

THE INTERNATIONAL OCEAN CARBON COORDINATION PROJECT (IOCCP)

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

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- *** Updated Repeat Hydrography Manual Now Available On-line
- *** Special Issue of Oceanography Magazine "Celebrating 50 Years of the Intergovernmental Oceanographic Commission" now available
- *** Matlab Toolbox to Perform Secondary Quality Control on Hydrographic Data Published at CDIAC
- *** Alliance for Coastal Technology Releases Demonstration Statements for pCO₂ Analyzers
- *** REgional Carbon Cycle Assessment and Processes (RECCAP) meeting
- *** Fifth Session of the IOCCP Scientific Steering Group

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Updated Repeat Hydrography Manual Available On-line

The Global Ocean Ship-based Repeat Hydrographic Investigations Program (GO-SHIP) was developed to provide a sustained coordination mechanism for global repeat hydrography as outlined in the GO-SHIP strategy (available online at: http://www.go-ship.org/Docs/IOCTS89_GOSHIP.pdf). Central to this coordination is ensuring that measurements made by different groups are comparable, compatible, and of the highest quality possible. One early priority for GO-SHIP was to revise the 1994 WOCE Hydrographic Programme manual.

In the 15 years since the original publication of the manual, many methods and techniques have changed and new sensors have been developed. *The GO-SHIP Repeat Hydrography Manual: A Collection of Expert Reports and Guidelines* (www.go-ship.org/HydroMan.html) provides detailed instructions for the high quality collection and analysis techniques of numerous ocean parameters, both physical and biogeochemical. Sixteen chapters covering CTD methods, discrete samples, and underway measurements have been reviewed and revised by more than 50 experts. Chapters have been through a period of open community review and comment and have also been reviewed through an informal peer-review process. While most chapters were written specifically for this new version of the manual, several chapters are recently published guides that have been adopted as the GO-SHIP reference for specific variables.

The GO-SHIP sponsors and committee members would like to thank all authors and reviewers for their contributions to this important effort.

Committee

Bernadette Sloyan (CSIRO, Australia)—*Co-chair*
Christopher Sabine (NOAA PMEL, USA)—*Co-chair*
Masao Fukasawa (JAMSTEC, Japan)
Nicolas Gruber (ETH-Z, Switzerland)
Masao Ishii (MRI-JMA, Japan)
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Lynne Talley (SIO, USA)
Toste Tanhua (IFM-GEOMAR, Germany)
Richard Feely (NOAA PMEL, USA)—*ex-officio*

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For more information please visit: www.go-ship.org/HydroMan.html

The September Special Issue of Oceanography Magazine "Celebrating 50 Years of the Intergovernmental Oceanographic Commission" Published

The special issue is one of the ways the IOC is being recognized for 50 years of outstanding service to the community through facilitating international cooperation and coordination of oceanographic research. The articles in the special issue help to illuminate five decades of IOC partnerships with a myriad of nations, including the United States, in support of ocean research, discovery, and the pursuit of knowledge about our ocean and its importance to the well-being and prosperity of nations around the world.

The most important purpose of this volume is to highlight, for today's young scientists, IOC's past role in fostering international research cooperation, as the Commission begins its next 50 years, with new leadership, and at a time when understanding the nature of our world's ocean is becoming more important by the day. The articles aim to

- Highlight the many arenas of ocean science that IOC has joined as a crucial partners, along with other international bodies (inter-governmental and non-governmental), individual nations and agencies, and the community of ocean scientists, to drive ocean research forward, to make it more international and interdisciplinary, and to tackle important environmental problems with increased and improved scientific research.

- Note and celebrate IOC's efforts, derived from its Ocean Sciences Section, that have had a disproportionate impact on the field of oceanography and its evolution. By doing so, we hope to increase awareness among future scientists of the vital role IOC plays in the promotion of fundamental ocean research as well as the development and support of observing systems and capacity building. This volume notes the development of methods to promote progress in our science, the formation and sustenance of international scientific discussion within working groups, and the development and implementation of international scientific research programs
- Outline ideas about future IOC needs that should be met in order to allow the Commission to continue to nurture, facilitate, and support international ocean science research.

Debbie Bronk (The College of William and Mary, Virginia Institute of Marine Science and US Committee for the IOC), Phil Taylor (National Science Foundation, and the US Interagency Working Group for the IOC), Kathy Tedesco (IOC/UNESCO)

For more information please visit: www.tos.org/oceanography/issues/current.html
To request print copies please contact Kathy Tedesco at k.tedesco@unesco.org

Matlab Toolbox to Perform Secondary Quality Control on Hydrographic Data published at CDIAC

The Matlab Toolbox to Perform Secondary Quality Control (2nd QC) on Hydrographic Data by Toste Tanhua (IFM-GEOMAR) was published at CDIAC:
http://cdiac.ornl.gov/oceans/2nd_QC_Tool/

Secondary quality control is a process in which data are objectively studied to quantify systematic biases in the measurements. The identified data biases are subjectively compared to predetermined accuracy limits. If the data from the cruise being analyzed show significant bias, this may indicate that an adjustment (either multiplicative or additive) needs to be made to the data, or that there is a systematic problem in the data generation or calibration.

It is not recommended that data be adjusted solely on the basis of a secondary QC, but rather that it be stated in the meta-data that there may be a bias and why. At best, the source of the bias will be identified (for example, a problem with the standard used) and corrected.

Using this package allows crossover analysis to be performed. Crossover analysis is an objective comparison of deep water data from one cruise with data from other cruises in the same area (e.g., Sabine et al. 1999, Gouretski and Jancke 2001, Johnson et al. 2001, Sabine et al. 2005, Tanhua et al., 2010, see also <http://cdiac.esd.ornl.gov/oceans/glodap/crossover.html>). The scripts in this package are modified versions of the scripts used by the CARINA project (Tanhua et al., 2010)

For more information please visit: <http://cdiac.ornl.gov/oceans/home.html>
or contact Alex Kozyr at kozyra@ornl.gov

Please cite as:

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Alliance for Coastal Technology Releases Demonstration Statements for pCO₂ Analyzers

The Alliance for Coastal Technology (ACT) has evaluated four commercial pCO₂ instruments (PMEL MAPCO₂/Battelle Seaology pCO₂, Contros HydroC/CO₂, Sunburst SAMI-CO₂, Pro-Oceanus Systems PSI CO₂-Pro) that are capable of being moored for weeks to months. The ACT demonstration projects are designed to characterize performance of relatively new and promising instruments for applications in coastal science, coastal resource management and ocean observing.

Briefly, test instruments were mounted on surface moorings in a temperate stratified estuary (Twano Bay, Hood Canal WA USA; August-September 2009) and a coral reef (Kaneohe Bay Hawaii; October-November 2009). Water samples were collected to determine pH and total alkalinity for calculation of pCO₂ and direct measurements of pCO₂ using a flow-through pCO₂ analyzer. In situ pCO₂ from the instruments are compared to both of these references and estimates of analytical and environmental variability are reported. The ACT evaluations examine performance under specific protocols, criteria, and quality assurance procedures.

ACT does not rank nor compare technologies or seek to determine “best available technology” for any purpose, but they have provided summary reports for each of the sensors and the ACT test protocols.

For more information please visit: www.act-us.info

REgional Carbon Cycle Assessment and Processes (RECCAP)

RECCAP is a new assessment of the Global Carbon Project¹ (GCP) to establish the mean carbon balance and its inter-annual variability of large regions of the globe for the period 1990-2009. It will cover all sub-continent and ocean basins allowing the regional budgets to be compared against the global carbon budget. This consistency check will be a unique measure of the level of confidence we have in scaling down regional budgets.

Four critical objectives justify the need for RECCAP:

- To provide higher spatial resolution of the global carbon balance with the aim to improve attribution to processes and hot-spots regions, essential to understand the future evolution of the carbon-climate feedback.

- To address a growing demand for a capacity to Measure, Report, and Verify (MRV) the evolution of regional fluxes and the outcomes of climate mitigation policies.
- To develop the technical capacity in regions with regional carbon balances of global significance but with little or not technical capabilities.
- To respond to the Group on Earth Observations (EOS) in establishing a global carbon observatory to track the evolution of natural and anthropogenic carbon sources and sinks.

Each regional carbon balance is being developed by comparing and reconciling multiple bottom-up estimates, which include observations and model outputs, with the results of regional top-down atmospheric CO₂ inversions. A methods soft-protocol guides the development of the assessment, and a consistent treatment of uncertainties (still being developed) will ensure the appropriate level of comparativeness and characterization of where the highest uncertainties are. A 2-tier system approach ensures that regions with limited observations and past analyses can build their syntheses upon datasets and model output from global products, while regions with a dense observational network can use and appropriately weigh regional estimates against those from global analyses. A data fair-use policy ensures the appropriate handling and acknowledgement of the data made available through the RECCAP process.

RECCAP was first conceived in 2007 followed by a 2-year period to establish the regional synthesis groups and develop a number of modeling and observational products in support of the regional syntheses. The first all-lead authors meeting took place in early October this year in Viterbo, Italy, where the groups assessed progress to date and the viability of global products to be part of the regional syntheses.

RECCAP has 14 regional syntheses (10 terrestrial and 4 ocean) and 8 global syntheses, for which a complete draft is expected by 25 April 2011 when a review and feedback process will be initiated. A second all-lead authors meeting will take place at the U.S. F&W National Conservation Training Center, West Virginia, USA, during 23-27 May 2011. This second meeting will help finalized the regional budget synthesis and design a number of “syntheses of syntheses” building upon the information generated by the various regional and global syntheses and products.

RECCAP builds upon existing synthesis efforts, national carbon research programs, existing and newly developed databases and model output. For those regions where little research capacity exists to work on the carbon budget syntheses, RECCAP has actively established consortia that bring together scientists from the developing and developed countries to work on specific regions.

RECCAP will produce one major special issue in Biogeosciences with all regional and global syntheses, and a number of high-level syntheses in other journals (eg, Nature Geosciences, Nature Climate Change, Science). There will be also a set of additional support papers (eg, soft protocol, uncertainties). An important legacy of RECCAP will be a distributed database (updatable in the future) of C fluxes from regional and global estimates for the broader community to use for further analyses.

RECCAP is probably one of the most ambitious assessments that the carbon cycle research community has engaged to date. This stems from its voluntary nature and the broad range of disciplines involved, including measurement and modeling research communities dealing with components of the land, ocean, and atmosphere carbon budgets.

The two major sponsors of RECCAP are the COOrdination action Carbon Observation System (COCOS in Europe), and the Carbon Cycle Science Program in the USA. Other sponsors include the International Ocean Carbon Coordination Project (IOCCP), the Chinese Science Academy (CAS), CSIRO Marine and Atmospheric Research (Australia), and the National Institute for Environmental Studies (NIES in Japan).

Detailed information on RECCAP can be viewed at:

<http://www.globalcarbonproject.org/reccap>

For further information, pep.canadell@csiro.au

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- (1) The Global Carbon Project is a joint project of the Earth System Science Partnership (International Geosphere-Biosphere Program (IGBP), the World Climate Research Program (WCRP), the International Human Dimensions Program (IHDP), and Diversitas).
<http://www.essp.org>

Fifth Session of the IOCCP Scientific Steering Group

The Fifth IOCCP Scientific Steering Group meeting was held 5 October 2010 in conjunction with the COCOS-RECAP Workshop (see above) in Viterbo, Italy. Chair Chris Sabine (NOAA/PMEL, USA) was joined by members Dorothee Bakker (UEA, UK), Melchor Gonzalez (U. Las Palmas, Spain), Alex Kozyr (CDIAC, USA), Pedro Monteiro (CSIR, South Africa), Yukihiro Nojiri (NIES, Japan), Ute Schuster (UEA, UK), and Toste Tanhua (IfM-Geomar, Germany). Masao Fukasawa (JAMSTEC, Japan) was unable to attend. Nicolas Metzl (LOCEAN-IPSL, France) and Nicolas Gruber (ETH, Switzerland) attended as representatives of the SOLAS-IMBER Carbon Working Groups.

The SSG thanked Dorothee Bakker and Masao Fukasawa who rotated off after six years of dedicated service to the IOCCP and welcomed new members Jean-Pierre Gattuso (CNRS-UPMC, France) as the ocean acidification representative, Are Olsen (Univ. Bergen, Norway) who will replace Dorothee Bakker, Bernadette Sloyan (CSIRO, Australia) to replace Masao Fukasawa, and Masao Ishii (MRI-JMA, Japan) to replace Toste Tanhua. Toste Tanhua will serve as co-Chair with Chris Sabine in 2011 and take over as Chair in 2012.

The full meeting report is in preparation and will be available at the IOCCP web-site in mid-November.

For further information please visit www.ioccp.org

