IMPACT ASSESSMENT ON A LONG-TERM INVESTMENT ON ARCTIC OBSERVATIONS (IMOBAR)

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Abstract
The goal of IMOBAR is to provide to policy makers with evidence to support long-term investments in Arctic observing systems and thereby inform the decision-making process. The main output of IMOBAR will be an evaluation of the costs and societal benefits of Arctic observing systems by analysing the value chain of a selected number of essential variables.

Introduction
During the last decades Arctic observation and monitoring programmes and EU funded initiatives have underpinned our improved understanding of the Arctic environment. On the other hand, due to the complexity of the interactions and difficulties in observing remote areas, our understanding of the Arctic system and its interaction with the rest of the globe is incomplete.

The observational systems (OS) deployed in the Arctic, together with the contribution from Arctic communities, help to measure elements, such as snow, permafrost, sea-ice, glaciers, fisheries and contaminants. Each of the observations and their related OS are used to produce multiple products and services that contribute to the prevention of disasters, the improvement of natural resources management or the sustainability of biodiversity.

Investments to sustain Arctic observing systems should be justified by stakeholder needs and the costs of investments can be compared with the societal benefits arising from the provision of environmental observations.

IMOBAR addresses these challenges through a systematic analysis and the assessment of benefits and co-benefits of Arctic observations, compared to investment and management costs. It provides elements of a "business case" for sustaining in the long-term Arctic observations, to support the decision-making process. IMOBAR is a collaboration between the Joint Research Centre (JRC) and the Directorate General for Research and Innovation (DG RTD). It also involves external expertise in estimating the societal benefits from observing systems.

The results of the impact assessment study will be published and presented to the next Arctic Science Ministerial that will be co-hosted by the European Commission, Finland and Germany on 25-26 October 2018 in Berlin. The report will promote and justify ongoing and future investments in observational systems in the Arctic.

Methodology
The study builds on existing initiatives and studies aiming at identifying key Arctic change variables and research or operational activities. In particular, IMOBAR leverages relevant EU funded projects from the 7th Framework Programme and Horizon 2020 as

well as major international initiatives such as Sustaining Arctic Observing Networks (SAON). The study uses the value tree framework methodology, proposed by the Science and Technology Policy Institute, which links in a structured way the assessment and evaluation of the qualitative benefits across a set of Arctic Societal Benefit Areas deriving from specific observational data streams and systems[1].

In practice, IMOBAR employs a mix of desk research and expert elicitation. Desk research constitutes a sound starting point and a fundamental basis in order to understand the current regarding what type of observational systems exist within the Arctic territory, what are the variables they are measuring, what type of data they collect, what type of services and products do they offer to the society, how are they financed and what are their costs.

A two-day workshop was held in Brussels on 21-22 November 2017 in close collaboration with JRC and DG RTD, bringing together experts on observations, Arctic stakeholders and users of Arctic observations. The outcome of the workshop provided a list of emerging sectors foreseen to benefit from Arctic observations in next 20 years and matrices of observational data streams, systems and societal benefit areas, for existing and emerging sectors that should be priorities in the quantitative analysis of costs and benefits.

Based on the output of the workshop, a set of key activities that may benefit from the observational network have been selected and their observational impacts will be estimated in greater detail, also by performing monetary evaluation of benefits.

The results will be published in a report evaluating observing system costs and societal benefits.

Conclusions

Costs of observing systems in the Arctic are estimated using information from observational providers, by adjusting global and regional estimates from other studies or by multiplying costs of single observational platforms by the number of observations in the Arctic. The analysis addresses parameters necessary for the short and medium term forecasting and long-term monitoring of environmental modification due to climate change, considering local, regional and global dimensions. The analysis of benefits concentrates on a representative subset of activities in the Arctic. In particular, products and services related to permafrost, sea ice, sea level rise, biodiversity and the human dimension are analysed in order to evaluate tangible and non-tangible societal benefits arising from observational systems supporting those activities.

[1] IDA Science and Technology Policy Institute and Sustaining Arctic Observing Networks, 2017. *International Arctic Observations Assessment Framework*, IDA Science and Technology Policy Institute, Washington, DC, U.S.A., and Sustaining Arctic Observing Networks, Oslo, Norway. https://www.arcticobserving.org/images/pdf/misc/STPI-SAON-International-Arctic-Observations-Framework-Report-2017.pdf