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Snow and Ice Mass Balance Array – SIMBA

The objective of the SIMBA ice mass balance buoys is to measures high-resolution (2cm) vertical temperature profiles (4 times a day) through the air-snow-sea ice-ocean column. The temperature data is used to derive snow depth and ice thickness. The SIMBA buoy uses GPS module to measure positions. The Iridium satellite is used for data transmission.

Figure 1. The Chinese icebreaker Xuelong during the CHINARE Arctic expedition in 2018

A total 15 SIMBA buoys have been deployed in the Arctic Ocean during the Chinese National Arctic Research Expedition (CHINARE) 2018 and the Nansen and Amundsen Basins Observational System (NABOS) 2018 field expeditions in late autumn. In 2019 17 SIMBA buoys were deployed during the CAATEX and MOSAIC expeditions. The cluster of SIMBA buoys is an important method to monitor temporal and spatial variations of snow depth and ice thickness in the Arctic Ocean.
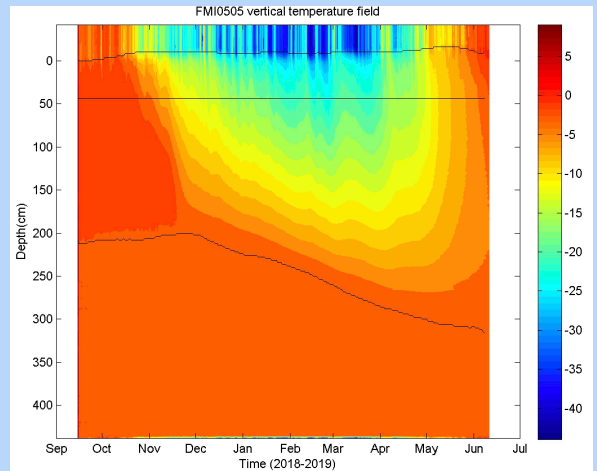

Figure 2. SIMBA data collected from one buoy over a seasonal cycle, showing the vertical temperature field (deg. C), snow depth and ice thickness. The black lines mark the snow surface (top), the initial freeboard (middle) and the ice bottom.
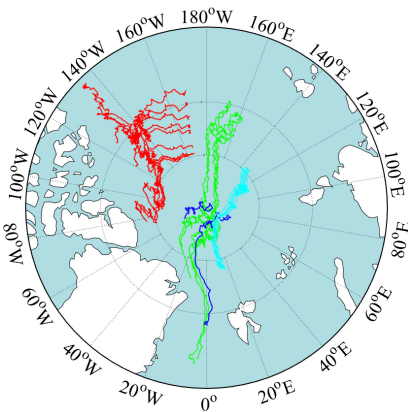

Figure 3. Trajectories of SIMBA buoys deployed in the Arctic in the period 2018-2019: Red: CHINARE(10), green: NABOS(5), dark blue: CAATEX(2), and light blue: MOSAiC(15).

The data are available at
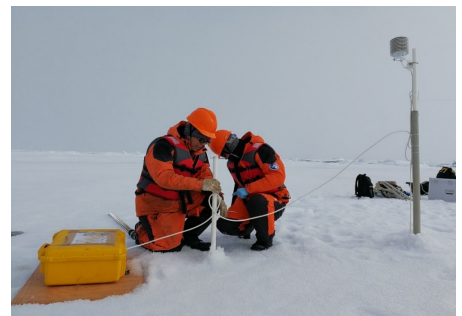https://simba.srsl.com/fmi/
https://simba.srsl.com/pric/
https://simba.srsl.com/nmefc/

Figure 4: Deployment of a SIMBA buoy