

International Ocean Carbon Coordination Project – a pilot project of the SCOR- IOC Advisory Panel on Ocean CO₂ and the IGBP-IHDP-WCRP Global Carbon Project

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Critical Ocean Carbon Questions

Three key scientific questions relevant to the ocean's role in the global carbon cycle arise from current policy-related issues:

- How large are present-day oceanic carbon sources and sinks, where do they operate, and what processes are controlling them?
- How will oceanic carbon sources and sinks behave in the future under higher atmospheric CO₂ concentrations and a possibly altered climate and ocean circulation?
- How will we assess our forecasts of future oceanic sink behaviour and thereby determine the effectiveness of any deliberate mitigation activities?

The Need For International Cooperation

There is considerable national and international interest to develop a global ocean carbon observing capability and research strategy for ocean carbon assessment and projection. After JGOFS, there is no single global research program that will provide an international home for ocean carbon research and observations. Because of the global scope of the ocean carbon cycle, research and observations require a new level of international cooperation and collaboration, including joint international planning, cooperative implementation, and data sharing. Only through a coordinated ocean sampling programme and improved, basic scientific understanding of the ocean carbon cycle will the overall goal of skilful predictions of future atmospheric CO₂ be attained.

The International Ocean Carbon Coordination Project

Recognizing the need for international coordination of ocean carbon observations, the SCOR-IOC Advisory Panel on Ocean CO₂ and the IGBP-IHDP-WCRP Global Carbon Project have initiated a collaborative project to provide:

- information about current and planned ocean carbon programs
- coordination for national, regional, and international observations
- joint planning workshops
- optimisation of resources, and
- maximum sharing and use of data and information.



Coordinating Committee

Maria Hood – IOC / UNESCO; technical officer of the CO₂ Panel.

Chris Sabine – NOAA / PMEL; ocean carbon focal point, Global Carbon Project.

Doug Wallace – IFM, Uni. Kiel; Chair, CO₂ Panel.

Ed Urban – Executive Director, SCOR.

Pep Canadell – Executive Director, Global Carbon Project.

Wendy Broadgate – Deputy Director, Natural Sciences, IGBP.

Howard Cattle and Katy Hill – International CLIVAR Project Office.

Planned Activities, 2003.

January 13-15 Workshop: Ocean Carbon Observations from Ships of Opportunity and Repeat Hydrographic Sections, IOC-UNESCO, Paris. <http://ioc.unesco.org/ioccp>. CD-ROMs of the meeting presentations, information compilations, and recommendations are available from M.Hood.

March 10-14 International Ocean pCO₂ Intercomparison Experiment, NIES / Hazaki, Japan. Indoor seawater pool to perform critical comparisons for underway systems and moored / drifter sensors to within 0.3 uatm. Lead: Yukihiro Nojiri (nojiri@nies.go.jp).

October (to be determined) Post-intercomparison workshop and workshop on standards and data formats, NIES, Tsukuba, Japan. Lead: Yukihiro Nojiri (nojiri@nies.go.jp).

The IOCCP provides an international mechanism for: program planning → coordination → standardization of methods and data → data product development.



Underway pCO₂ – quantifying the basin-scale air-sea fluxes of CO₂ over seasonal to interannual time periods.



Hydrographic Sections – quantifying the decadal evolution of natural and anthropogenic CO₂ in the ocean interior.



Remote Sensing – estimating upper ocean biomass and primary productivity, providing a synoptic link between the ocean ecosystem and physical processes, and quantifying air-sea gas flux.



Coastal Observations – quantifying high-flux interfacial exchanges, calculating the large-scale effect of coastal margin processes on the ocean carbon cycle.



Atmospheric Monitoring – characterizing the exchanges affecting marine and atmospheric biogeochemical cycles of key nutrients and gases; CO₂, carbon isotopes, O₂/N₂, trace metals and nutrients, DMS, and meteorological forcing.

The IOCCP is working with national, regional, and international programs and data centers to provide a global view of ocean carbon research and observations.



Results from the First Workshop of the IOCCP:



Workshop information is available at: <http://ioc.unesco.org/ioccp>. For a copy of the workshop CD-ROM, please contact Maria Hood (m.hood@unesco.org).

International Ocean Carbon Coordination Project Workshop on Ocean Carbon Observations from Ships of Opportunity and Repeat Hydrographic Sections

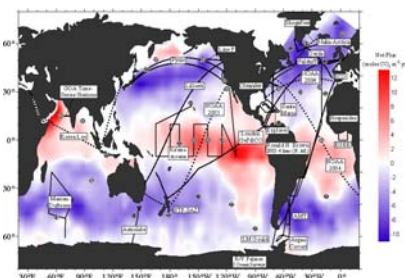
Date and Location: January 13-15, 2003, Intergovernmental Oceanographic Commission-UNESCO, Paris, France.

Financial Support: Support for this workshop was provided through US National Science Foundation Award No. OCE-0245278 to SCOR. Organizing committee support and meeting support services were provided by IOC-SCOR, and the GCP. Travel support provided by NSF/USA, NOAA OGP/ USA, NIES/Japan, JAMSTEC/Japan, AIST/ Japan, Fuji Research Institute Corp. /Japan. 56 participants from 17 countries.

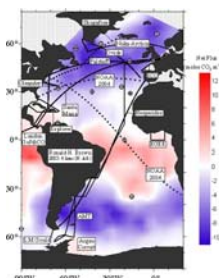
Workshop Results:

- Observation program information compilation** – collected VOS metadata forms, collected Repeat Section metadata forms, developed Atlantic, Indian, and Pacific compilation maps and tables (below) showing repeat sections, ship of opportunity tracks, and time series stations currently operational or planned.
- Data Exchange and Release Agreements** – the group recommended the release of repeat section carbon data sets to be carried out as quickly as possible, not to exceed 2 years after cruise completion; VOS data should be released within 1 year.

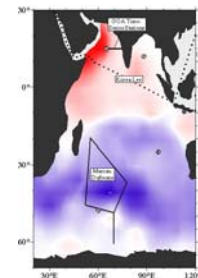
Observation Program Information Compilations from the First IOCCP Workshop:



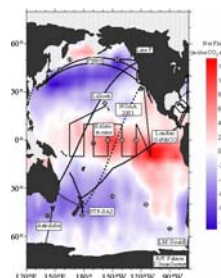
Global View of VOS network measuring carbon and/or biogeochemical variables. Solid lines = funded. Dotted lines = planned. Symbols = time series stations measuring carbon and biogeochemistry. Project information for these lines can be found at: <http://ioc.unesco.org/ioccp>.



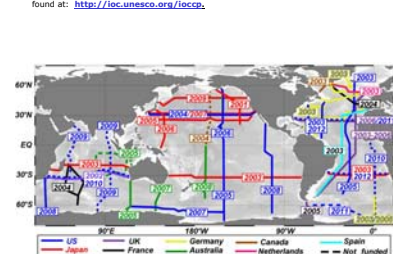
Atlantic



Indian



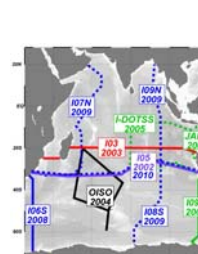
Pacific



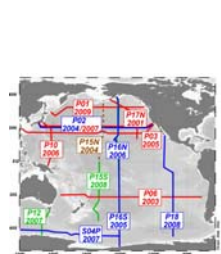
Global View of the repeat hydrographic sections measuring carbon and tracers. Solid lines = funded. Dotted lines = planned. Project information for these sections can be found at: <http://ioc.unesco.org/ioccp>.



Atlantic



Indian



Pacific