1: Task Title:

Distributed Biological Observatory: Improving international collaboration, data sharing and synthesis

2: Name of leader and partners (*leader’s e-mail address and partner names, affiliation and country):*

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3: Objective (*please be clear and specific):*

The Distributed Biological Observatory (DBO) was initiated by the Pacific Arctic Group (PAG) and has been supported by the Marine Working Group (MWG) of the International Arctic Science Committee (IASC). . Under this proposed task, work will be done to strengthen the DBO and put it on a path to sustainability and product delivery. In particular, effort will be placed on the following activities:

1. Forming science teams to coordinate observations and data management
2. Developing an effective data management protocol
3. Identifying opportunities for integrated data analysis and synthesis
4. Disseminating results of DBO activities and products

4: The need (*please state briefly which need will be met by your proposal, and who has the need)*

The dramatic seasonal retreats and thinning of sea ice, record-setting seawater temperatures and multiple observations of biological changes in the Pacific sector of the Arctic are well documented in the literature. This knowledge precipitated a workshop to evaluate ecosystem response to climate forcing in the Arctic. The international Biology-Sea Ice Workshop was held in May 2009 with participation by 20 experts, including physical, geochemical and biological field scientists and modelers. A key outcome of the workshop was an EOS article entitled “Biological Response to Recent Pacific Arctic Sea Ice Retreats”. In addition to an overview of observed biophysical changes in the ecosystem, the article suggested a framework for the development of a biological observatory by members of the international Pacific Arctic Group (PAG; <http://pag.arcticportal.org>).

The “Distributed Biological Observatory (DBO)” is envisioned as a change detection array along a latitudinal gradient extending from the northern Bering Sea to the Barrow Arc [map of sites and example of change in sea ice and Chl-a]. DBO sampling is focused on transects centered on locations of high productivity, biodiversity and rates of biological change. The DBO sampling framework was initially tested during the successful 2010 Pilot Study, which consisted of international ship occupations of two of the DBO sites, one in the SE Chukchi Sea and one across upper Barrow Canyon. Provisional results of the 2010 Pilot Study were the central topic at the December 2010 PAG meeting in Tokyo, Japan, and at the March 2011 DBO workshop in Seoul, Korea, held immediately prior to the international Arctic Science Summit Week. Approximately 90 people attended the one-day DBO workshop in Seoul, including invited speakers who presented ideas for efforts to expand the DBO concept to the Eastern Arctic. In addition, provisional data sets were presented and planning efforts for the 2011 Pilot Study were initiated. The planned work was undertaken in 2011 and additional work performed in 2012. There is now sufficient interest in continuing the DBO activity on an international basis that greater effort is needed on coordination and product development.

5: Short description (*please limit to one page, use attachment if strictly needed)*:

The Pacific Arctic Group desires to work not only within its membership but in association with partners from the Atlantic sector to advance the DBO concept and produce new levels of scientific understanding. To this end, PAG has been working with the Marine WG to discuss with observatories in the Atlantic sector compatible observations and data sharing. The approach is to use self-forming science teams, under the guidance of a team leader selected by the PAG, to identify opportunities for blending data from multiple international sources to produce a unique scientific product. Creation of such products will send a positive feedback signal to the national organizations financing the research, encouraging them to continue their support for the research and international collaboration.

6: Funding (*estimated budget and likely funding sources):*

The major funding requirement is for the resources to support the science teams. It is expected that the teams will need to meet at the beginning of their work, and at intervals as the work progresses. To the extent possible, science team meetings will take advantage of opportunities to meet in association with major science conferences or other events, and will do a large amount of their work through teleconnections. Science team members will need support for their time commitment, either as direct funding or through agreement to use existing support for this purpose. At this point, only the initiation phase can be budgeted. As future work is defined, budgets can be developed.

Two science teams have been formed to focus on 1) physical, and 2) biological aspects of DBO research in the Chukchi Sea. The need for a data workshop has been identified and is being planned for the spring of 2013. The anticipated funding requirements are:

Physical Science Team

* time and travel support for the team coordinator(s) - $60,000 USD
* travel support for team participants - $30,000 USD

Biological Science Team

* time and travel support for the team coordinator(s) - $60,000 USD
* travel support for team participants - $30,000 USD

Data Workshop

* time and travel support for workshop coordinators - $40,000 USD
* travel support for workshop participants - $50,000 USD

Total estimated funding required for initial phase of work = $270,000 USD

The U.S. NSF and NOAA have committed to support this task, but exact funding levels are to be determined. It is expected that team and workshop participants will seek individual financial support from a national source.

7: Time line *(start and ending):*

Fall 2012 – Biological and physical science teams propose specific actions

Winter/Spring 2013 – DBO data workshop

Spring 2013 - Report to Pacific Arctic Group at Arctic Science Summit Week on progress and plans

Spring 2013 – Science teams begin work on initial products

Spring 2014 – Report to Pacific Arctic Group at Arctic Science Summit Week on progress and plans

The timeline from spring 2014 will depend on accomplishments and PAG evaluation of effectiveness.

8: Expected outcome/product:

1. A plan for data management and data sharing that builds on national capabilities and allows for international access
2. Final or late stage drafts of specific science products that derive from the international data sharing and analysis activities of the science teams