



## French Arctic Initiative (*Chantier Arctique*): contribution to an Arctic Observing System

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The French Arctic Initiative (FAI), the *Chantier Arctique* (see <http://www.chantier-arctique.fr/en>), started in 2012, but was launched in 2014, with its first call for proposals, for an initial duration of 10 years. It is a multi-agency initiative led by CNRS, also including CNES, MétéoFrance, Ifremer, CEA, BRGM, IPEV and participation from government research and foreign affairs ministries. The FAI goals contribute to the French national Arctic Roadmap and to EU PolarNet and are represented via participation in international bodies such as IASC, SAON, EPB, the Arctic Council working groups. This French national research program has its main objective to foster new research in the Arctic that is trans-disciplinary in nature and which builds on already existing French expertise. In this respect it covers not only environmental sciences but also societal aspects. Ten cross-disciplinary priorities are detailed in the Science Plan (see [http://www.chantier-arctique.fr/en/uploads/Prospective\\_february2015.pdf](http://www.chantier-arctique.fr/en/uploads/Prospective_february2015.pdf)) together with 2 transverse themes on modeling and observations.

Considering that the Arctic region is undergoing rapid changes in all its major components, most of them still poorly documented, **the FAI recommends that national strategies focus effort on designing a collaborative, interdisciplinary and sustainable strategy for observing the Arctic environment.** This strategy warrants a better understanding of key processes underpinning Arctic evolution and continuous monitoring of changes in different key components. An important issue identified by the FAI is the need to maintain, and to build on, already existing observational capacity in the Arctic that is supported by French agencies (often in collaboration with international partners), and to make use of existing French expertise in terms of developing new instrumentation, contributing to observational networks, participation and analysis of data from, for example, satellite missions, and joint initiatives with local communities (citizen-based science). **This Short Statement summarizes recommendations from the FAI science plan (section on Observations) that are the result of community wide consultations.** We primarily address issues of relevance to *Priority 1* (national strategies) and *Priority 5* (synergies with global observing systems) but also including *Priority 2* (new observational opportunities) and *Priority 6* (community-based observations and Traditional Knowledge). This document provides a basis for discussions related to sustained support of and improvements to a coordinated Arctic Observing System (AOS) that builds on national and international strategies.

Considering that:

- (1) Changes currently observed in the Arctic involve complex interactions between all the components of the Arctic environment, with impacts of utmost importance in terms of ecological, societal, economical and political aspects, at the regional and global scale,
- (2) Current changes must be understood in the context of longer term variability that is only beginning to be tackled (especially with regard to ubiquitous natural climate variability) due to lack of suitably long time series of key variables,
- (3) Improved quantification of impacts of human activities on the Arctic environment constitutes one of the major challenges needed to better predict future change in the Arctic,

The French Arctic Initiative considers that it is urgent that national strategies, in conjunction with international initiatives, combine their efforts by:

- a) **Encouraging observation-based research, by increasing national and international efforts to maintain and develop perennial instrumented networks and ground-based infrastructures in**

**key instrumented or multi-disciplinary research sites.** Such sites currently exist but their spatial distribution must be enhanced and their access secured at the national/international level. Similar solutions are encouraged for the (ice-covered) ocean since instrumented sites mainly exist on land, at present. France is already involved in several of such infrastructures in the context of international cooperation (AWIPEV/SIOS in Svalbard, observatories in Siberia, UMI Takuvik in Québec), instrumented networks (e.g. NDACC) or via national platforms (aircraft, balloons). France is unfortunately lacking a national ice-strengthened sea-going research vessel which might have hindered nationally led observational initiatives, stressing the need for international coordination and trans-national access to optimize observationally-based polar research.

b) **Fostering close interactions at the international level between observational initiatives, on one hand, and scientific communities involved in remote sensing (through various agency polar missions) and regional modeling, on the other hand.** In this latter respect, a coordinated approach should be encouraged, aiming to improve the reliability of data-assimilation or operational/predictive regional systems for one or several components of the Arctic system and their interaction (e.g. through improvements in coupled modeling). This should be developed with the framework of international initiatives (e.g. YOPP, CMIP...).

c) **Exploring national, bilateral or international funding strategies to support the development of new instrumentation, including dedicated technologies, miniaturizing or integration of new sensors, capable of sustaining the challenges of reliability, autonomy, robustness imposed by polar conditions.** These initiatives, which already have support at the national level (e.g. IAOOS, CLIMCOR) should make a significant contribution to sustained international efforts concerning arctic observations and should contribute to enlarging the existing global observational systems (GOOS, GCOS, GEOSS) often restricted to the extra-polar regions due to instrumental limitations.

d) **Promoting interdisciplinary approaches with the aim to foster new research topics at the interface between disciplines or components of the Arctic system.** This would require specific actions within funding programs, such as shared multi-instrumented platforms, gathering a wide range of expertise needed to address questions of special relevance to the Arctic.

e) **Supporting involvement of Arctic native populations in international research efforts, in particular, promoting their participation in observational initiatives, and benefiting from specific local knowledge to increase understanding about past and present Arctic change and future evolution.** This should build on and expand already existing initiatives.

f) **Insuring proper management of the diverse range of data that will be gathered at different levels and scales, making data accessible to the international community through consistent quality controlled datasets and real-time access for assisting observational strategies and model implementation.** The success of AOS will depend on the capacity of all nations to coordinate their initiatives in terms of data processing, storage and delivery to all Arctic related communities and stakeholders.

In application of the above recommendations, to date the FAI has:

- **finalized a White Paper in 2015** outlining **future challenges for multidisciplinary Arctic research** and the technical/financial support required for **the national community to contribute efficiently to the international initiatives leading to improve Arctic knowledge;**
- **implemented** a regular national "**Call for Proposal**", launched in 2015, encouraging cross-disciplinary **national research collaborations and multi-agency support** in order to foster **comprehensive multi-approaches projects** answering the above challenges; similar calls should be launched on a regular basis;
- **communicated information about scientific initiatives at the political level** through involvement in science diplomacy (Ministry of Foreign Affairs, Ministry of Research) in the French government initiative for better management of the Arctic.

The FAI is in its **early stages. Its success will depend on the fruit of these actions** and on continued implementation and development of this national program.