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## SIDEBAR | Arctic Ocean Science and Outreach: A Perspective from the International Polar Year Programme Office

By David Carlson

*International Polar Years (IPY) are internationally coordinated programs of intensified scientific research focused on the Arctic and the Antarctic. In order to have full coverage of both the Arctic and the Antarctic seasons, IPY 2007–2008 covered two full annual cycles from March 2007 to March 2009 and involved over 200 projects, with thousands of scientists from over 60 nations examining a wide range of physical, biological, and social research topics. It also offered an unprecedented opportunity to demonstrate and engage the public in cutting edge science in real time (Dickson, 2009). More details can be found at <http://ipy.arcticportal.org/about-ipy>.*

During its formative months, I often faced the question whether this fourth IPY would include “kayaks” (my codeword for small, individual, and implicitly flexible and innovative research projects) or exclusively “icebreakers” (a codeword for large multi-investigator projects, by implication complex planned efforts, generally controlled by the established polar scientific order). The question of project scope arose in Arctic science meetings and penetrated, for a time, the public media. I maintained that innovation and creativity would occur throughout IPY, regardless of size of project or platform. As steward of the IPY International Office, I argued publicly for the widest inclusion of ideas and proposals, from groups large and small.

Ultimately, the rigors of national funding competitions and logistic constraints inherent to polar research determined the composition and size of IPY projects. The variety and quality of Arctic Ocean research presented in this special issue of *Oceanography* confirm my prediction of pervasive innovation and creativity. After the first “IPY season” of oceanographic operations in the Arctic, my friend Bob Dickson, an Arctic research veteran, contended that we had approached the unprecedented ability to measure anything anywhere in that complex and difficult ocean (Dickson, 2009). That accomplishment required complementary and collaborative efforts by “kayaks” and “icebreakers.” Indeed, several of the biggest Arctic projects, such as the EU-funded project DAMOCLES (Perovich, 2011, and Beszczynska-Möller et al., 2011, both in this issue), involving in some cases multiple icebreakers, included facets and subprograms that depended on extraordinary individual efforts and that established intimate connection and relevance to the smallest Arctic communities.

For public impact, however, and notwithstanding the skillful and effective outreach surrounding the “icebreakers,” the “kayaks”

win the day. Integrating education and outreach was central to the IPY vision; two examples reached wide audiences and drew them into the demands of science in the Arctic Ocean. Audiences for the film *Tara—Journey to the Heart of the Climate Machine* (co-produced by Emmanuel Roblin and Thierry Ragobert) follow with thrill and enchantment the endurance of the modest vessel *Tara* and its crew of eight as they tackle scientific observations amid the stresses and surprises of fierce blowing snow in the Arctic night, ice and vessel and instruments lifted and scattered by wind and ocean swell, ice ridges grinding against one another and against the ship, the mystical formation of frazil ice, and, of course, the sudden appearance of polar bears. Afterward, audiences in Oslo, Paris, Brussels, Montreal, Boston, and San Francisco, among others, have been observed to linger and talk because they want to show the film to friends, to clubs, to classrooms, to gatherings where they feel people need to hear the messages of urgent change in the Arctic. Those viewing Eric Brossier’s sweet film *Sous les étoiles du Pôle*, which includes his family and his dogs as they winter over in a Svalbard fjord in their small vessel *Vagabond*, can inhale its messages of skill, persistence, and affection in a starkly cold setting. These films convey the remarkable capabilities and endurance of two small vessels and crews, the fascinating and frightful Arctic in its winter essence, the urgency and immediacy of climate change, and the profound beauty of our frozen northern ocean.

These “kayak” images and messages resonate deeply with global audiences, and will continue to represent one of our most important mechanisms to interest and alert the public as IPY results continue to emerge. 

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