# Radiation Station on Meereisportal.de

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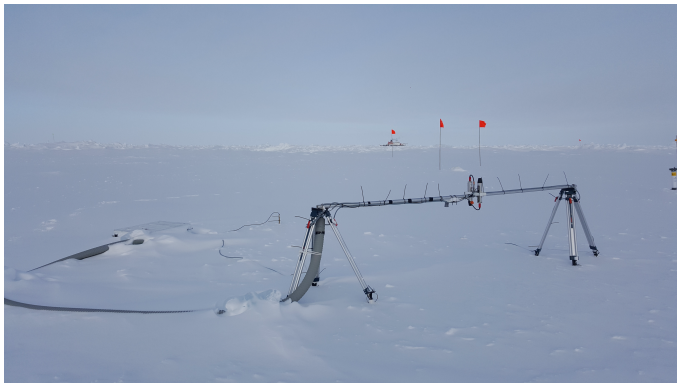

Photo: Philipp Anhaus, AWI

## Description of autonomous platform

The main component of a Radiation Station is a set of three spectral radiometers. Two sensors, solar irradiance and upward reflected solar irradiance, are mounted about 1 m above the sea ice surface. The third sensor is mounted e.g. 0.5 m underneath the sea ice measuring the downward transmitted irradiance. In addition, the radiation station allows a most flexible configuration of additional sensors above, in, and under the ice, very similar to a modular buoy. The main component is designed to be installed on an ice floe, including batteries and all control electronics. Sensor configurations vary from unit to unit. Many platforms report GPS position and radiation data via Iridium. Sometimes, the data are stored on local hard drives, which are collected when the platform is recovered.

| **Property name** | **Property value** |
|---|---|
| Manufacturer | Bruncin, Zagreb, Croatia or<br>AWI, Bremerhaven, Germany |
| Data provider | Bruncin, Zagreb, Croatia or<br>AWI, Bremerhaven, Germany |
| Weight | 50 to 80 kg |
| Deployment type | Installation on sea ice |
| Power supply | Lithium or alkaline batteries (life time >1 year) |
| Data transmission interval | 1 hour (user defined) |

## Parameters and accuracy

| **Parameter** | **Sensor** | **Accuracy** |
|---|---|---|
| Irradiance (W/m²) | 3x TriOS Ramses ACC-VIS | better than 6-10 %,<br>depending on wavelength |
| Barometric pressure (hPa) | BMP180 | ±1 hPa |
| Body temperature (°C) | HIH6130 | ±0.5 °C |
| Body relative humidity (%) | HIH6130 | ±4 %RH |
| Temperature (˚C) | 240 x ADT7320 for a 5m long chain | ±0.015 °C |
| Pyranometer | Apogee SP-230 or Apogee SP-110 | ±5 % |
| Fluorescence & Backscatter | WetLabs Eco Triplet | |

| | | |
|---|---|---|
| Dissolved Oxygen | Aanderaa optode | |
| Salinity | | |
| Position (from GPS) | S1315R | ± 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, sun: If the suns position is close to the horizon, the radiometers measure a very noisy signal. Radiometer measurements and variables which are computed from them are flagged +1 if the sun elevation is below 10 degrees; +2 if the broad band albedo exceeds the threshold 1.05.

## 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. 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).

3. 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.