SIN'XS: Towards a reconciled estimate on Sea-Ice Thickness and associated uncertainty

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Introduction

In light of rapid changes of the Arctic and Antarctic sea ice cover, continued and improved observations, understanding, and predictions of its thickness are particularly important for a range of fields from climate studies to offshore operations in ice. Systematic and accurate ice thickness observations are now available from several satellite missions.

However, they differ in their processing algorithms and assumptions, temporal and spatial coverage and resolution, and applicability to stakeholder needs like modelling and assimilation, numerical weather prediction, and ship routing. These differences between products have so far complicated the consistent use of the various data products, and there is still little consensus about Arctic and Antarctic Sea ice volume variability and change.

The Sea Ice-thickness product iNter-comparison eXerciSe (SIN'XS) will identify some of these gaps by carrying out in-depth intercomparisons between a wide range of satellite ice thickness products from altimetry and other methods, in close collaboration with an international community of scientific and operational sea ice experts, and in partnership with the WMO Global Cryosphere Watch (GCW).

Objectives
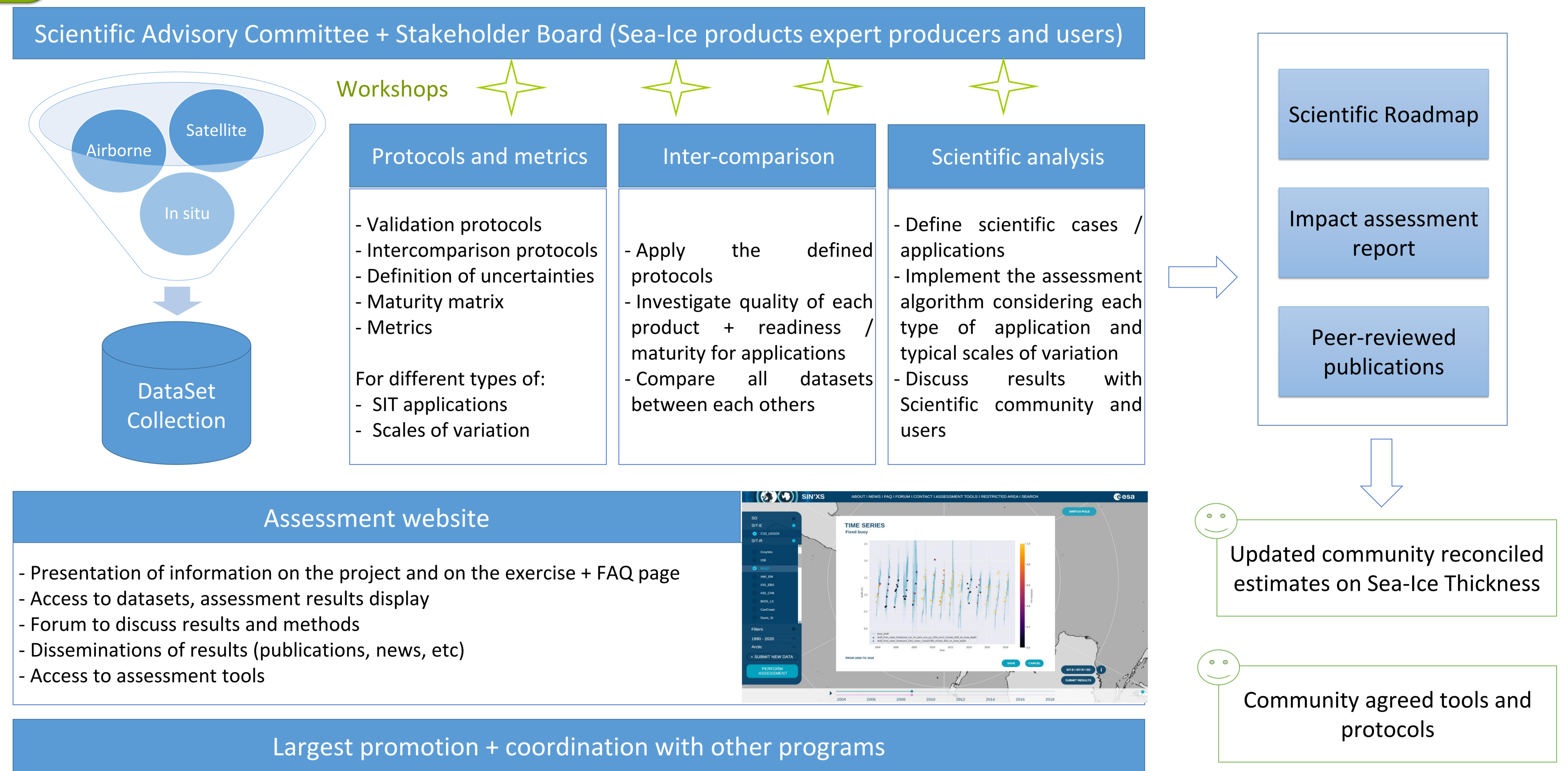
Ongoing tasks

The following tasks are currently in progress:

- Establish the SIN'XS activity framework that will allow methods to be fairly assessed and uncertainties to be defined so the results can be standardized and the uncertainties understood and reduced. This task also includes the collection, review, quality control and preparation of several SIT-related data products, as well as the elaboration and maintenance of a project database.

- Build all the components that will enable the SIN'XS framework and the assessment to be implemented: development of the assessment website to display results, give access to datasets, and share results with the scientific community, and of the assessment tools.

- Develop the assessment algorithm, in accordance with QA4EO standards and metrics as well as inputs from the metrology community.

- Identify main causes for uncertainties and disagreement between input datasets, identify key datasets and key periods/region combination for reconciled SIT time series.

A promotion and coordination task is also led in parallel, because one of the key factors for the success of this project is the full support and involvement of the global Sea Ice scientific community.

A first presentation of the project to the Scientific Advisory Committee and Stakeholder Board was made at the end of June.

A first workshop with Scientific Advisory Committee and Stakeholder Board to define datasets and discuss the first ideas on the inter-comparison protocol is scheduled for the beginning of October.

Expected Results

The main outcomes expected from this project are the following:

- To provide an improved community reconciled estimate of Sea-ice mass balance and associated uncertainty from the best available SIT products evaluated in this project: to be compared to the Ice Sheet Mass Balance Inter-comparison exercise (IMBIE; http://imbie.org)

- To provide community agreed tools and inter-comparison protocols, including compliance maturity matrix.

- To provide recommendations for future EO sea-ice missions, campaigns, data providers and multi end-users, and to fully leverage on the findings of this activity in terms of Cal/Val activities and SIT uncertainty computation.

- To provide a web portal, that will foster and share the use of the reference dataset and the sea-ice thickness products with the scientific community, and allow this latter to access them.

More information will be available at: https://sinxs.noveltis.fr