Snow Buoy Case Study

Snow Buoy Enables Snow Depth Monitoring in Polar Regions

METOCEAN SYSTEMS

The Challenge

Researchers from the world-renowned Alfred Wegener Institute (AWI) were looking for a way to monitor snow depth in the Arctic and Antarctic sea ice systems. Although snow depth on sea ice is an essential state variable of the polar climate system, it is one of the least known and most difficult to characterize parameters in the polar regions.

Snow on sea ice can have a range of effects, such as altering the properties of the underlying sea ice, entraining and transporting contaminants, impacting hunting and travel conditions during subsistence activities, and reducing the efficiency of ice breakers. To better observe snow depth in the polar regions, MetOcean worked with researchers from AWI to create a simple to deploy and affordable autonomous platform, the Snow Buoy.

The Solution

The Snow Buoy is an autonomous platform that measures snow depth, air temperature and barometric pressure in near real time (NRT). Developed based on the need for more *in situ* observations that cover the entire annual cycle and help to characterize the seasonality of snow depth in different regions, the Snow Buoys were designed to withstand the harshest environment conditions and deliver high and consistent quality data with minimal impact on the surface.

In addition, the overall design of this affordable platform allows a quick and straightforward deployment mostly independent of deployment logistics, and may even be performed by one or two persons with minimal training within 30 minutes. The Snow Buoy was designed and tested by MetOcean in conjunction with the AWI.

The Result

Between 2013 and 2019, 79 Snow Buoys were deployed in the Arctic Ocean and Weddell Sea, some of which provided the longest autonomous time series of snow depth on Weddell Sea pack ice and likely the most comprehensive *in situ* data set of snow depth on the Antarctic sea ice so far.

As a result, researchers from AWI saw that Snow Buoys can contribute to fill in the critical gap of *in situ* snow depth and near-surface meteorological measurements in the remote ice-covered areas. Data from the Snow Buoys were also reported to the Global Telecommunication System (GTS), thereby supporting various international efforts aiming to improve numerical weather forecasts in the high- and mid- latitudes.

The ongoing Snow Buoy program at the institute will be the basis of many future studies and is expected to advance understandings of snow and sea ice, while providing invaluable *in situ* validation data for numerical simulations and remote sensing techniques.

To read the full white paper on the Snow Buoy program, click here. For additional product information on the Snow Buoy, please visit this page.