An autonomous, multi-disciplinary sea-atmosphere-ocean observatory in the central Arctic & in the Weddell Sea

to overcome the Three main observational challenges in ice-covered oceans:

Spatial coverage:
the challenge of scales

Temporal coverage:
the challenge of seasonality

Interdisciplinarity:
climate- & ecosystem interaction

Sea-ice thickness
Snow depth
Sea ice drift
Thermal properties
Reflected & transmitted (spectral) irradiance
Chl-a fluorescence
Dissolved Oxygen

Surface & air temperature
Barometric pressure
Relative Humidity
Wind speed & direction
Downwelling (spectral) irradiance

Temperature, Salinity,
Dissolved Oxygen
Chl-a & CDOM fluorescence
Particle backscatter
Nitrate
PAR

Snow Buoy/weather station
Spectral radiation station
Ice mass balance buoy (IMB)
Ice-tethered bio-optical buoy
Upper ocean profiler
Remotely operated vehicle (ROV)

One central node and 3 sub-nodes represent one drifting observatory. Each year between 2017 and 2020, two such observatories will be deployed upstream the Transpolar Drift of the Arctic Ocean.

Central Arctic & Weddell Sea buoy deployments between 2013 and 2016, and region of planned deployments in 2017.

The remotely operated vehicle „BEAST“ is equipped with similar sensors as the buoys, and used to characterize the spatial variability of key parameters on floe scale.

Highlight so far: ocean profiler ITP93 recorded 1.5 years of biophysical data in the Eurasian Basin.

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.

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*actual deployments may vary

Data availability

Outlook: ROV operations & buoy observatories are critical elements of the MOSAiC experiment in 2019/20.