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Arctic Ocean – Atmosphere – Sea Ice – Snowpack (OASIS) Interactions Affecting Atmospheric Biogeochemistry, Climate and Ecosystems in the Arctic

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The Arctic Ocean is central to the understanding of climate and global environmental change. As a critical component of the Earth system, the Arctic region both influences and responds rapidly to natural variations and to human-induced perturbations, such as warming, contaminant accumulation, and associated impacts. While it is clear that there are dramatic changes occurring in the Arctic, the interactions between the air and surfaces are still not understood. The international, multidisciplinary Ocean-Atmosphere-Sea Ice-Snowpack (OASIS) program addresses the knowledge gaps and coordinates studies of Arctic atmosphere-surface interactions and associated feedbacks to the climate system.

OASIS is planned as a long term science program for the next decade. OASIS is linked to a number of international organizations and activities, including AMAP, the IGBP programs IGAC under the AICI (Air Ice Chemical Interactions) activity, and SOLAS (Surface Ocean Lower Atmosphere Study), and the WCRP project CliC (Climate and Cryosphere).

The abundant snowpack in the Arctic is not just a white cover: an array of intriguing reactions has been observed within and on snowpacks and sea-ice during springtime Arctic sunrise that dramatically influences the composition of the atmosphere. Building on these discoveries, the OASIS research approach is aimed at a better understanding of air-surface chemical exchange in the context of a changing climate. Fundamental physical, chemical, and biologically-mediated chemical exchange processes will be studied to answer questions such as: Will climate change increase or decrease the amount of mercury deposited in the Arctic? How will warming affect regional and global climate? How are sea ice and snow chemistry and physics chang-

ing? What is the role of biological processes in producing reactive atmospheric gases? What is the role of sea-salt in ozone depletion? What are ecological and human health impacts of toxic materials such as mercury and chlorinated contaminants?

OASIS-IPY will include multiple coordinated research approaches from a number of logistics platforms such as ships, ice-camps, aircraft, buoys and land-based stations.