

# INTAROS – Integrated Arctic Observation System

A project funded by EC - H2020-BG-09-2016

Coordinator: Stein Sandven, Nansen Environmental and Remote Sensing Center, Norway

Overall objective: to develop an efficient integrated Arctic Observation System by **extending, improving and unifying** existing and evolving systems in different regions of the Arctic

Start date: 01 December 2016 - Duration: 5 year



# Partners

Norway: NERSC, UIB, IMR, UNIS, NIVA, NORUT, DNV-GL

Denmark: GEUS, DTU, NORDECO, Aarhus University

Greenland: GINR

Sweden: SMHI, Stockholm University

Finland; FMI, University of Helsinki

Germany: AWI, U. Hamburg, U. Bremen, MPG, GFZ

UK: University of Sheffield, **University of Exeter**

Ireland: Maynooth University

Poland: IOPAN, IGPAN, University Slaski

France: CNRS, Ifremer, ARMINES

Spain: Polyt. Univ Madrid, Barcelona Supercomputing Centre

Portugal : Eurocean

Belgium: EuroGOOS AISBL

Italy: Terradue

Russia: RIHMI-WDC, NIERSC

USA: **UAF**, UCSD/SIO, WHOI,

Canada: Université Laval, **ONC**

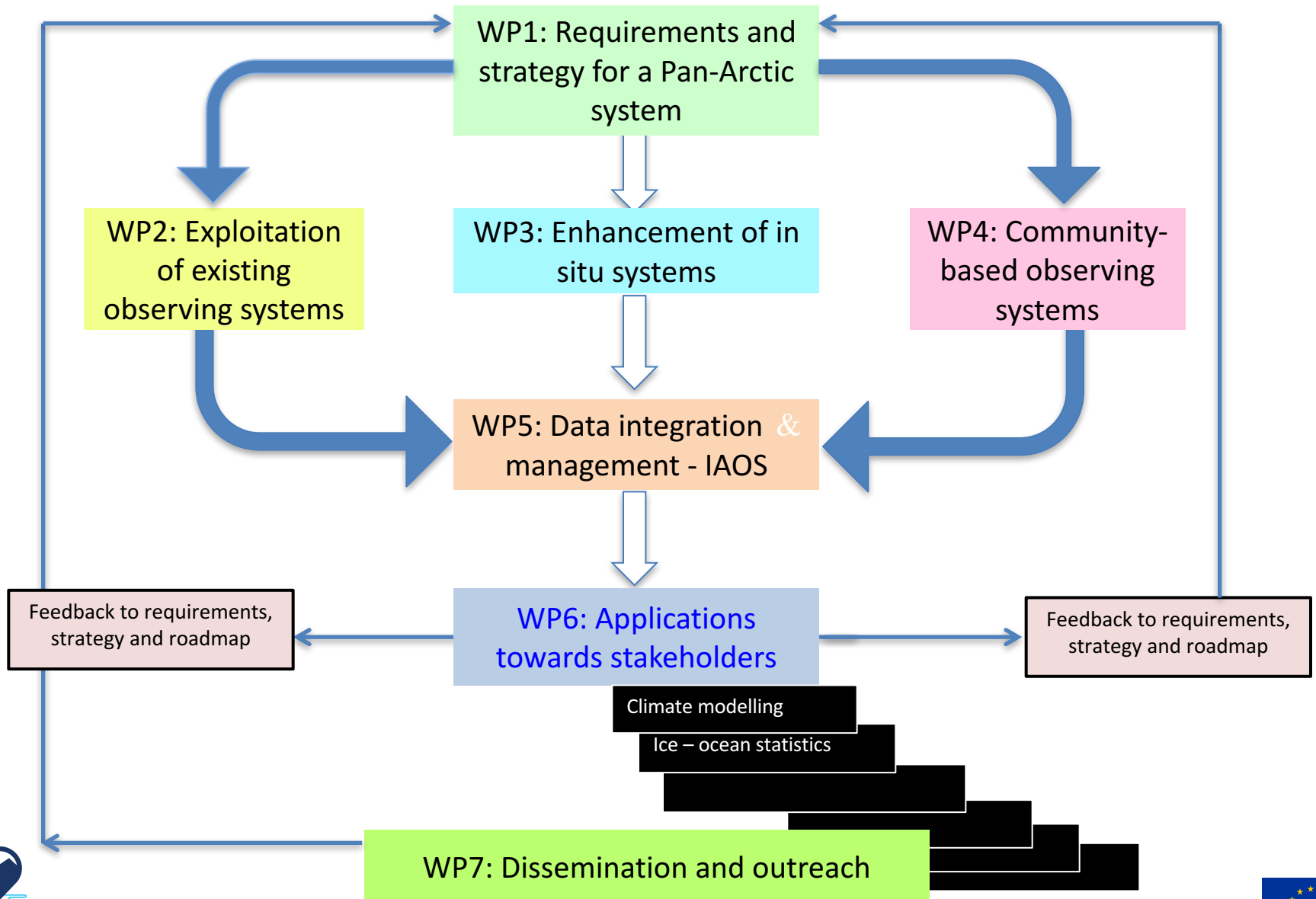
China: **RADI**, **NMEFC**, **PRIC**

Japan: **ROIS** (NIPR ++)

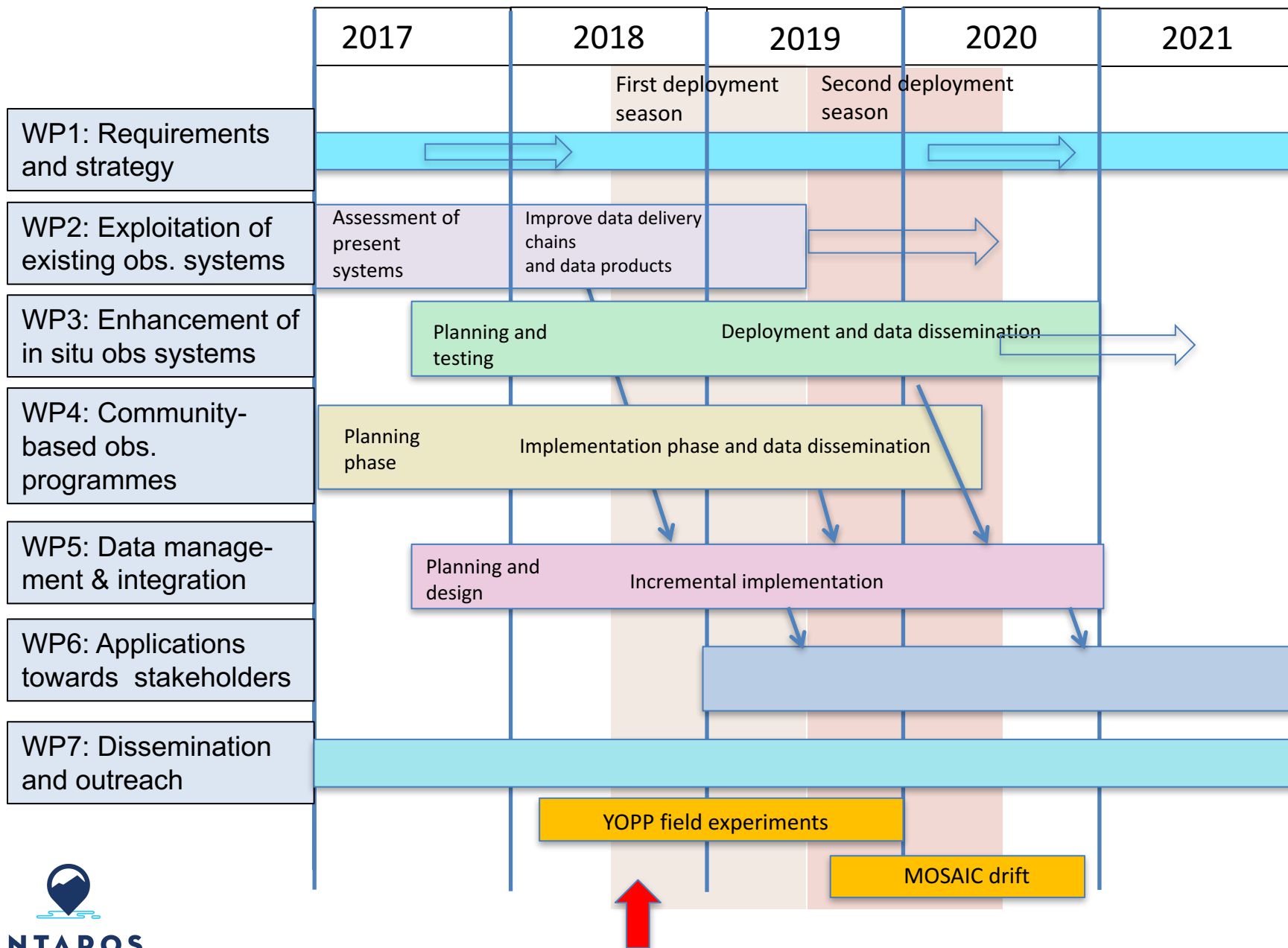
South Korea: **KOPRI**



# Workpackage structure



# Schedule



# The role of INTAROS

Science programmes, monitoring programmes,, global and regional networks, SAON, GEOCRI, etc.

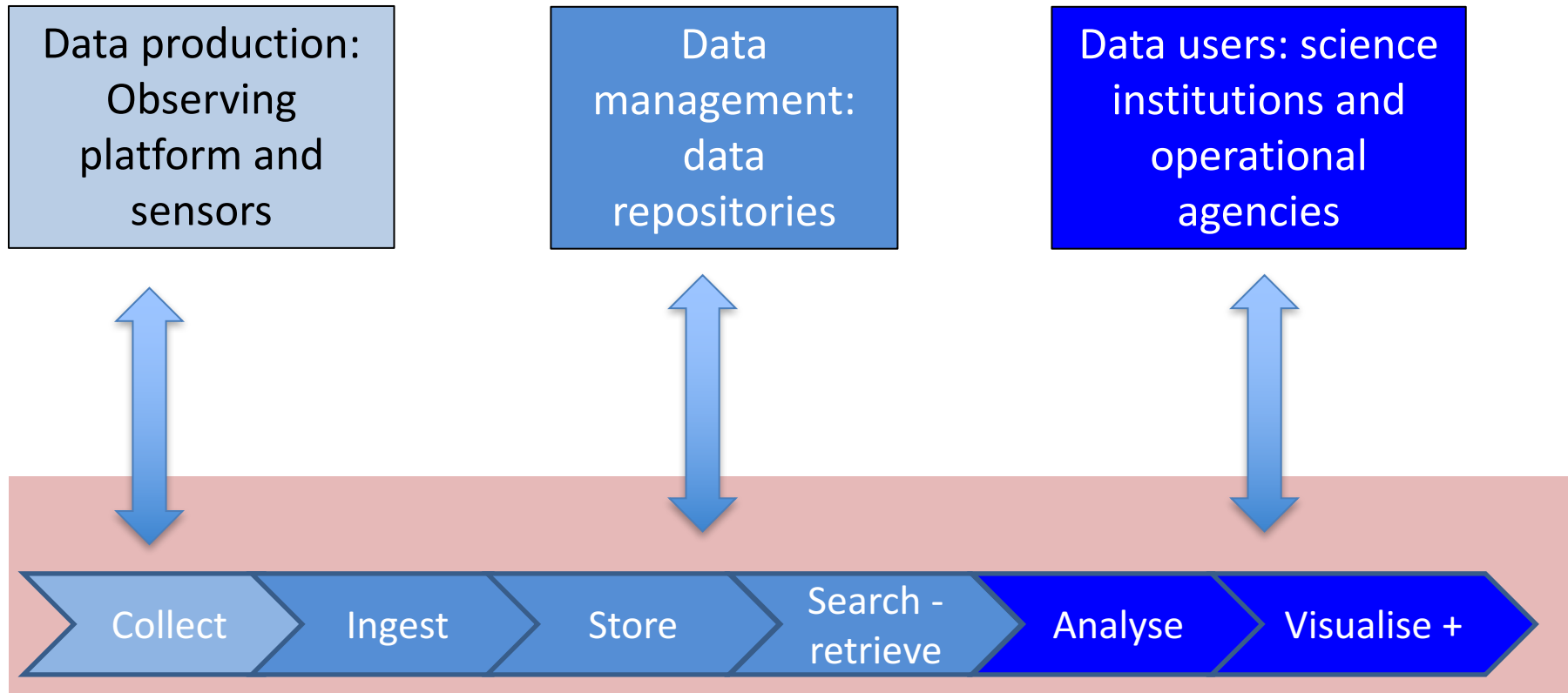
**Observing systems:**  
operational, semi-operational, ad hoc, research-funded, community-based observing, etc.

Technology development, research projects, pilot systems

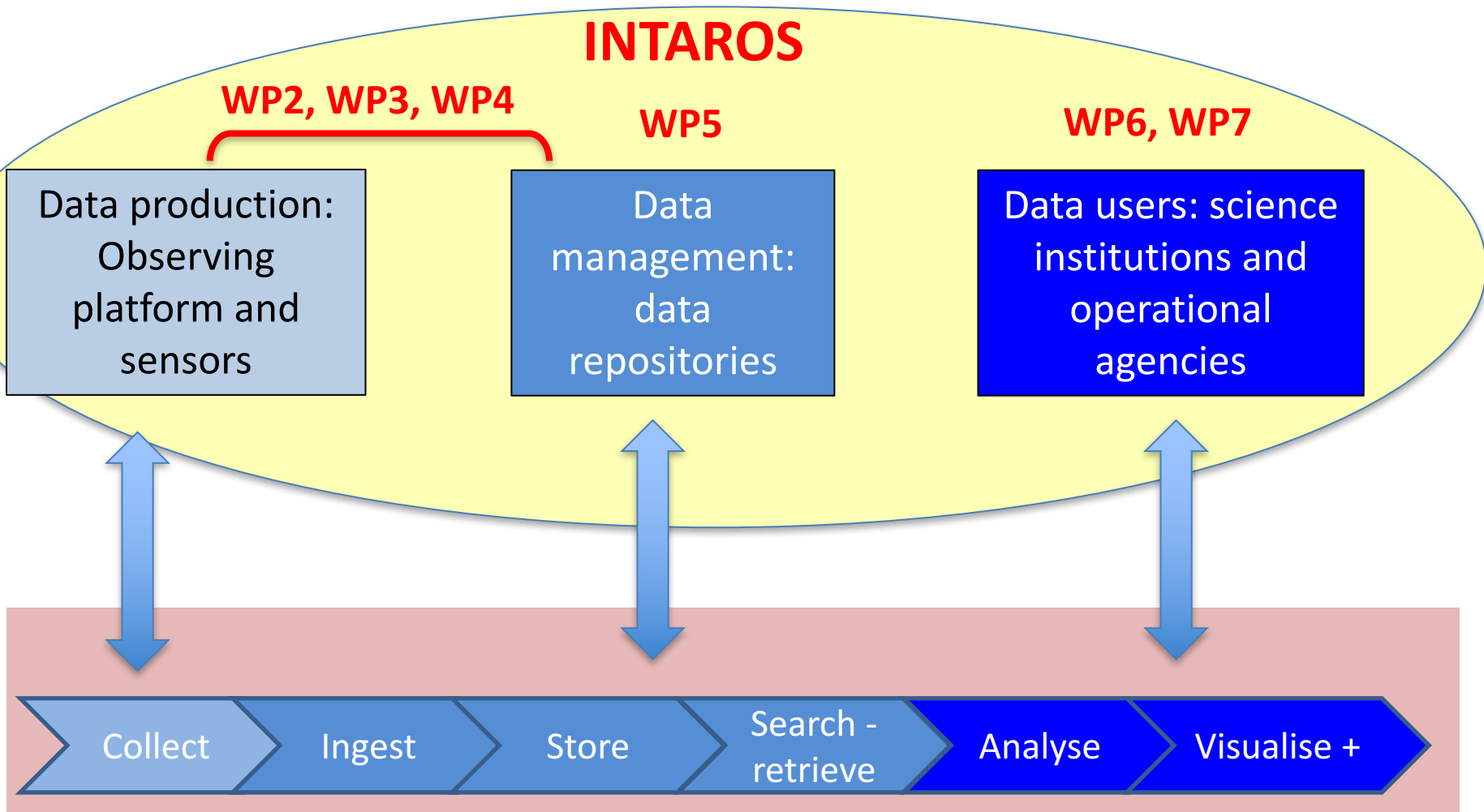
*atmosphere,  
ocean & seafloor,  
sea ice,  
marine ecosystem,  
glaciology,  
terrestrial themes,  
natural hazards,  
and community-based monitoring*



# Observing system components



# Observing system components



# Production chain from observations to useful information in the societal benefit areas

## Example: Sea ice forecasting

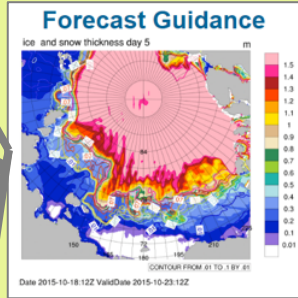
### Arctic Societal Benefit Areas

- DISASTER PREPAREDNESS
- INFRASTRUCTURE & OPERATIONS
- NATURAL RESOURCES
- FUNDAMENTAL UNDERSTANDING OF THE ARCTIC SYSTEM
- WEATHER & CLIMATE

### Applications: End User Service

- AK SEA ICE PROGRAM (NWS)
- NATIONAL ICE CENTER (Navy-USCG-NOAA)
- RESEARCH
- CAMPAIGN SUPPORT

### Application Products: Sea Ice Forecasting



Model Outputs: Initialize Models, New Data Products

### Observed parameter or "Phenomena"

- SIE
- SIC
- SIT
- T
- WIND
- ++

### Observed Synth. Products

- U. BREMEN
- UCL/AWI
- NOAA, GFS
- MetNo, TOPAZ

### Space component

### Observing Systems

- JAXA, AMSR2
- ESA, Cryosat
- Intern. IABP
- Extensive Ob's Inputs

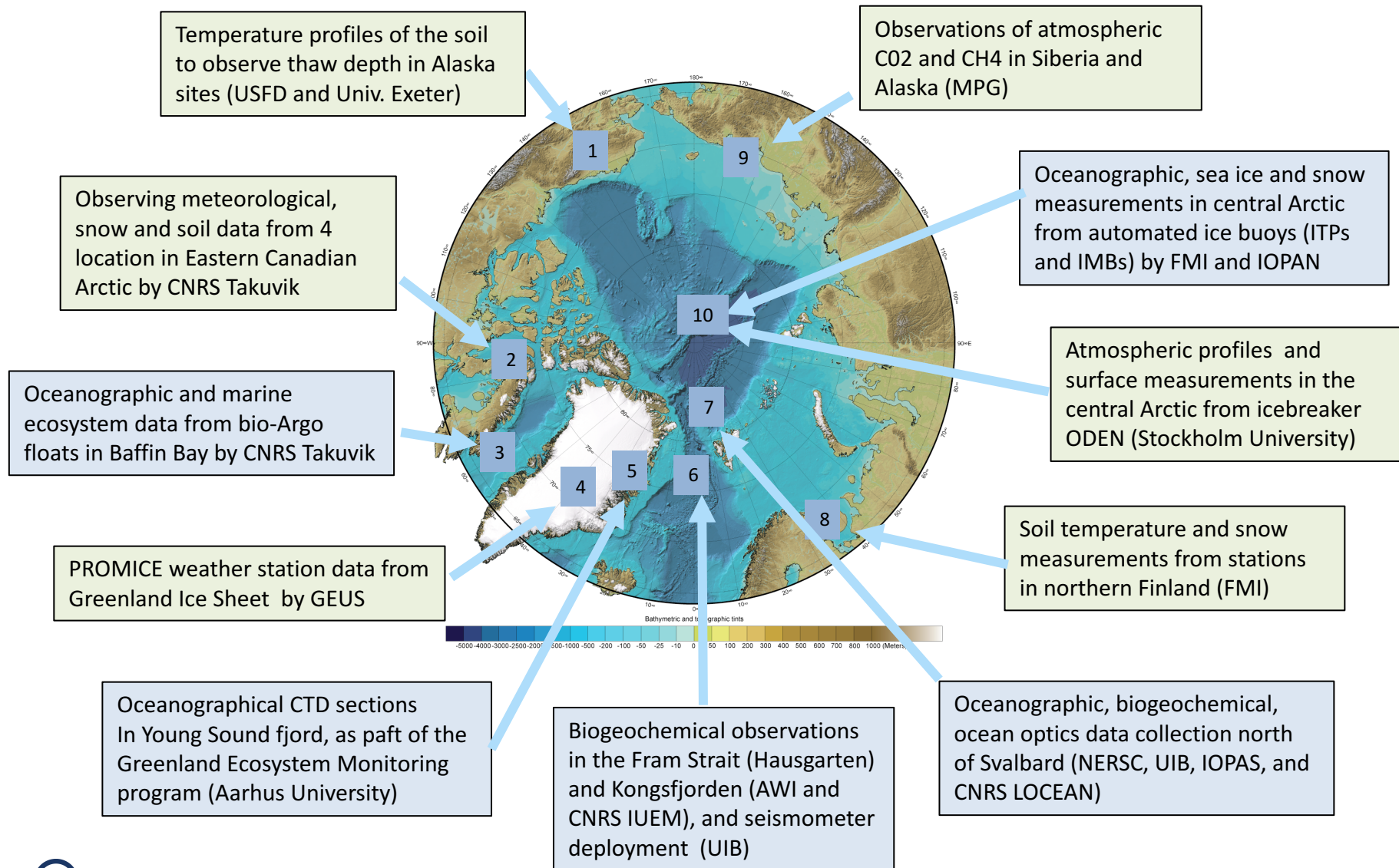
### In situ component INTAROS

Ref. US AON Sea Ice Forecasting Task Team





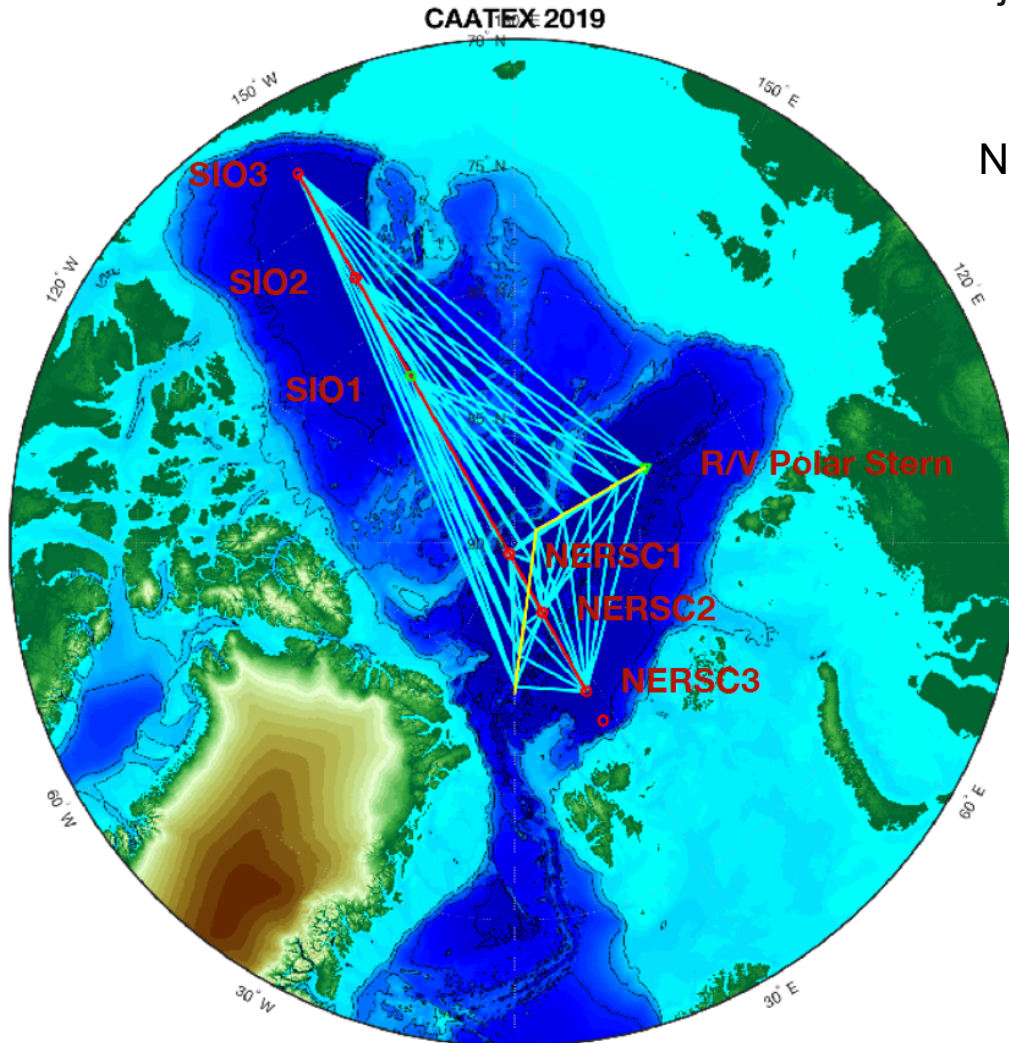
# INTAROS field activities in 2017-2018



# Several SPINOFF projects have been generated

Coordinated Arctic Acoustic Thermometry Experiment (CAATEX)  
A joint Norway-USA-Canada project (2018-2022)  
as part of MOSAIC

Norwegian part leader: Hanne Sagen (NERSC)  
US part leader: Matthew Dzieciuch (SIO)



The project will use basin-wide acoustic thermometry and local ice-ocean observations in combination with an eddy-resolving ice-ocean model to produce improved ocean state estimates. This will be used to estimate the Arctic Ocean heat content and to benchmark global climate models.

# Challenges in building Arctic observing systems

- (1) Develop coordination and collaboration between data providers and stakeholders in the pan-Arctic region in order to better use existing systems and resources (**Organisation**)
- (2) Improvement of the observing platforms and sensors, filling of gaps in the observing network and facilitate for year-round operation, how to go from research to operational systems (**Technology**)
- (3) Data sampling, transmission, calibration, processing, archiving and retrieval of required variables and build distributed and connected databases (**Data dissemination, data management**)
- (4) How to develop sustainability of the observing systems, and what are the funding mechanisms ? (**Funding**)



# First Arctic Science Ministerial – Washington Sept 2016



Joint statement from science ministers in 24 countries + EU where four key themes were defined:

1. Arctic-Science Challenges and Their Regional and Global Implications
2. Strengthening and Integrating Arctic Observations and Data-Sharing
3. Applying Expanded Scientific Understanding of the Arctic to Build Regional Resilience and to Shape Global Responses
4. Empowering Citizens through Science Technology, Engineering, and Mathematics (STEM) Education Leveraging Arctic Science



# Second Arctic Science Ministerial – Berlin Oct. 2018

The European Commission, Finland and Germany will co-host the 2nd Arctic Science Ministerial on 25-26 October 2018 in Berlin.

## **The Arctic Science Forum: 3 overarching themes**

**Theme 1. Strengthening, Integrating and Sustaining Arctic Observations, Facilitating Access to Arctic Data, and Sharing Arctic Research Infrastructure**

Theme 2. Understanding Regional and Global Dynamics of Arctic Change

Theme 3. Assessing Vulnerability and Building Resilience of Arctic Environments and Societies

Ca. 20 INTAROS members are represented in national delegations to the Forum

