

A Proposed Arctic Climate Impact Assessment Follow-up Action By the Arctic Monitoring and Assessment Program

Title: A Scientific Synthesis and Assessment of the Arctic Carbon Cycle

Rationale: The release of large stores of carbon in land and ocean systems of the Arctic in response to climate change have the potential to substantially increase the concentration of the radiatively active gases carbon dioxide (CO₂) and methane (CH₄), which would act as a positive feedback to climate change and have consequences both within and outside the Arctic.

Overall Objectives:

- A. Gather existing data and information on the current exchanges of major carbon species (CO₂, CH₄, dissolved organic carbon – DOC, dissolved inorganic carbon – DIC, and particulate organic carbon – POC) among the atmosphere, land, and ocean systems of the Arctic (see Figure 1) and prepare an assessment of the current state of the Arctic carbon cycle and its quantitative significance relative to the global carbon cycle.
- B. Based on the above, along with historical instrumental and paleo-data, evaluate potential sensitivities of the Arctic carbon cycle under a range of global change scenarios.
- C. Evaluate the representation of the Arctic carbon cycle in climate models.
- D. Identify the key uncertainties in A, B, and C above, and recommend actions to reduce them.

Expected Outcome: The product of this assessment will be a paper published in the peer-reviewed science literature. This paper will be a synthesis that is useful to the science community and to funding agencies. It will serve to provide guidance for further research and monitoring and as input to decisions on funding priorities. The assessment will have implications for policy, but it will not consider policy-related issues. Publication may be through an international scientific journal, or other appropriate means. There is no expectation of producing an overview document for non-scientists.

Approach: A team of experts will prepare the assessment based on published information. Experts will be nominated in the usual AMAP manner, with the expectation that nominating organizations will arrange base support for their nominees.

Lead Country: The United States offers to serve as a lead country for this activity, along with any other interested country.

Next Steps: AMAP Members, PPs, and Observers are asked to express their interest in participating in this activity. The US is prepared to organize and host

a workshop in early 2007 to further define the details of the assessment and begin its preparation.