

# Year-round atmosphere-ice-ocean monitoring using a

# FRAM

# Distributed Sea Ice Observatory

**AWI** ALFRED-WEGENER-INSTITUT  
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## Abstract & Summary

**Understanding** the complex interactions between atmosphere, snow, sea ice and ocean is one of the biggest challenges in polar research. The lack of simultaneous in-situ observations leads to significant knowledge gaps on these interactions and their impacts.

**Main challenges** are 1) to cover a broad range of scales from process studies at single points to basin wide assessments, 2) to maintain such observations over the full annual cycle in order to capture seasonal changes, and 3) to perform well coordinated and colocated interdisciplinary studies.

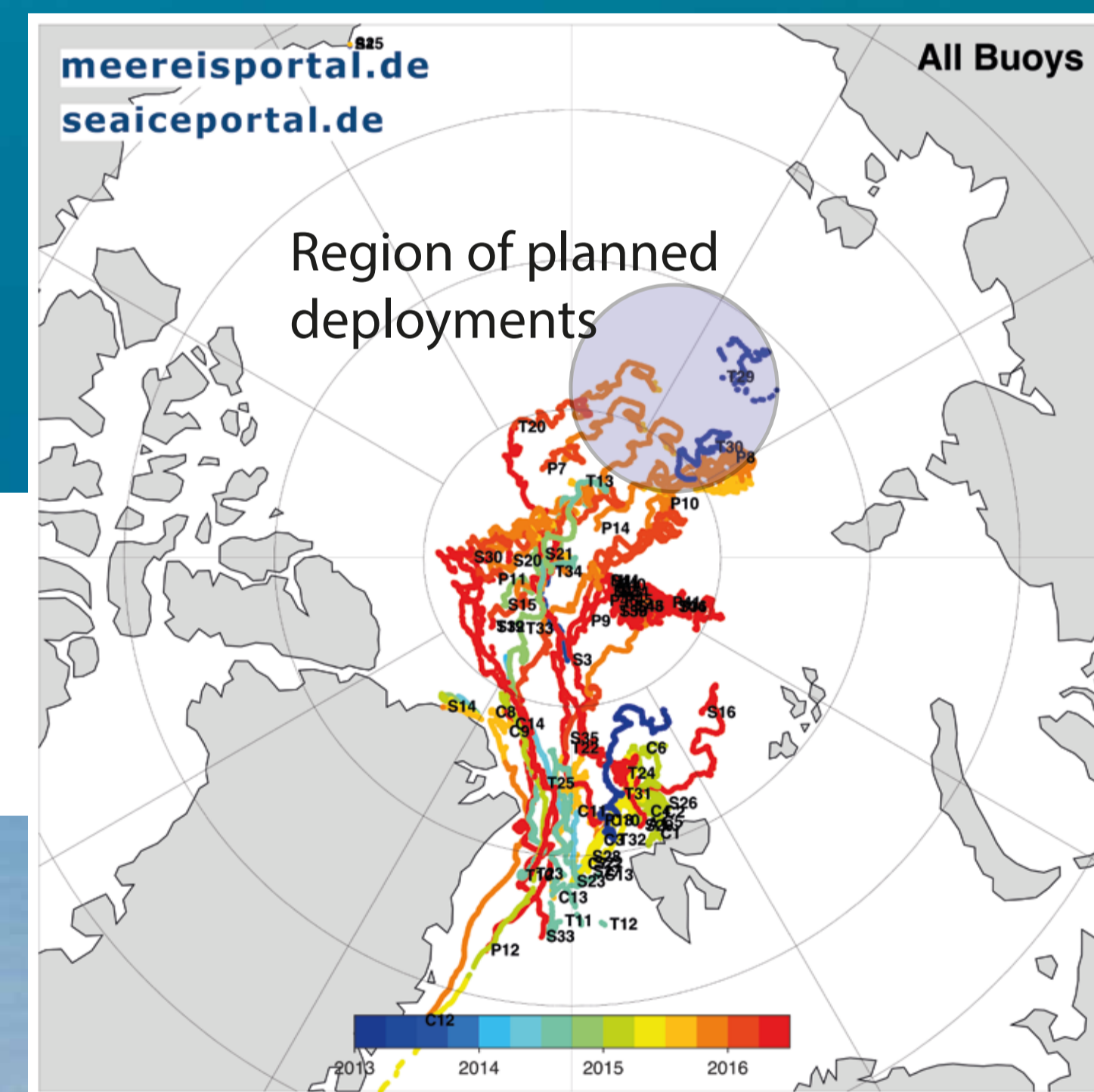
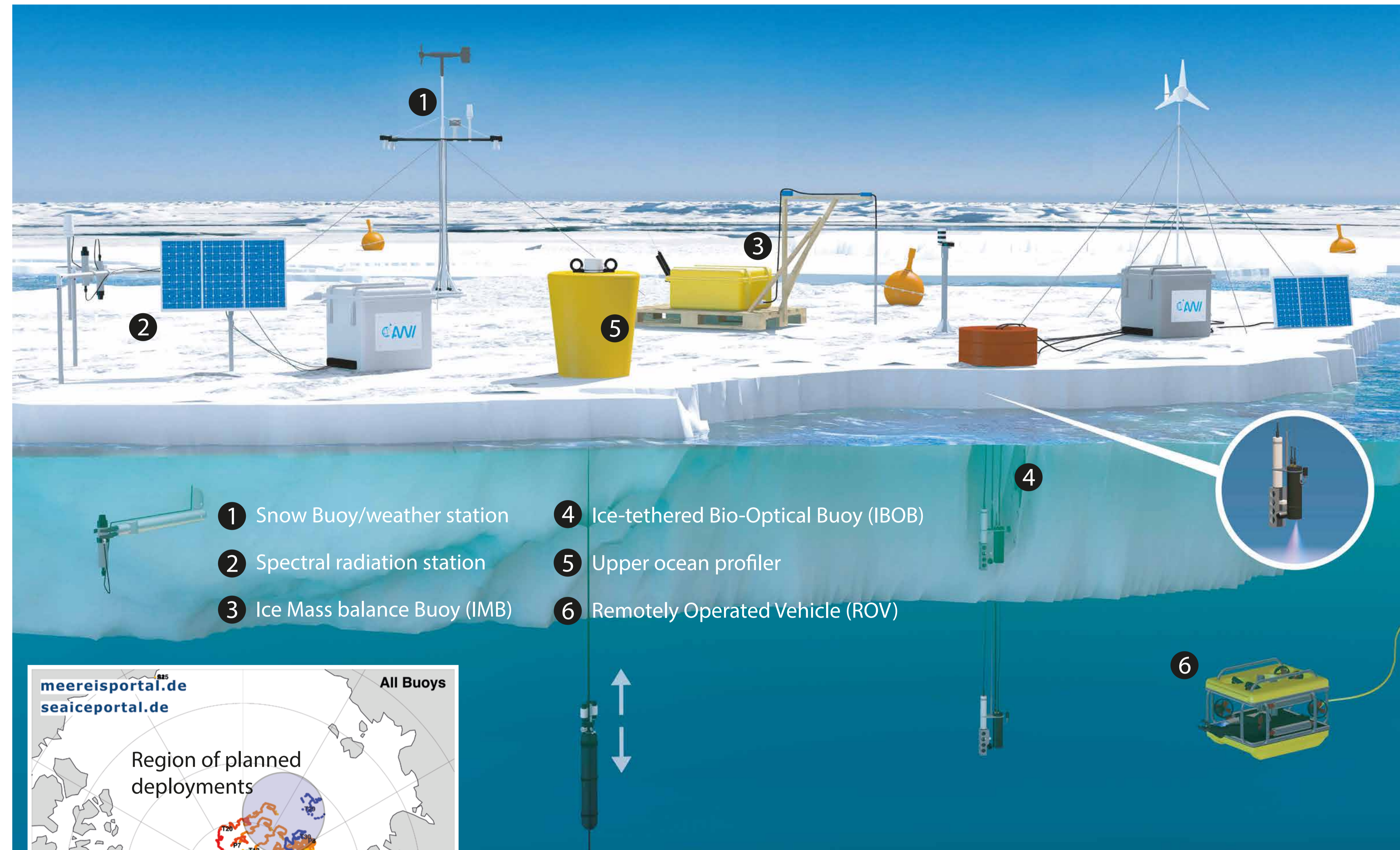
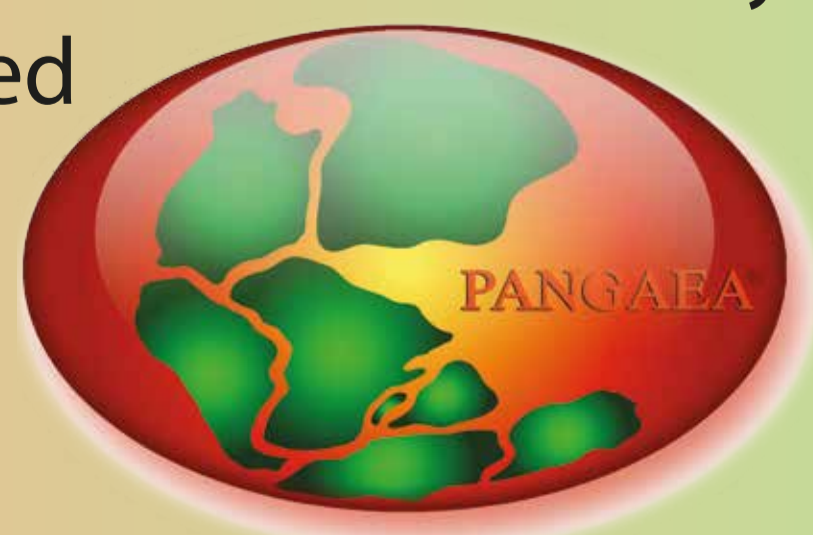
The **Multidisciplinary Ice-based Distributed Observatory (MIDO)** is a network of autonomous platforms that monitor the most essential climate and ecosystem parameters. A number of innovative instruments record atmosphere, snow, sea ice, and ocean parameters year round, including the largely under-sampled winter period.

**First deployments** suggest that this approach has great potential to advance our understanding of many physical and biogeochemical processes and interactions in the Polar Oceans.

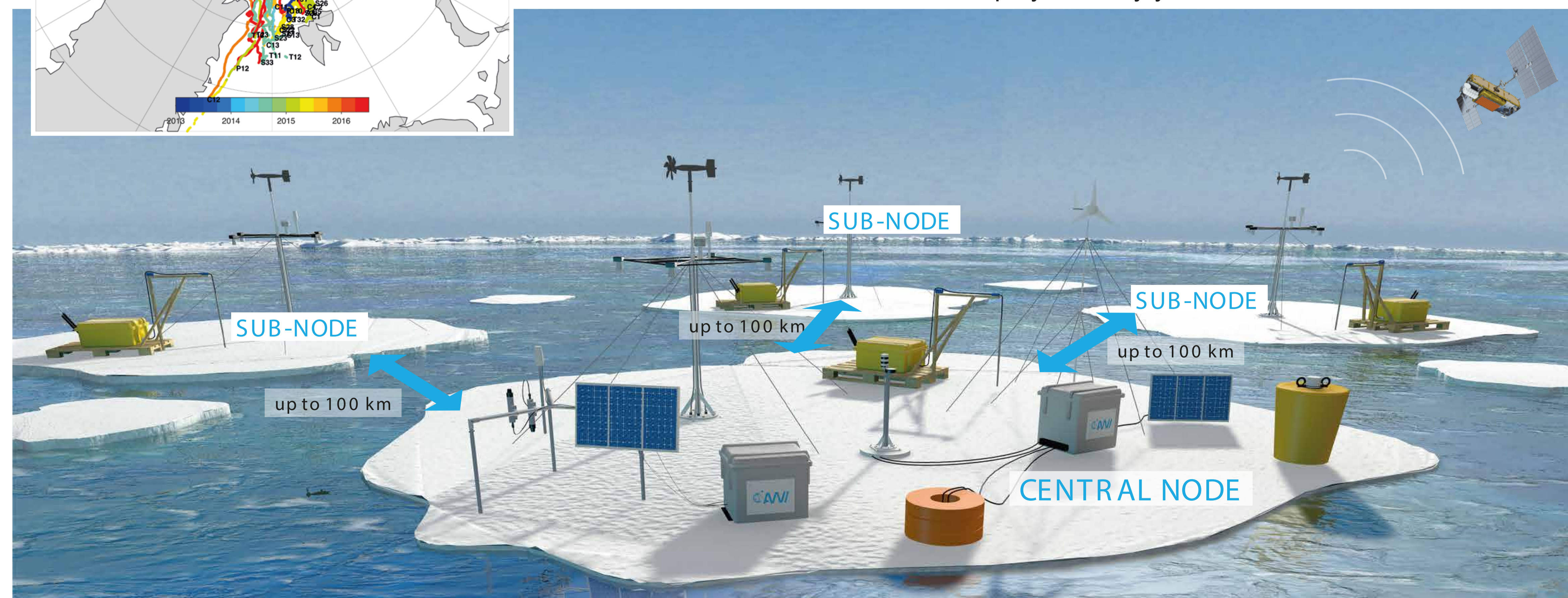
**The ultimate aim** is to achieve a quasi-synoptic, basin-wide coverage of key parameters.

## Data availability

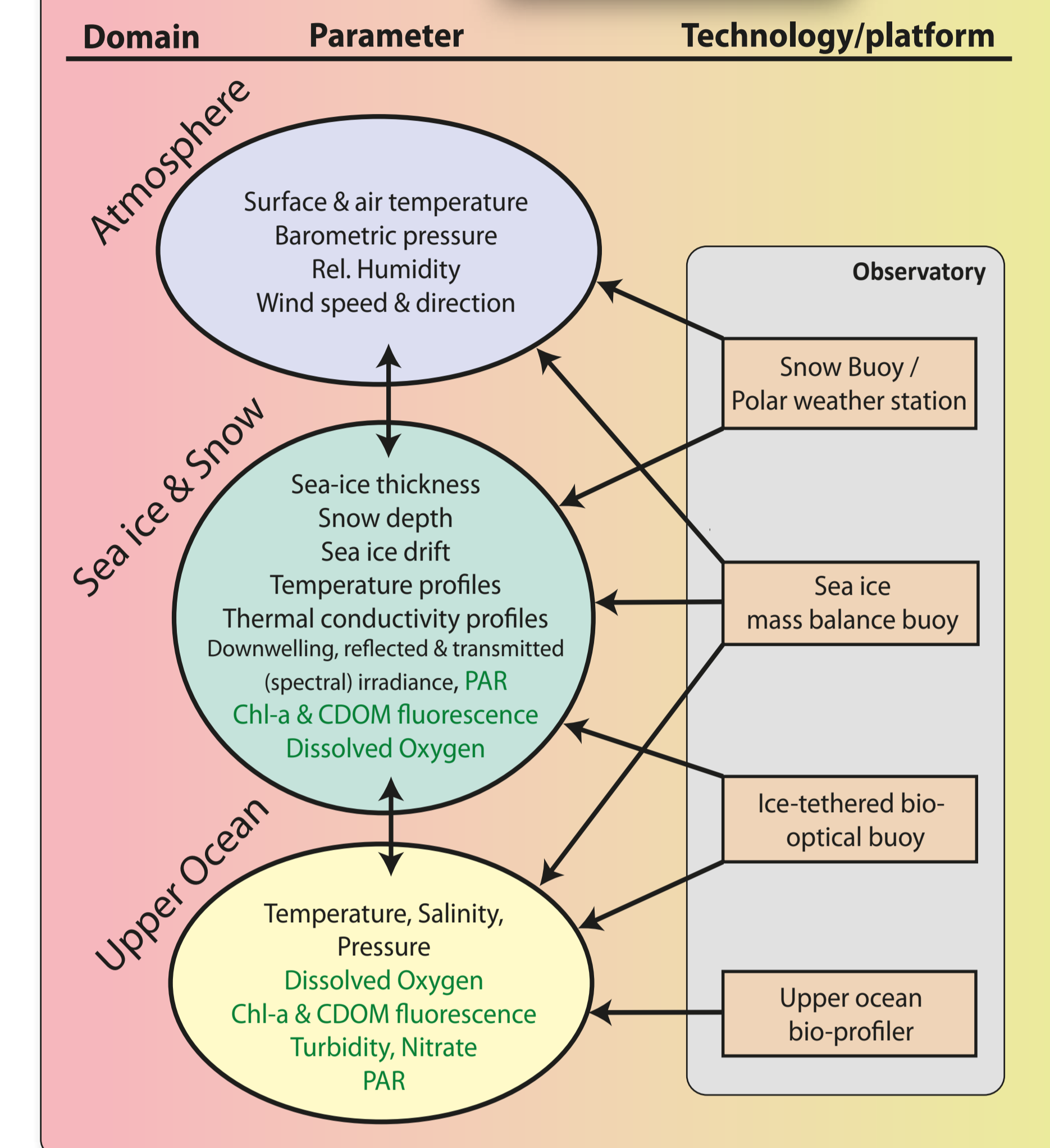
Arctic and Antarctic buoy data are available in near real time on <http://data.seaiceportal.de>. These buoys also contribute to the international buoy networks, as well as to the Global Telecommunication System (GTS). The data of all buoys are published and distributed through the online database PANGAEA.



**Top:** MIDO sensor suite installed on/in/under sea ice with additional ROV observations.  
**Left:** Map of trajectories of all autonomous platforms, as available from [meereisportal.de](http://meereisportal.de).  
**Bottom:** Central node with 3 sub-nodes representing a drifting observatory. From 2018 to 2020, two such observatories will be deployed every year in the Arctic Ocean.



## Concept



**Top:** Buoy types and parameters of MIDO

**Bottom:** Extended autonomous distributed observatories are performed in the framework of the Year Of Polar Prediction (YOPP, 2017-2019) and the Multidisciplinary drifting Observatory for the Study of the Arctic Climate (MOSAIC, 2019-2020).



**Acknowledgement**  
Most developments and the design of the distributed network were financed through the Helmholtz Infrastructure Initiative 'Frontiers in Arctic Marine Monitoring' (FRAM). The operational network MIDO is funded through the Alfred-Wegener-Institut (AWI) internal funds.

Building and maintaining the open online [meereisportal.de](http://meereisportal.de) / [data.seaiceportal.de](http://data.seaiceportal.de) is funded through the Helmholtz Climate Initiative REKLIM (Regional Climate Change, grant REKLIM-2012-04) and benefited from manifold contributions of various additional colleagues and students. Additional funding was received from the AWI.

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