do so. This year, POGO is providing travel support for the SOOS “Seeing Below the Ice” workshop that will take place in Hobart, Tasmania in Oct 2012. POGO maintains a good relationship with the SOOS Project Office, and is represented on the SOOS Executive by a POGO member, Mike Meredith (British Antarctic Survey).

POGO members have been driving the establishment of OceanSITES, a network of deep sea time-series stations. POGO has provided financial support for the OceanSITES project office in 2011 and 2012, which has helped them to recruit a project coordinator. POGO also provided travel support for a participant from Brazil to attend the Steering Committee Meeting and Data Management Group workshop in December 2011. OceanSITES has been included on the agenda for the “Oceans and Society: Blue Planet” Symposium.

2. Capacity Building

2.1. Existing programmes

POGO-SCOR fellowships

The POGO-SCOR fellowship programme is now in its 12th year. The application period opened earlier this year, with a closing date of 15 January 2012. A significant increase in the number of applications was observed this year (from 37 to 75), and the applications were of a very high standard. 12 candidates were selected, from 9 countries. 5 of these have already taken place, or are currently underway.

POGO Visiting Professorship

The 2011 Visiting Professorship took place in February 2012. Prof. Walker Smith (Virginia Institute of Marine Sciences, USA) was hosted by Dr. Ngoc Nguyen Lam (Institute of Oceanography, Viet Nam) to teach a 4-week course on fluorescence measurements and their applications in oceanography. The course included lectures and laboratory components, and an overnight field trip.

This was shortly followed by the 2012 Visiting Professorship, which was awarded to Dr. Arulanathan (National Aquatic Resources Research and Development Agency, NARA, Sri Lanka) to host Prof. Iossif Lozovatsky (University of Notre Dame, USA). Prof. Lozovatsky taught a 4-week course on “Coastal Dynamics: Observation and analysis of currents, internal waves and turbulence on shelves”.

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Both professorships built on and strengthened existing relationships between laboratories in developed and developing countries. The second one, in particular, built on the collaboration that was initiated by a POGOSCOR fellowship in 2011, and the fellow himself was heavily involved in the organisation of the Visiting Professorship. These two programmes combined are instrumental in fulfilling POGO's mission to conduct sustained capacity building in developing countries, with long-lasting impacts.

Nippon Foundation -POGO Centre of Excellence in Ocean Observations

The NF-POGO Centre of Excellence, located at the Bermuda Institute of Ocean Sciences (BIOS), recently completed its fourth year, with the graduation of 10 students in May 2012. A regional training programme was also organised as part of this year's CofE, which took place in Hyderabad (India) in Feb 2012. This was a highly successful and well received course. The students from this course and from year 4 of the CofE were the latest alumni to join the Network of Alumni (see below), bringing the total number of official members to over 150. Some key scientists at BIOS resigned during the period 2011 to 2012. This led to a re-evaluation of BIOS as the host laboratory for the Centre, and to extensive discussions between the Secretariat and the Nippon Foundation about the future of the Centre. At the time of writing, these discussions are continuing.

Austral Summer Institute (ASI)

POGO sponsored once again the Austral Summer Institute in Chile, by providing travel bursaries to students from neighbouring countries to attend the course. ASI-XII (Oct-Nov 2011 & Jan 2012) was devoted to the themes Marine Genomics, Water and Global Change, Time Series in Oceanography and Microbial Oceanography. Activities were held at the Main Campus of the University of Concepcion and at the Marine Biology Station of the Catholic University in Las Cruces. Some 118 graduate and advanced undergraduate students from Argentina, Brazil, Colombia, Cuba, Ecuador, France, Uruguay and Chile participated in ASI-XII.

UCT bursary

Every year POGO provides a bursary for an African student to study on the Applied Marine Science taught Masters at the University of Cape Town. In 2012, POGO provided support for the 2011 student to finish the course, because she had needed some additional time to complete due to initial language problems experienced at the start of the course.

2.2.Development of new programmes and partnerships

POGO-EUROBASIN and POGO-GreenSeas collaborations

The POGO Secretariat has been approached by several European projects about potential collaborations in capacity building. This is a testament to POGO's reputation as a leader in the arena of capacity building. Discussions were held with the EUROBASIN project officer and leaders of the Porcupine Abyssal Plain (PAP) programme in May 2012. They have agreed to collaborate with POGO in setting up a POGO-EUROBASIN fellowship in 2013 for on-board

training, along the lines of the existing POGO-AMT fellowship. More recently, the EU project GreenSeas has approached the POGO Secretariat with the idea of collaborating on the existing POGO-AMT fellowship, by providing funds for additional fellows to receive training on-board the 2012 and 2013 cruises. They will possibly also fund one or more fellow(s) to join the PAP cruise.

POGO grant to attend SAHFOS-MBA Phytoplankton Identification Workshop

This year, POGO decided to sponsor a young scientist from a developing country, to attend the SAHFOS/MBA Phytoplankton Identification Workshop (3-13 July) in Plymouth. This was decided in the context of POGO's support for the development of GACS, and in particular its expansion to developing countries. Among the fifty or so applications received, the workshop organisers selected Dr. Gaston Almandoz, from National University of La Plata in Argentina. At the end of the course, Gaston was invited to visit the POGO Secretariat and PML, to give him the opportunity to meet some PML scientists and to give a presentation on his current work, and on how the phytoplankton workshop will help him to further develop his research.

NF-POGO Alumni Network for Oceans (NANO)

POGO received an additional 125K USD from the Nippon Foundation in March 2012 to continue to develop NANO. 100K USD of this has been allocated to four regional, collaborative research projects that are being undertaken by the alumni in different regions (Latin America, NW Africa, SE Asia, Indian Sub-Continent). The Secretariat is in charge of the overall coordination for the projects, while regional coordinators have been nominated to manage individual projects. All projects are off to a good start, with planning stages completed and sampling already underway in some cases. See www.nf-pogo-alumni.org.

3. Outreach

Expo 2012

After almost two years of preparations, the POGO exhibit at Expo 2012 Yeosu Korea opened on 12 May 2012. POGO was allocated 150 K USD in kind to prepare its exhibit in close collaboration with the design company appointed by the Expo. The exhibit concept that we proposed was articulated around three main themes: (1) The history of ocean observations; (2) The institutes carrying out these observations; and (3) Experiencing the ocean –an interactive display. The Theme Pavilion (that includes the POGO exhibit) has proved to be very popular, with long queues of people waiting to enter. The number of Expo visitors has been steadily increasing, reaching 78,000 visitors in a single day. So far, nearly 1 million people have visited the POGO exhibit. POGO also had the opportunity to organise a special communication event, which took place from 22 to 24 June. This consisted of a mixture of public lectures and video and film screenings. The topics covered satellite oceanography and ocean colour, the Great Tohoku Earthquake of March 2011, biological oceanography and sound in the ocean. All lectures were well received by adults and children alike.

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PEMSEA

POGO also had an exhibit at the PEMSEA East Asian Seas Congress from 9 to 13 July 2012 in Changwon City, Korea. This opportunity arose because POGO Executive Director and Assistant Director were invited to the Congress to convene a session and give a presentation, respectively. The POGO News and Information Group representative for PML was also attending, and manning a stand for PML at the associated exhibition. She therefore helped to set up and man the POGO exhibit, which was located next to the PML one.

7.4.2 Scientific Committee on Problems of the Environment (SCOPE)

Scientific Committee on Problems of the Environment (SCOPE) 2011-2012

Selected Programmes and Events

In January 2011 SCOPE moved to its new **premises** at UNESCO headquarters in Paris.

The International Nitrogen Initiative (INI), a joint programme with IGBP, has been particularly active on a number of fronts. The regional African meeting of the INI (AN-RAP) was held in Nairobi, Kenya in January 2011. 350 scientists, policymakers, industry and NGO representatives gathered in Edinburgh at the Nitrogen and Global Change international conference on 11-15 April 2011. During the week the first European Nitrogen Assessment was published, the impact of reactive nitrogen on Europe's wildlife and forests was discussed, and a Nitrogen footprint calculator was launched. At the closing session of the conference the delegates agreed on a statement outlining mechanisms for tackling the threats of nitrogen pollution in Europe and beyond, known as the Edinburgh Declaration: <http://www.nitrogen2011.org/>. Ten papers produced from the INI workshop on Nitrogen Deposition, Critical Loads, and Biodiversity in Edinburgh, Scotland in November 2009 were published in a special edition of *Environmental Pollution* on "Nitrogen Deposition, Critical Loads and Biodiversity", Volume 159, Issue 10, Pages 2211-3142 (October 2011).

INI leaders have been involved in the development of the Global Overview of Nutrient Management in collaboration with UNEP and many other partners, through a number of workshops and conferences over the past 18 months (Paris, Manila, Rio de Janeiro, London). A side event at Rio+20 in June directed attention to the nutrient challenge and the need to reduce nutrient losses and improve overall nutrient use efficiency in all sectors, simultaneously providing the foundation for a Greener Economy to produce more food and energy while reducing environmental pollution. The 1st International Stakeholders' workshop for a global N assessment was held in London in July 2012.

In 2011, the SCOPE-Zhongyu Environmental Awards distinguished young scientists who developed innovative approaches in their research, demonstrated capacity to address broad issues, and an outstanding publication record. The 2011 laureates were *Environmental sciences*: Jonathan Belmaker (Israel); *Environmental technology and innovation*: Taicheng An (China); and *Environmental management*: Felicia Wu (USA). In addition to three Young Scientist Awards, the 2012 edition will also recognize two senior scientists for their Lifetime Achievements.

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On 27-30 November 2011, SCOPE and the Zhongyu Environmental Technologies Corporation brought together invited experts, young early-career scientists, and decision-makers and practitioners from the civil society at an International Forum in Yixing, China. This was the first of a 10-year cycle of annual meetings designed to provide a framework for 2-way information exchange between the scientific community and decision makers on multiple aspects of environmental sciences, challenges and opportunities at international scale and perspectives to help better manage world resources. The second Forum will take place in Taiyuan, Shanxi on 11-14 October 2012.

Elsevier and SCOPE formalized their collaboration to publish a new quarterly journal *Environmental Development*, in February 2011. The Editor in Chief is Prof. Theo Beckers; Profs. John Giesy and Lü Yonglong are Associate Editors. Distinguished scientists from around the world serve as regional editors and on the editorial board. Open access is available for the issues published to date at <http://www.sciencedirect.com/science/journal/22114645>

The UNEP Year Book 2011 was released in February 2011 at the meeting of the UNEP Governing Council. The Emerging Issues section, prepared by SCOPE experts, covers three topics: plastic debris in the oceans, phosphorus and food production, and loss of forest biodiversity. SCOPE experts were again involved in this section of the 2012 Year Book, released again during the UNEP Governing Council in Nairobi in February 2012. Topics reviewed were: benefits of soil carbon and the closing and decommissioning of nuclear power reactors (see http://www.unep.org/yearbook/2012/uyb_series.asp).

The report “21 Issues for the 21st Century Results of the UNEP Foresight Process on Emerging Environmental Issues” was presented to the Governing Council during its February 2012 meeting in Nairobi. The Foresight Process is designed to answer a set of critical scientific questions and provide a careful and authoritative ranking concerning the most important emerging issues related to the global environment. Feedback from SCOPE network experts was coordinated by the Secretariat in a 3-week drive in March 2011 to provide UNEP with a roster of more than 800 names, representing a balanced representation of world regions, expertise, and gender. SCOPE also assisted by identifying the science reviewers of the final document and coordinating that review.

Publications

UNESCO-SCOPE-UNEP Policy Brief Series published in 2011

- PB 14: Engineering the Climate: research questions and policy implications
- PB 13: Third Pole Environment

More INI publications

- Nitrogen in Europe (NinE) website
<http://www.nine-esf.org/ENA-Book>

- The European Nitrogen Assessment, Cambridge University Press : http://www.cambridge.org/gb/knowledge/isbn/item5962645/?site_locale=en_GB
- The Nitrogen Deposition and Natura 2000 study looking at the impact of nitrogen pollution on wildlife <http://cost729.ceh.ac.uk/n2kworkshop>
- For more information on the nitrogen footprint calculator visit <http://www.n-print.org/>

IAI – Inter-American Institute for Global Change Studies

- Climate Change and Biodiversity in the Tropical Andes - The IAI conducted a 2-year assessment of the interactions between climate change and biodiversity in the tropical Andes, and of the regional capacities to address issues of research, mitigation, and adaptation. The resulting book, co-produced with SCOPE, is the first comprehensive state-of-the-art appraisal for the region.

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AOSB/Marine Working Group

Steering Group:

Savithri Narayanan, Chair, Canada

Bert Rudels, Vice Chair, Finland

Rolf Gradinger, Vice Chair, US

Harald Loeng, Past Chair, Norway

Scope:

The geographic scope of the Marine Working Group shall be the Arctic Ocean and the Subarctic Seas. The scientific scope of the Marine Working Group shall include but not be limited to any marine natural science or engineering research.

Scientific Priorities:

The Arctic Ocean Sciences Board/Marine WG of IASC has been active for the past 25 year. Therefore, their priorities and activities are ongoing and well-established. However, the membership expanded considerably when AOSB merged with IASC in 2009 and the meeting in Potsdam in January 2011 offered the first opportunity for the new and expanded membership to meet. Since their terms of reference were already agreed upon, the group focused first and foremost on discussion and approval of its five-year strategy (priority areas of research), secondly on its ongoing activities, and lastly on development of cross-cutting initiatives that could be undertaken with other IASC WGs.

Scientific priorities of the AOSB/MWG are:

- Predicting and understanding rapid changes to the Arctic Ocean system
- Understanding sea ice structure dynamics and the Arctic system
- Understanding biological and ecosystem processes in the Arctic and Sub-arctic seas
- Understanding geochemical processes in the Arctic and Sub-arctic seas
- Improving access to the geological record of the Arctic Ocean

Activities:

Many of the activities undertaken by the AOSB/MWG are directly related to the priorities outlined above. Some of the priority areas have no current activities but the AOSB/MWG will entertain new activities in these areas in 2012 and beyond.

Following the Potsdam meeting, the AOSB/MWG held its annual meeting during the ASSW 2011 in Seoul, Korea. At this meeting it approved a number of activities related to the priorities identified in its five year plan.

The AOSB/MWG was instrumental in drafting a cross-cutting proposal with the CWG and AWG to better understand sea ice structure and dynamics by creating an IASC network entitled the Arctic Climate System Network (ACSNet). This program aims through the coordination and networking of existing or emerging fieldwork, to implement an intensive cross-disciplinary study of the role of the polar seas in climate. The essential aim of ACSNet is to devise a common space-time framework for individual research projects arguing for the combining of disparate efforts to form an intensive, international and multidisciplinary research effort--initially with its focus on the Greater Canada Basin and its marginal ice zone. Chaired by MWG member Mary Louise Timmermans, the ACSNet will hold its first open meeting during the IPY Montreal Science Conference in April 2012.

The AOSB/MWG co-sponsored with the European Science Foundation a workshop on “Overcoming Barriers to Arctic Ocean Scientific Drilling: the Site Survey Challenge” in November 2012 in Copenhagen, Denmark. Chaired by MWG member Naja Mikkelsen, the workshop aimed to develop a site survey and planning strategy based upon existing and planned proposals for deep sea drilling in the Arctic Ocean.

Also in November, the AOSB/MWG partnered with the Pacific Arctic Group to support a Distributed Biological Observatory Workshop in Victoria, Canada. The Distributed Biological Observatory (DBO), led by Dr. Jacqueline Grebmeier, is designed as a change detection array for the identification and consistent monitoring of biophysical responses in pivotal geographic areas that exhibit high productivity, biodiversity and rates of change. The Pacific Arctic Group (PAG) is undertaking a pilot program of this array. With the goal of the Marine WG to both understand biological processes and ecosystem change in the Arctic, the WG is supporting actions to harmonize DBO activities in the Pacific sector with similar and ongoing planned activities in the Atlantic sector of the Arctic.

The Arctic in Rapid Transition (ART) Initiative is an integrative, international, interdisciplinary, pan-Arctic network to study the spatial and temporal changes in sea ice cover, ocean circulation and associated physical drivers over multiple timescales to better understand and forecast the impact of these changes on the ecosystems and biogeochemistry of the Arctic Ocean. The ART initiative was initiated by early career scientists in October 2008 and subsequently endorsed by the MWG. The ART Executive Committee (EC), chaired by Dr. Carolyn Wegner, will held a meeting in November in Copenhagen to develop several funding proposals for activities in 2012 and beyond. Additionally, the EC is planning a workshop in October 2012 in Sopot, Poland entitled “Overcoming challenges of observation to model integration in marine ecosystem response to sea ice transitions.”

During the IPY, the AOSB/MWG organized and supported the integrated Arctic Ocean

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Observing System (iAOOS) which supported many new observational initiatives in the Arctic Ocean and sub-arctic seas. The AOSB/MWG now envisions a Sustained Arctic Observing Network (SAON) of technical capacity, human resources, good will and commitments that will compile Arctic Ocean data acquired during the IPY, and complete its standardization, synthesis and timely migration from project archives to a single internally consistent public resource. At this point, the focus of the AOSB/MWG is proposing a modest demonstration project to explore and address the challenges of this vision. The demonstration will focus attention only on observations from moored instruments during IPY. The hope is to assemble and provide easy access to as much data as possible. The consolidated data will further be integrated to form a preliminary synthesis of the state of the Arctic Ocean during the IPY. A core group of individuals, led by Dr. Humfrey Melling, has been working to realize this vision held a discussion with PIs in November 2011 during the Arctic Sub-arctic Ocean Fluxes (ASOF) meeting in Bergen, Norway. A subsequent larger meeting with data managers and PIs is being planned for 2012.

During 2011, IASC, on behalf of the AOSB/MWG, signed a MoU with the International Council for the Exploration of the Sea (ICES). Under this MoU, the AOSB/MWG will jointly sponsor two sessions at the September 2012 Annual Science Conference of ICES. Taking into account AOSB/MWG's long experience with subarctic influences on the physical dynamics of the Arctic and the biogeochemical responses, AOSB/MWG will cosponsor a session on "The Role of the Arctic in Climate Change" and "Subarctic-Arctic Interactions: Ecological Consequences." This will be the first of what hopefully will be many collaborations with ICES.