Ocean Surface pCO_2, Data Integration and Database Development

An international workshop co-sponsored by
NIES, IOCCP, and PICES WG 17
January 14-17, 2004 Tsukuba, Japan

Independent Administrative Institution
National Institute for Environmental Studies

PICES

Working Group III: Data Integration and Inventory of Observations

Summary of Discussions and Decisions on Data Integration and Data Networking:

Data Integration

The goal is to estimate basin scale annual air-sea flux of CO_2 to better than ±0.2 Pg Carbon. Required data sets include seasonal to inter-annual basin-scale syntheses; 10 year global scale syntheses.

Data Release / Data Center Networking

Data sets (providing the IOCCP-recommended information) should be sent to CDIAC World Data Center for Atmospheric Trace Gases (either directly or via other World, National or project data centers) no later than 2 years after the end of the cruise.

Data Citations and Acknowledgements

When data are submitted to the data center, the contributor should provide information on how the data set is to be cited or acknowledged in publications using the data. For data submitted < 2 years before end of program, CDIAC will limit access to the data until the contributor has been contacted. As a courtesy to the original data contributors, it should become common practice for individuals who prepare scientific products based (even in part) on a particular dataset to inform the contact person for that dataset of this use of the dataset.

Data Integration and Synthesis Activities

Data integration and synthesis activities (such as developing basin-scale and global data sets) in the next few years should be coordinated and carried out as part of SOLAS Focus 3 (especially 3.1), with integration organized around regional groups. Integration will also cover coastal areas.

Summary of Discussions on Future Needs for Data Integration:

The workshop participants concluded that meeting the data integration goals outlined above requires an international implementation strategy. International activities must be coordinated to develop a comprehensive global network by sustaining existing observation programs and developing new programs following a strategy based on the analysis of the spatial and temporal resolution of measurements needed to meet global data set goals. International programs and national funding agencies need an internationally-agreed upon implementation strategy in order to evaluate national

efforts in an international context and to prioritize projects that contribute to the global network. The workshop participants outlined the necessary elements for developing a coordinated network of surface ocean CO_2 observations, and noted that many of the elements already exist.

Future Needs = A Global Ocean Carbon Observing System.

- Surface pCO_2 Network
- Hydrographic Sections
- Time Series Stations
- Remote Sensing

The Surface pCO_2 Network – Developing an Implementation Strategy
(Grey Italics = elements needing further work; Bold Text = elements we already have). (Note: the following list was developed at the workshop to place existing coordination efforts and agreements in the context of a global system. It should not be considered as an outline for the implementation strategy.)

1. **Analysis of the spatial and temporal resolution required for the global system – LSCOP Annexes D & E define spatial and temporal resolution required to meet the goals of producing high-quality basin-scale data sets for climate research. This analysis may be used as a first estimate, but has several weaknesses and should be redone to include high-frequency variability.**
2. **The Network Design – based on the analysis from #1 above, define needs in each basin or sub-basin in terms of number of VOS, time series, and drifters? Stringent adherence to quality (needs to be defined globally and for specific measurement platforms).**
3. **The Inventory – existing programs that can be considered to be the initial / developing network. http://ioc.unesco.org/ioccp**
4. **Assessment of Gaps – based on the network design and the inventory, where are the critical gaps in the global system? Must consider existing programs and plans for other parts of the observing system (e.g., time series network).**
5. **Implementation Strategy and System Feedback – Based on the analysis, network design, inventory, and analysis of gaps: how to prioritise and fill gaps and sustain existing elements; MUST INCLUDE plans for data analysis, synthesis, modelling, etc, (e.g., via SOLAS Focus 3) required as feedbacks into the system design to ensure that the network is meeting scientific requirements. Research should also include development of interpolation techniques and new approaches / technology (flask sampling, etc) to fill gaps.**
6. **Data Management Plans – where data should be sent, what is the release and exchange policy, what methodologies to follow, what standards to use, what data center(s) manage the network, data formats, file formats, metadata requirements, etc.** (based on decisions from this workshop)
7. **Development Timeframe and Operational Costs – timeframe goals for implementation of the global network and estimation of incremental development and maintenance costs.**

8. **Develop a programmatic link and advocacy for integration of this project into global observing system plans – develop the system as a pilot project under IOCCP / OOPC / GCOS (GOOS).** (has already been suggested / requested by OOPC).

The workshop participants recommended that the IOCCP develop a draft implementation strategy for a surface ocean CO_2 pilot project. While the LSCOP report appendices (D & E) provide a good first estimate of the required temporal and spatial resolution, the methods used in the analysis considerably smooth the data. The workshop participants recommended to proceed with the first draft of the implementation strategy based on this analysis, but to carry out a more rigorous analysis as soon as possible (in parallel). The IOCCP will investigate funding possibilities for this activity (estimated to be 1-2 months salary support).