INTAROS WP6

Applications towards stakeholders, plans for the case studies starting after year 2

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Main objective

Demonstrate the economic value and societal benefit of enhanced integration of data from Arctic observing systems through a suite of selected applications towards industry, governance, local communities and research

Ambition

Show the IAOS' capability for providing:

- enhanced search and retrieval
- scientific analysis
- assimilation into models
- validation of estimated and projected climate parameters
- decision-support and policy-making on local, regional and global scale

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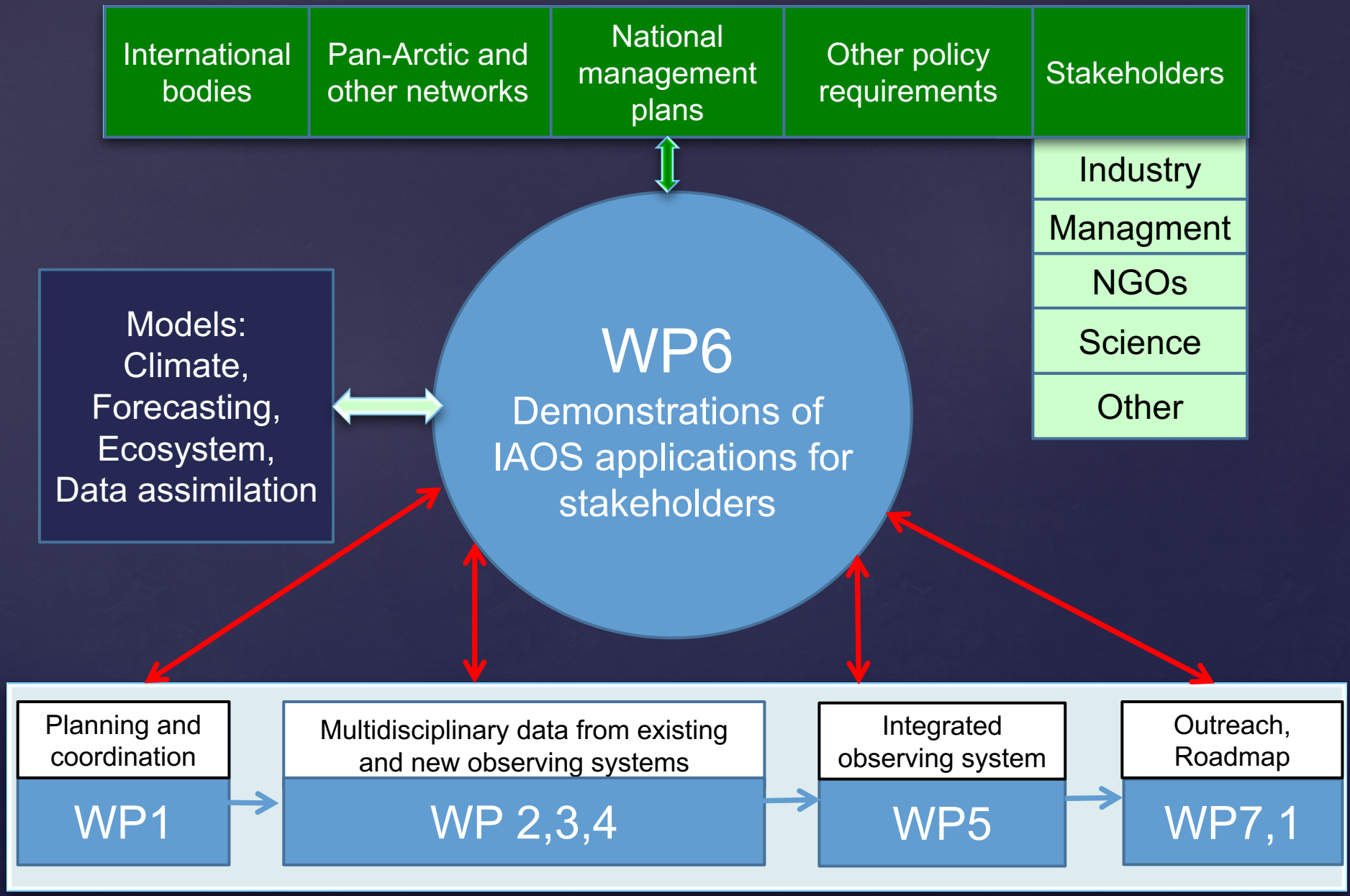
Workpackage structure, seen from WP6



WP6 TASKS

6.0 Scientific Coordination

6.1 Improving skill of climate predictions

6.2 Improved ecosystem understanding and management

6.3 Ice-ocean statistics for decisions support and risk assessment

6.4 Natural hazards in the Arctic

6.5 Data assimilation to advance process understanding in Arctic greenhouse gas exchange

6.6 Cross-fertilize local and scientific observations

6.7 Support to Marine and maritime industries

6.8 Fisheries and environmental management

WP6 - progress

WP6 officially starts Month 24, i.e. December 2018

Planning and preparation:

- Work plan for each task revised and enhanced
- Data flow/handling skype meetings have been held per task with INTAROS and WP6 leads, task leader and WP5 experts
- Within task coordination meetings – more tomorrow (some tasks more than others)

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6.1 Improving skill of climate predictions

Lead: SMHI, R. Döscher; Contributors: BSC, NERSC

Novel INTAROS observations will benefit the climate prediction and climate services community, especially through an improved accuracy of initial conditions towards more skillful climate prediction.

Climate prediction models will use observations from INTAROS' iAOS in a physically consistent manner to better understand the variability of our climate and provide predictions and their principal dependence on data availability.

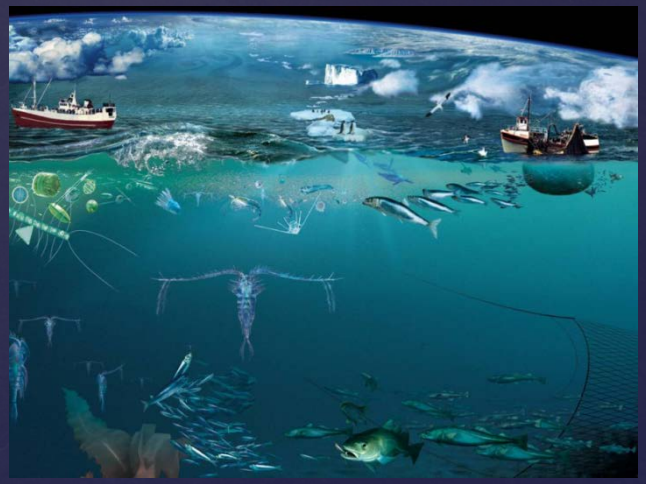
The benefit of the new integrated observations for predicting river discharge as well as for monitoring the hydrological regime will be demonstrated by means of a hydrological model (Arctic-HYPE) fed with new data.

6.2 Improved ecosystem understanding and management

Lead: IMR, Gro van der Meeren; Contributors: AU, GINR, DTU

Demonstrate how data from an iAOS may contribute to advances in marine ecological and environmental understanding and management

With the Barents Sea as a demonstration area the established ecosystem models NORWECOM and ATLANTIS will be employed to integrate data originating from a range of platforms



The FLEXSEM model, using data assimilation with the INTAROS iAOS, will be applied for the Disko Bay region in Greenland to evaluate external impacts of climate and environmental change on local marine resources

6.3 Ice-ocean statistics for decisions support and risk assessment

Lead: NERSC, Hanne Sagen; Contributors: UHAM, IOPAN, ARMINES, AWI, UNIS, DTU, IFREMER, UiB, FMI, CNRS-IUEM, DNVGL

Better ice-ocean state estimates can be used to establish background knowledge and constraints important for (1) design and development of new technologies and installations in the Arctic, (2) risk assessment (3) environmental monitoring and (4) weather and ice services.

- Integrative data analysis to provide statistics of ice-ocean time-series for decision support and risk assessments
- Baseline description of Arctic soundscape
- Assimilation of new data into ice-ocean models
- High-resolution data archive for use in risk management for offshore oil and gas and maritime activities

6.4 Natural hazards in the Arctic

Lead: GEUS, Anne Solgaard; Contributors: UPM, GEUS, FMI

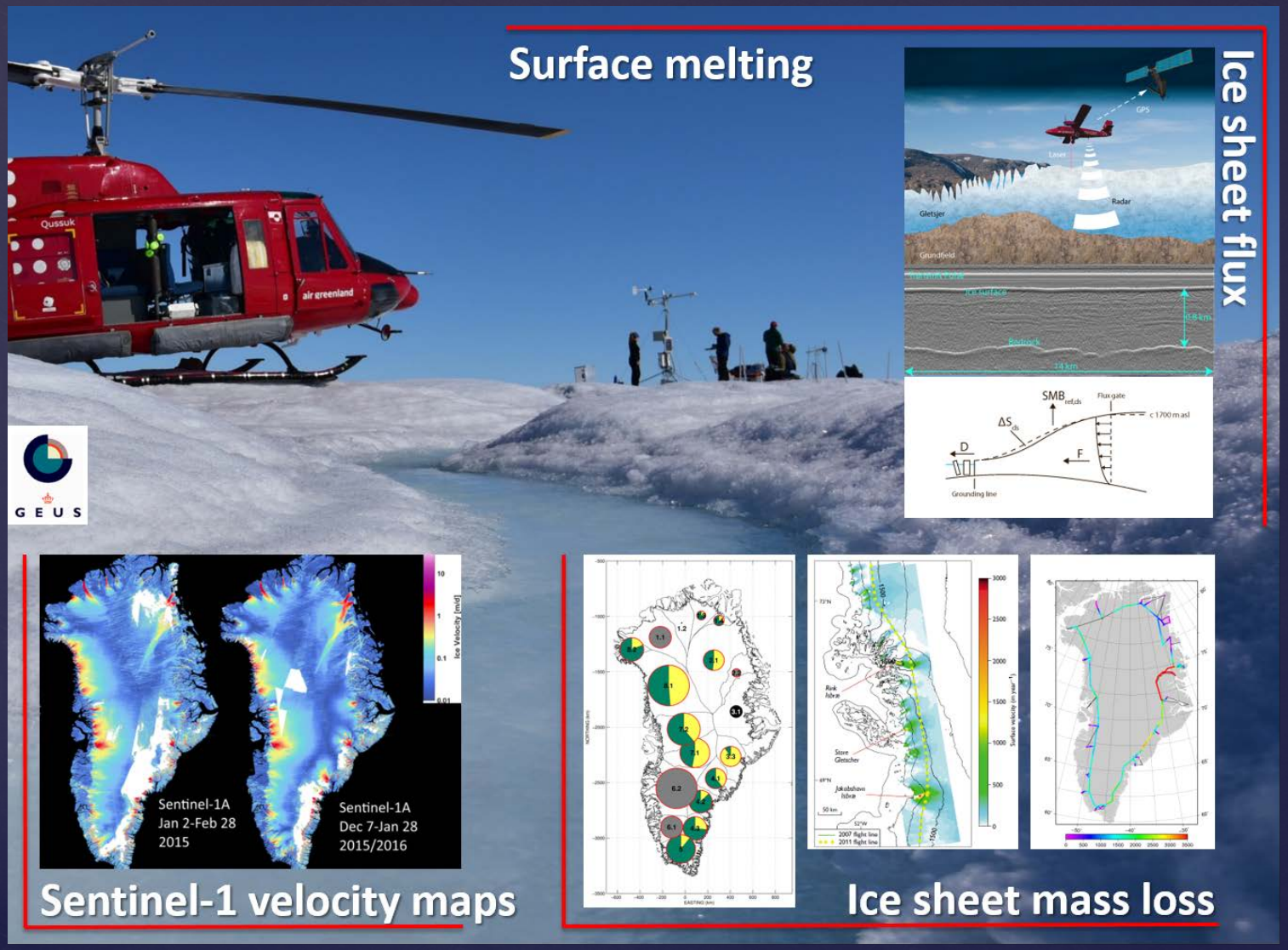
Demonstrate how iAOS data can be exploited to better understand natural hazards in the Arctic and how these are affected by climate changes

AROME model outputs of extreme precipitation events in Svalbard will be post-processed using in situ snow and meteorological observations to improve extreme precipitation and avalanche forecasts

Sentinel-1 data will be integrated with enhanced in situ observations of surface mass balance and mass loss + innovative modelling to provide the contribution of mass losses from the Greenland ice sheet and Svalbard glaciers and ice caps to sea-level rise

Seismological data will be used to show the benefits of seafloor monitoring in the Arctic Ocean for the detection of earthquakes

Product: Calculations of Freshwater flux to ocean from Greenland ice sheet (GEUS; T6.4)



6.5 Multi-disciplinary data assimilation to advance process understanding in Arctic greenhouse gas exchange

Lead: MPG, Mathias Göckede; Contributors: NIVA, AU, UiB

Atmospheric inverse modelling constrains regional to global scale GHG budgets based on transport fields and time series of GHG mixing ratios from a network of towers. Geostatistical inverse modelling (GIM) techniques will be applied to extend this approach

Constrain the net exchange of CO2 and CH4 between surface and atmosphere at high spatiotemporal resolution in selected regional Arctic case studies based on GIM techniques

Characterize GHG mass transport and inorganic carbon chemistry focusing on the ocean region around Svalbard

Identify the most relevant data layers from the iAOS for explaining GHG patterns in the Arctic and promote the integration of these layers into process modelling

6.6. Demonstrating the benefits of cross-fertilizing local and scientific observation systems

Lead: NERSC, Lisbeth Iversen; Contributors: NORDECO, AU

In Longyearbyen, Svalbard and Disko Bay in Greenland, Task 6.6 will prepare, present and discuss a policy brief on topics of high priority to the local communities, using information from both indigenous, local and scientific observation systems.

The task will showcase 'real-world' examples of the benefits of cross-fertilizing local and scientific observation systems

Topics of potential interest for communities include
climate change, natural hazards, and economic development

6.7 Support to Marine and Maritime Industry

Lead: EuroGOOS, Erik Buch; Contributors: NERSC

Demonstrate the benefits of an upgraded iAOS to foster business development, increase safety and protect the environment by integrating data, products and services from EMODnet and Copernicus Marine service with those produced by INTAROS

Employ model (re)analysis and observations (of wind, currents, sea ice ++) to

- enhance products for operational forecasts of marine conditions
- estimate risks and costs associated with activities of specific industries when extending operations to the Arctic Ocean.

6.8. Demonstrations for fisheries and environmental management agencies

Lead: AU, Marie Maar; Contributors: IMR

Demonstrate the use of iAOS products for managers of living marine resources and the environment through software, reports and face-to-face

Ecological model results from the Barents Sea (NORWECOM, Atlantis) and Disko Bay, W Greenland (FLEXSEM) will be presented in a report and discussed with fisheries and environmental managers at workshops in Norway and on Greenland

T6.8 (AU) DISKO BAY ECOSYSTEM MODEL

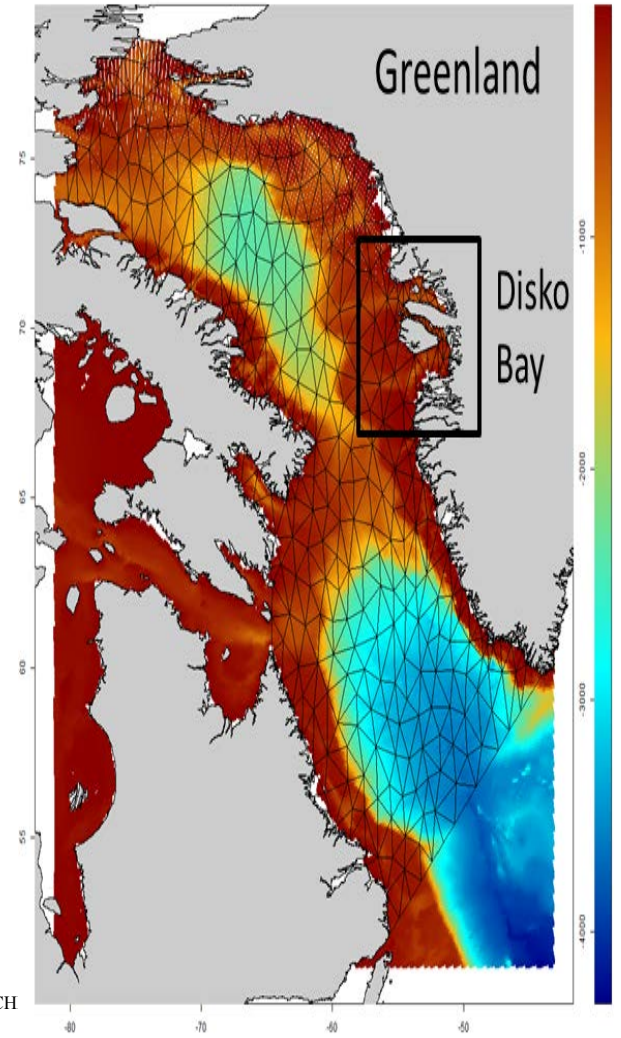
PrOMICE ice sheet data

Data assimilation Baffin Bay

HYCOM regional model

Downscaling to Disko Bay

Flexsem Disko Bay model



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WP6

Demonstrations of iAOS applications for stakeholders

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