

The Arctic Climate System Network (ACSNet)

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The IASC has recently restructured the organization of its science into five separate disciplines. The fact remains of course that many of the major science questions of Northern Seas are interdisciplinary in nature. This program aims through the coordination and networking of existing or emerging fieldwork to implement an intensive cross-disciplinary study of the role of the polar seas in climate. In particular special reference is made to the Western Arctic as a site of demonstrable global importance and to the research questions identified as of key importance by the 2011 iAOOS plan of the IASC Marine Working Group (see <http://aosb.arcticportal.org/> under iAOOS).

For the past 4 years, the Marine Working Group (MWG) of IASC has concerned itself with redefining the role of the Northern Seas in climate. This time frame also coincided with the intensive observing period of the IPY. In 2011 (at Seoul ASSW) it used these results to design an ocean-observing system for the 'legacy phase' of the IPY. Building on this experience ACSNet will implement important elements of that MWG plan. The most striking and important of our new ideas on the role of the Arctic 'system' on climate are themselves multi-disciplinary and so currently claim the attention of three ISAC WGs*. For example the warming of the upper Arctic water column in summer is preserved beneath a sea-ice and freshwater 'cap' to exert a delayed effect on the regional atmospheric circulation in fall. In another, heat to melt a significant thickness of sea-ice might be brought up from currently-inaccessible depths as the depth of wind-mixing increases subtly across the newly-opened polar sea. In these and in other examples from the MWG Report, the autonomous observing techniques available to the three WGs are for the first time at a sufficiently advanced state, or close to it, to describe the complex and delicate interactions between the thermal field of the upper ocean, the diminishing sea-ice and the stability of the lower atmosphere providing that the expertise of all three disciplines is joined. [*It is important to note however that ACSNet will extend beyond these three working groups. For example, it will have connections to the Social and Human Sciences WG through anticipated relationships with such programs as ELOKA (Exchange for Local Observations and Knowledge of the Arctic) which advances the collection and archival of local observations and knowledge of the Arctic].

The essential aim of ACSNet is to devise a common space-time framework for individual research projects arguing for the combining of disparate efforts to form an intensive, international and multidisciplinary research effort initially with its focus on the Greater Canada Basin and its marginal ice zone, later on a pan-Arctic scale. If this is effective, the combined effect could approach the intensity of the IPY itself in these sea areas. It will be of mutual benefit by adding a worthwhile depth and context to the original programs while generating the intensity and variety of coverage needed to understand the complex workings of the ocean-cryosphere-atmosphere system and its role in climate. ACSNet will take its timing cue from the current ONR Marginal Ice Zone research call. Scientific programs making up the ACSNet, including a broad range of international field projects spanning multiple disciplines, have yet to be confirmed. The Setup and Planning Phase of ACSNet and its initial workshops will take place in 2011-13. The main Field Phase will take place in 2013-15, with a synthesis effort in 2015-16.

The total span of the ACSNet project is 5 years 2011-16, similar to the successful AOSB ASOF program of 2000-2006 and ultimately with the same pan-Arctic scope.

The solution to the research questions identified in the current (2011) MWG Report (<http://aosb.arcticportal.org/> under iAOOS) will require protracted and intense observing of the ocean-cryosphere-atmosphere system of the Arctic; yet an Arctic observing program of IPY intensity can only be expected every half-Century. By arguing the case for existing individual research efforts to adjust their planning to conform to a more-common framework in space and time, the hope and intention is that a research effort of IPY-like intensity can be brought into being across a more focused geographical area than the IPY (the Canada Basin and surrounding marginal ice zone, initially) but with its point augmented by a range of techniques that were not available at the time of the IPY. The lasting legacy would be the joint development by the IASC WGs of cross-cutting solutions to research questions on the role of the Polar seas in climate that have only recently become evident as a result of the IPY.

IASC cross-cutting funds will be used to support a network whose membership is international, circum-Arctic and involves early career scientists. ACSNet will be managed by a Scientific Steering Group (SSG) of around 18 people, from a broad spread of IASC Member Countries; some scientists will be early in their careers (i.e., PhD students or post-doctoral researchers). The SSG will meet annually at venues that assist the science-development of the project, and dissemination of results.