generally close to the atmospheric CO_2 increase, indicating relatively constant sinks. In recent years, significant decadal changes in pCO_2 have been observed in some parts of the ocean, e.g., in the North Atlantic and the equatorial Pacific; however, for many regions there are still no routine observations. Quantification of the decadal changes of the air-sea CO_2 fluxes has been improved using atmospheric data, especially for the vulnerable Southern Ocean, where oceanic data are sparse. Presentations, posters, working group reports, and maps and tables of the ocean carbon observation network are available on the meeting Web page: http://www.ioc.unesco.org/ioccp/pCO2_2007.htm.

A major outcome of the workshop was the widespread recognition and strong support for sustained funding and further development of the global observing system for surface pCO_2. The workshop resulted in actions for developing joint synthesis papers, establishing a standard and well-documented global surface pCO_2 data set, and producing a regular atlas of surface ocean pCO_2. Regional synthesis groups were formed to analyze the underlying causes for variability and vulnerability in the system and to develop plans for a sustained observing system.

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Past, Present, and Future: A Science Program for the Arctic Ocean Linking Ancient and Contemporary Observations of Change Through Modeling

A follow-up to the 2nd International Conference on Arctic Research Planning, 19–21 November 2007, Potsdam, Germany

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The Arctic Ocean is the missing piece for any global model. Records of processes at both long and short timescales will be necessary to predict the future evolution of the Arctic Ocean through what appears to be a period of rapid climate change. Ocean monitoring is impoverished without the long-timescale records available from paleoceanography and the boundary conditions that can be obtained from marine geology and geophysics. The past and the present are the key to our ability to predict the future.

The 2nd International Conference on Arctic Research Planning (ICARP II) was organized around preparation of science plans by 12 working groups (WG) that spanned the full range of Arctic studies. The reports from these working groups are available at http://www.icarp.dk. To build on the ICARP II effort, chairs and young scientists from the working groups, representatives of the sponsoring agencies, and members of the steering group met in Potsdam, Germany, from 19 to 21 November 2006 to use the rationale laid out in the working group reports to focus future science activity in the post International Polar Year environment.

The original marine working groups were divided into shelf, margins and gateways, and deep basin regions. Their connectivity and overlapping concerns were reflected in redundancies between the WG reports. At the same time, gaps were evident between the WG reports. In Potsdam, these three groups, Deep Basin (WG 4), Margins and Gateways (WG 5), and Shelves (WG 6), came together to prepare a unified science plan. Our unified science plan has two primary objectives.

Improved monitoring of the Arctic Ocean through autonomous data acquisition and time-series studies is the first component of our proposed program. Understanding of the active processes in the Arctic Ocean is being built on monitoring at sea and on land at strategic sites. Synoptic observations collected through varied means will document change at seasonal, annual, and, eventually, decadal scales.

The second focus is on scientific drilling to reconstruct the tectonic history of the Arctic Ocean and recover paleoceanographic records. The tectonic history of the Arctic Ocean is critical to setting the physical boundary conditions that restrict and enable oceanographic processes and shape ocean circulation.

Understanding contemporary processes and variations at the days to decades scale at dispersed sites across the Arctic Ocean margins and basin is the highest priority for the oceanography, biology, and sea ice communities. Consistently monitoring key locales and circulation choke points (e.g., gateways) with autonomous instruments will establish how climate change is advancing through various systems in the Arctic.

While a well-structured monitoring program could expose the synoptic changes, study of the basin at timescales of hundreds to tens of millions of years can only be accomplished through a systematic program of scientific drilling. These records would also span the time of the last high-pCO_2 environment, which would provide a critical analog for the present anthropogenically driven climate changes.

The full text of this meeting report can be found in the electronic supplement to this *Eos* edition (http://www.agu.org/eos_elec/).

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