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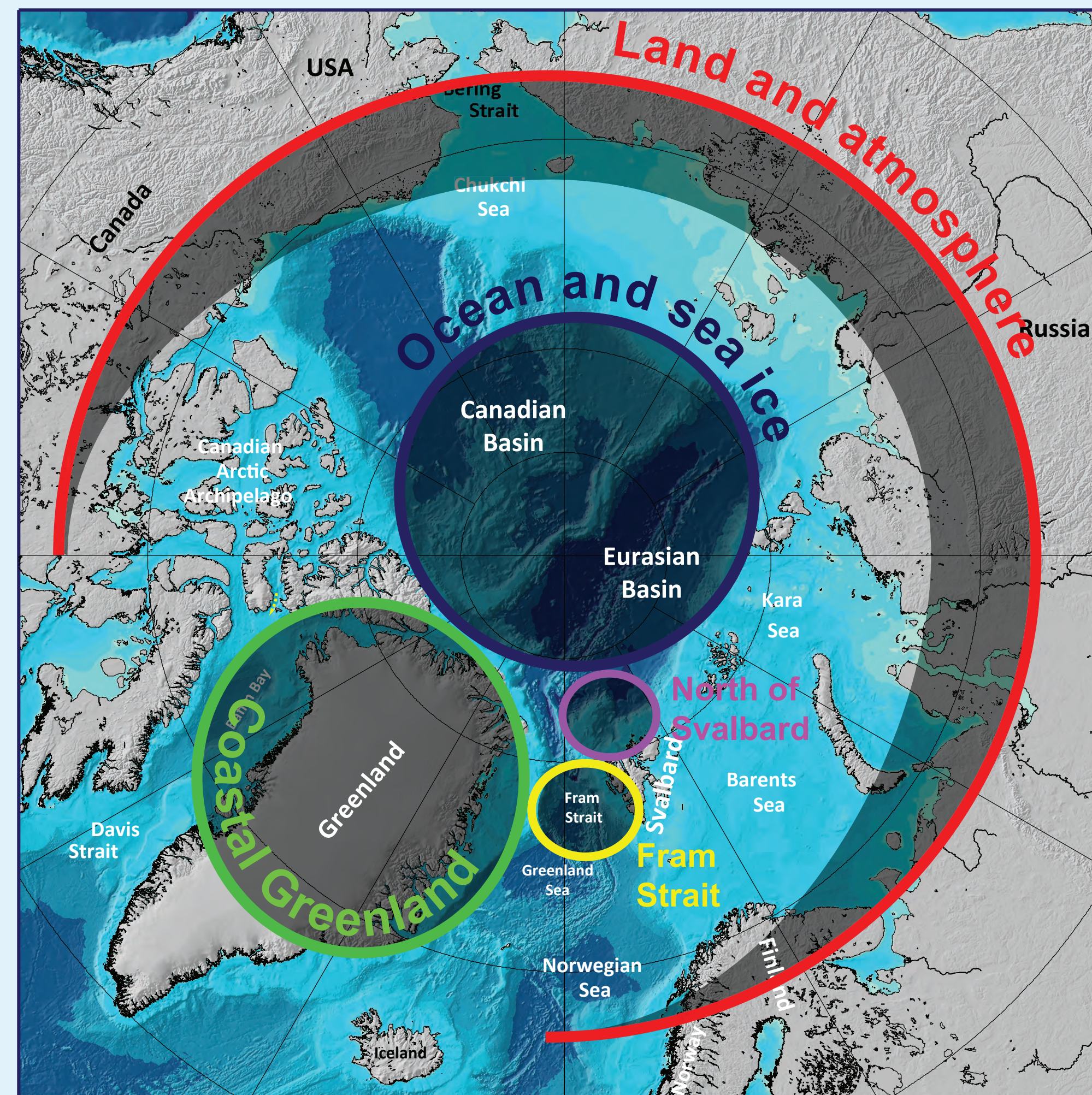


## Integrated Arctic Observation System

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



The H2020 project Integrated Arctic Observation System (INTAROS) aspires to increase the temporal and geographic coverage of in situ observations and add new key geophysical and biogeochemical variables in selected regions of the Arctic. By using a combination of mature and new instruments and sensors in integration with existing observatories, INTAROS aims to fill selected gaps in the present-day system and build additional capacity of multidisciplinary pan-Arctic monitoring networks.



Three reference sites have been selected as key locations for monitoring ongoing Arctic changes: **Coastal Greenland**, paramount for freshwater output from the Greenland ice sheet; **North of Svalbard** (shelf to deep basin) - the hot-spot for ocean-air-sea ice interactions, and heat and biological energy input to the European Arctic; and **Fram Strait** - the critical gateway for exchanges between the Arctic and the World oceans. Two distributed observatories: for **ocean and sea ice** and for **terrestrial and atmospheric** measurements will be extended with multidisciplinary observations, still missing from the central Arctic and remote coastal areas. New sensors, integrated platforms and experimental set-ups are under implementation during a two-year long deployment phase (2018-2020) with an aim for sustained use in a future integrated Arctic observing system (iAOS). New observations will be used for integration of new data products, demonstration studies and stakeholder consultations, and contribute to ongoing and future long-term initiatives.

### Observational platforms used by INTAROS



INTAROS builds on existing observing systems and networks in the Arctic, identified as key components of a future sustained iAOS. By adding new sensors and platforms to existing infrastructure, INTAROS aims to deliver new observations of essential ocean and climate variables, including water column biogeochemistry and biology, sea ice parameters, and autonomous atmospheric measurements, in accordance with recommendations provided by the OceanObs'19 white paper by Lee et al. (2019).



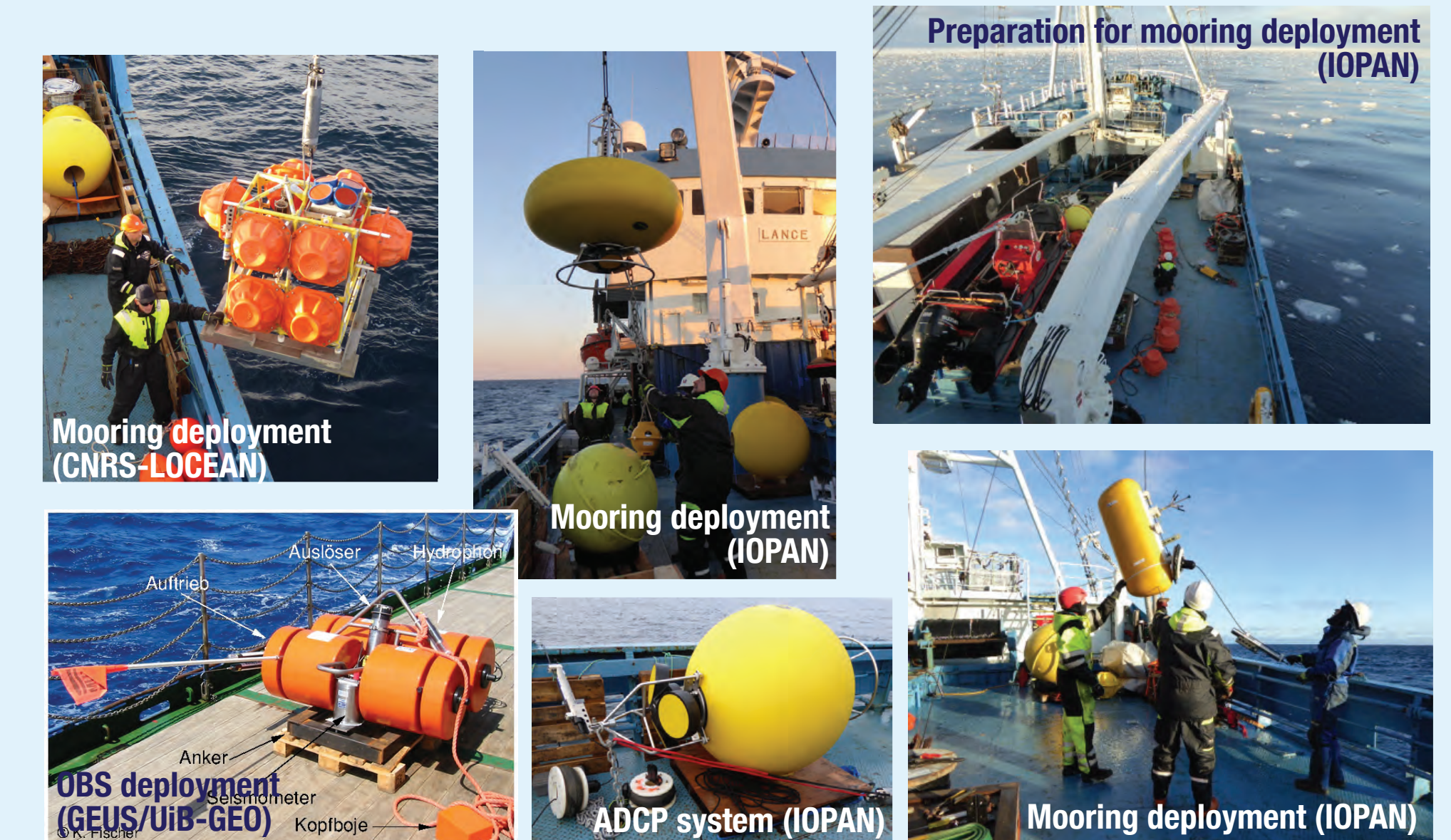
### Distributed observatories for atmosphere and land systems

- semi-autonomous system for atmospheric observations in the central Arctic for icebreaker Oden and SOOs (MISU)



### Multidisciplinary moored observatory north of Svalbard

- array of multidisciplinary moorings with profiling instruments and point measurements of ocean physical variables (IOPAN, CNRS-LOCEAN, UiB-GFI)
- pCO<sub>2</sub> and pH sensors for carbon system variables (UiB-GFI)
- autonomous passive contaminant samplers (NIVA)
- integrated OCTOPUS system with underwater vision profiler, FRRF fluorimeter and nutrient sensor (AWI)
- combined ADCP-echosounders for currents and zooplankton (IMR)
- combined ADCPs and echosounders for ocean currents and sea ice (IOPAN, UiB-GFI)
- bottom pressure recorders (UNIS)
- passive acoustics recorders for ocean soundscape (NERSC/NIOT)
- ocean bottom seismometers (GEUS/UiB-GEO)



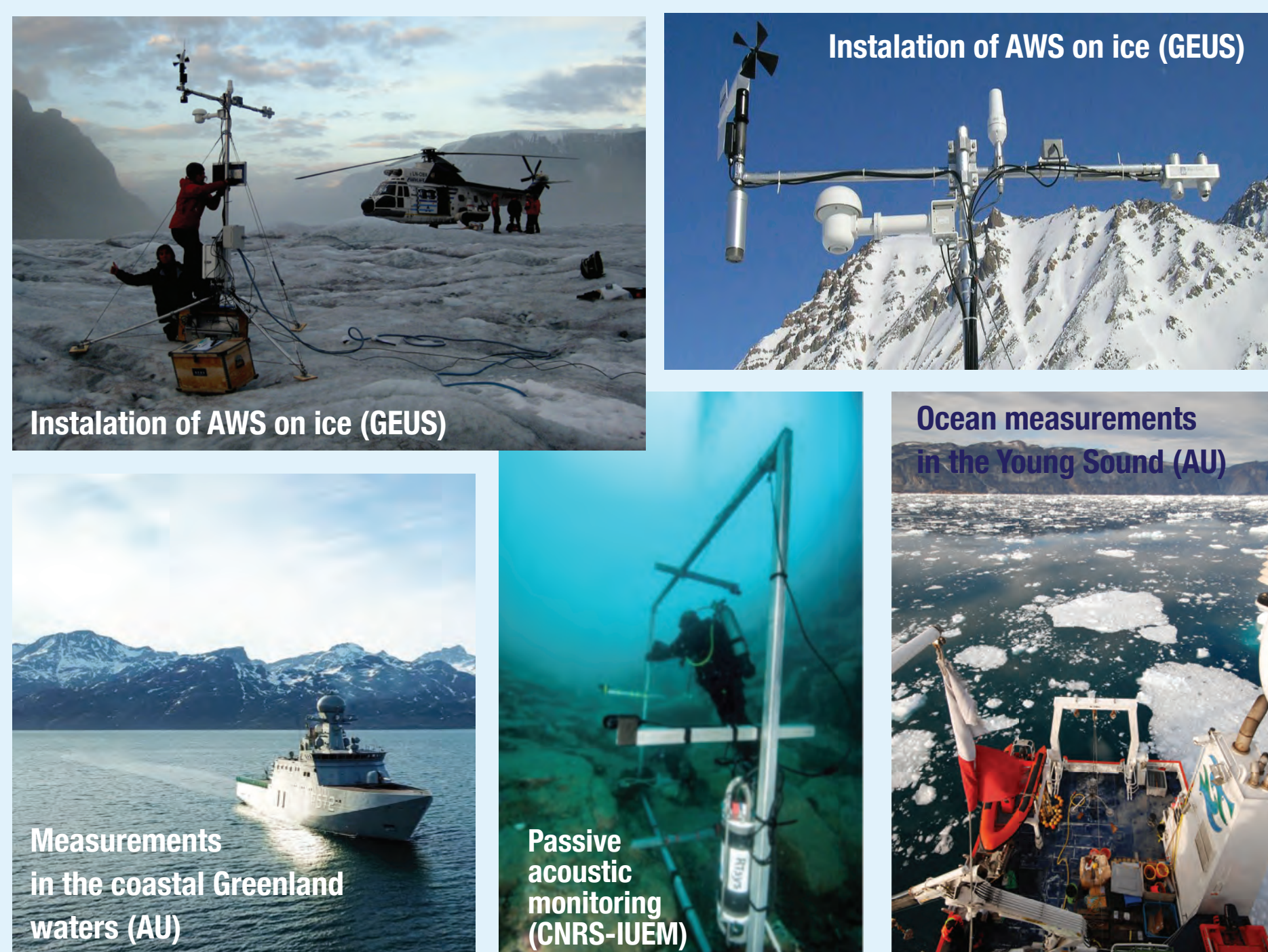
### Distributed observatories for ocean and sea ice

- ice-tethered platform for measurements of ocean physical variables with meteo and sea ice sensors (IOPAN with French Equipex IAOS)
- sea-ice mass balance buoys (FMI)
- measurements of snow properties and ABL observations (FMI)
- quadrocopter measurements of broadband and surface albedo (FMI)
- novel sensors for FerryBoxes (ocean acidification and carbonate chemistry, inherent optical properties, microplastic sampler) (NIVA)
- endurance glider lines in the open water Arctic regions (CNRS-LOCEAN)
- BioArgo floats in Baffin Bay (CNRS-Takuvik)



### Observatories on Coastal Greenland and in Baffin Bay

- ocean moorings with freshwater focus in NE Greenland (AU)
- properties of snow cover on sea ice in NE Greenland (GEUS/AU)
- surface pCO<sub>2</sub> and ocean acidification in the coastal zone (AU)
- on-ice weather station network for snow-water equivalent (GEUS)
- precise positioning system for ice sheet dynamics (GEUS)
- novel ground penetrating radar system for ice sheet (UPM)
- multidisciplinary acoustic observatory in the Young Sound with passive acoustic (CNRS-IUEM)



### Observatories in Fram Strait and Kongsfjorden

- extending the LTER observatory Hausgarten with experimental autonomous system for impacts of ocean acidification on benthic biology arcFOCE Arctic Free Ocean Carbon Enrichment (AWI)
- real-time measurements of pCO<sub>2</sub> and pH, monitoring of carbon cycle parameters in Kongsfjorden (CNRS-LOV)
- directional acoustic system to monitor benthic species and dynamics of sea ice and icebergs in Kongsfjorden (CNRS-IUEM)

