Snow Buoys
on Meereisportal.de

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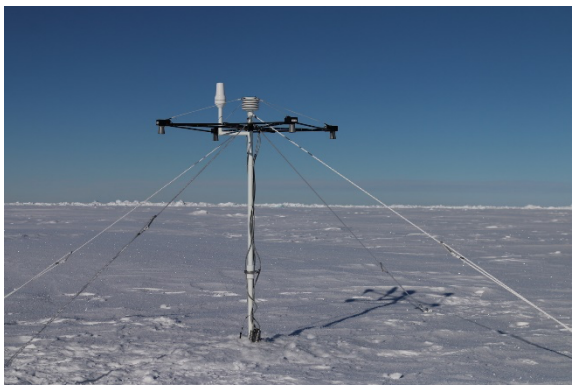

Photo: Stefanie Arndt, AWI

Description of autonomous platform

Snow Buoys (also called snow height beacons) measure relative changes in snow height around the platform by means of 4 ultra-sonic snow depth sensors. Calibrated against the initial snow depths during deployment, these relative changes translate into absolute snow depth. In addition, standard meteorological parameters are recorded. All data plus the GPS position are sent via Iridium at hourly intervals.

Property name	**Property value**
Manufacturer	MetOcean, Halifax, Canada
Manufacturer name	Snow Beacon
Data provider	JouBeh Technologies, Halifax, Canada
Height of mast	1.75 m, total height: 2.55 m, height of sensors: 1.5 m
Weight	approx. 30 kg
Deployment type	Installation on sea ice (into 25cm diameter hole)
Power supply	Lithium or alkaline batteries (life time >1 year)
Data transmission interval	1 hour

Parameters and accuracy

Parameter	**Sensor**	**Accuracy**
Relative snow height (m)	4x HRXL-MaxSonar-WR3 (MaxBotix)	±0.001 m
Air temperature (°C) at 1.5 m	YSI 44032	±0.1 °C
Body temperature (°C)	YSI 44032	±0.1 °C
Barometric pressure (hPa)	PTB110 (Vaisala) or equivalent	±1.0 hPa
Position (from GPS)	Jupiter 32xLP (Navman Wireless)	± 2.5 m

Data Processing

The data set has been processed and contains quality flags for different kinds for erroneous data. Flag values are the sum of individual error codes. The value of 0 refers to no error.

Quality flag, position: The geographic position is flagged +1 if the drift velocity, as derived from the GPS longitude and latitude, exceeds a threshold of 10 deg latitude or 50 deg longitude per time step; +2 if the position exceeds extreme values, such as longitude > 360 deg; +4 if the position is exactly 0.0.

Quality flag, snow: The snow height is flagged for each sensor +1 for manual corrections during processing (e.g. sensor issues); +2 if the snow accumulation exceeds 0.1 m per hour; +4 if the difference in snow height is larger than 0.03 m compared to values within the last and next 2 hours; +32 if the value exceeds the height of sensor on the platform at 1.5 m.

Quality flag, temperature: The air temperature is flagged +1 for manual corrections during processing (e.g. sensor issues); + 32 if the value is below – 50 °C.

Quality flag, pressure: The barometric pressure is flagged +1 for manual corrections during processing (e.g. sensor issues).

How to cite

1. The reference for the (data portal of) Meereisportal.de is:

Grosfeld, K.; Treffeisen, R.; Asseng, J.; Bartsch, A.; Bräuer, B.; Fritzsch, B.; Gerdes, R.; Hendricks, S.; Hiller, W.; Heygster, G.; Krumpen, T.; Lemke, P.; Melsheimer, C.; Nicolaus, M.; Ricker, R. and Weigelt, M. (2016), Online sea-ice knowledge and data platform <www.meereisportal.de>, Polarforschung, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research & German Society of Polar Research, 85 (2), 143-155, doi:10.2312/polfor.2016.011.

2. The reference for Snow Buoy data and their processing is:

Nicolaus, M.; Hoppmann, M.; Arndt, S.; Hendricks, S.; Katlein, C.; Nicolaus, A.; Rossmann, L.; Schiller, M. and Schwegmann, S. (2021), Snow Depth and Air Temperature Seasonality on Sea Ice Derived From Snow Buoy Measurements, Frontiers in Marine Science, 8, 377, doi:10.3389/fmars.2021.655446.

3. Please include the following phrase into the acknowledgment, substituting PARAMETER and DATE according to your usage:

Autonomous sea ice measurements (PARAMETER) from DATE to DATE were obtained from https://www.meereisportal.de (grant: REKLIM-2013-04).

4. Buoy data is archived at PANGAEA, a Data Publisher for Earth & Environmental Science, after the buoy has stopped sending data. Please refer to the buoys DOI.