

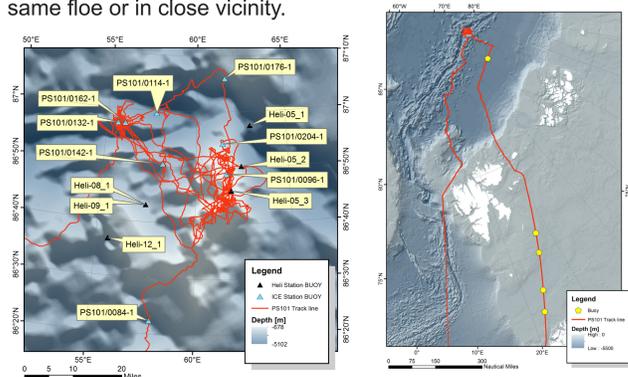
# Buoy deployments on PS101

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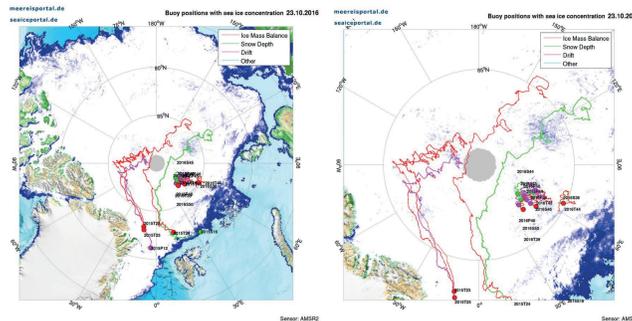
## Buoys on PS101

During the Polarstern cruise PS101 to the Karasik seamount in the Central Arctic, we deployed in total 26 sea-ice buoys. Due to persistent low clouds, helicopter flying was limited to a minimum, so that most buoys had to be deployed along the ship's track either during longer ROV ice-stations or quick 30 minute stops accessing the ice with the mummy chair.

This closer deployment pattern is in accordance with an agreement of buoy deployers worldwide, to focus buoy deployments not only on the large-scale distributions, but also to enable a look into local sub-grid-cell variability by deploying several platforms on the same floe or in close vicinity.



## Deployments

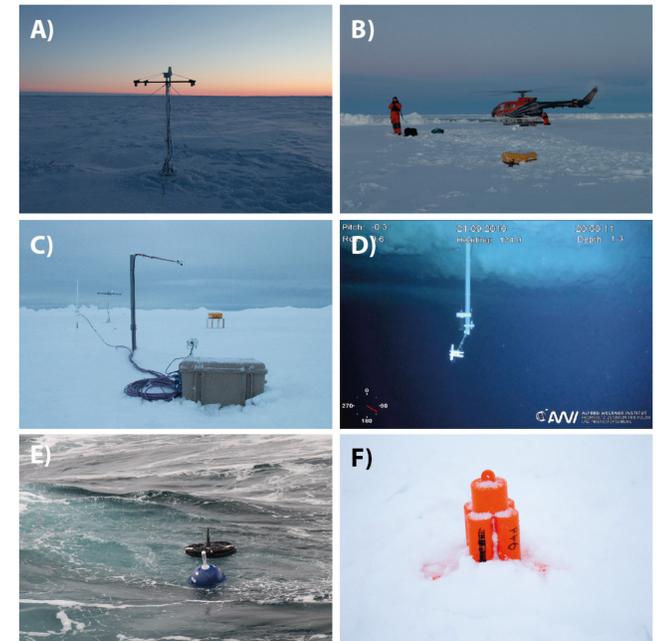


In total we deployed 8 surface velocity profiler (SVP) buoys, 8 GPS trackers, 5 Snow Buoys, 4 thermistorstring Ice-mass-balance buoys and two ITBOB prototypes including a solar-radiation package and an oxygen optode underneath the sea-ice.

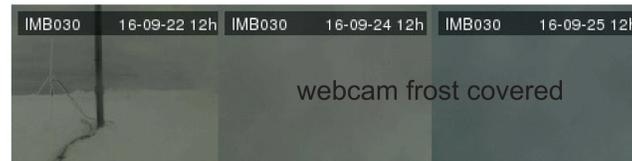
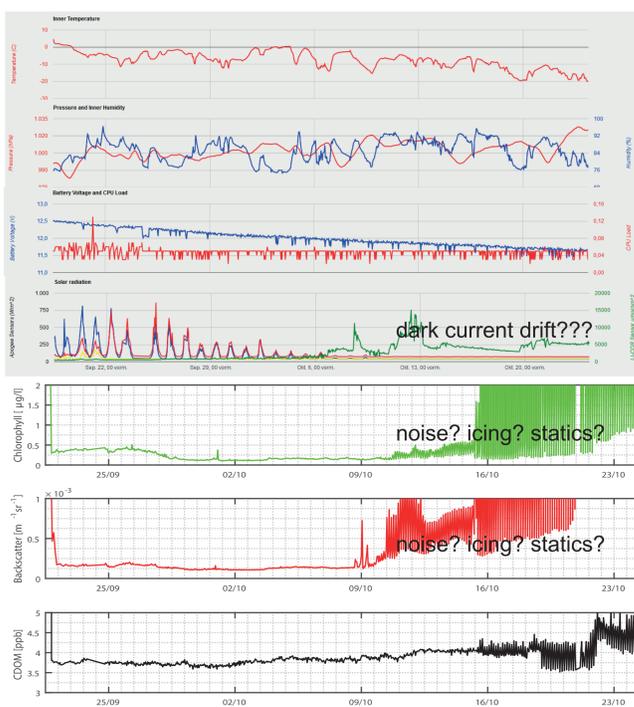
SVP and Snow Buoys are reporting directly into the global telecommunications system (GTS), providing air temperature and barometric pressure for weather forecasting. All buoy data is available live on meereisportal.de.

## Buoy types

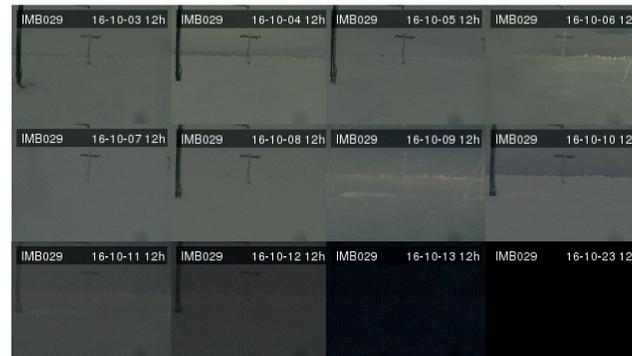
We deployed several sets of snow buoys (A) together with thermistorstring Ice-Mass-Balance Buoys (B). In a super-buoy station this setup was combined with an ITBOB prototype (C) which has a solar radiation package and an under-ice part (D) with a triplet fluorometer, oxygen optode and two different PAR sensors. SVP drifters (E) were deployed for the International Arctic Buoy Program and simple position drifters (F) for local ice-drift forecasting.



## ITBOB prototype deployment



Time series plots of 2016M2, the ITBOB prototype including chlorophyll, backscatter, CDOM, and solar radiation measurements. Live webcam images from the buoy show the surroundings with the radiation arm, temperature chain tripod, a thermistorstring IMB and the Snow Buoy. Unfortunately frost formed one day after deployment. Images of 2016M1 clearly show decreasing light at the end of the season.



## New Developments

- In house developed GPS tracker battery and housing solution to support on-site ice-drift forecasting
- First AWI deployment of ITBOB prototype with webcam, improved thermistor chain and solar radiation package
- ITBOB prototype: triplet fluorometer and oxygen optode on advanced IMB platform to test sensor and platform performance.
- Deployment of dense buoy network (21 units on 50x50 nm)
- IceGIS for live on-board buoy data display

## Super Buoy Station recovery



The Polar Atmospheric Weather Station (PAWS) was found in good condition. The slightly tilted instruments could be easily recovered.



The Snow Buoy was still standing perfectly upright after a summer of more than 40 cm of surface ablation. It was recovered to evaluate device status after one year in the ice.



Only the datalogger unit of the spectral radiation station could be recovered. The station failed early during the measurement period and likely sunk into a meltpond.



ITP93 had fallen over into an adjacent melt-pond. However it was still able to send data while being partly snow covered.

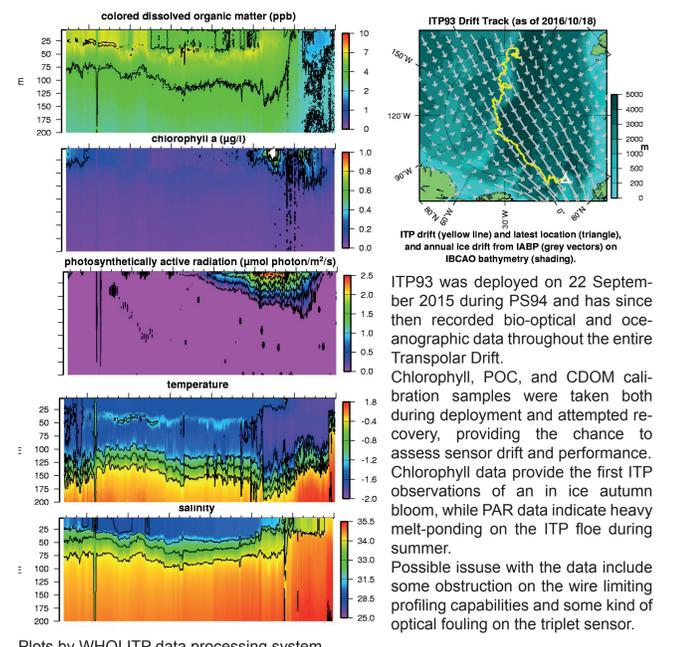


We dug ITP93 out of the snow and drilled/ picked it out of the fresh-water ice. Recovery by hand was impossible due to 2m thick ice and unclear tether position.



ITP93 was left again in an upright position to ease satellite communications.

## Success story ITP93



Plots by WHOI ITP data processing system.

ITP93 was deployed on 22 September 2015 during PS94 and has since then recorded bio-optical and oceanographic data throughout the entire Transpolar Drift. Chlorophyll, POC, and CDOM calibration samples were taken both during deployment and attempted recovery, providing the chance to assess sensor drift and performance. Chlorophyll data provide the first ITP observations of an ice autumn bloom, while PAR data indicate heavy melt-ponding on the ITP floe during summer. Possible issue with the data include some obstruction on the wire limiting profiling capabilities and some kind of optical fouling on the triplet sensor.