

Application Note

GeoSwath Plus Compact



KONGSBERG

Multibeam Surveys with a RIB

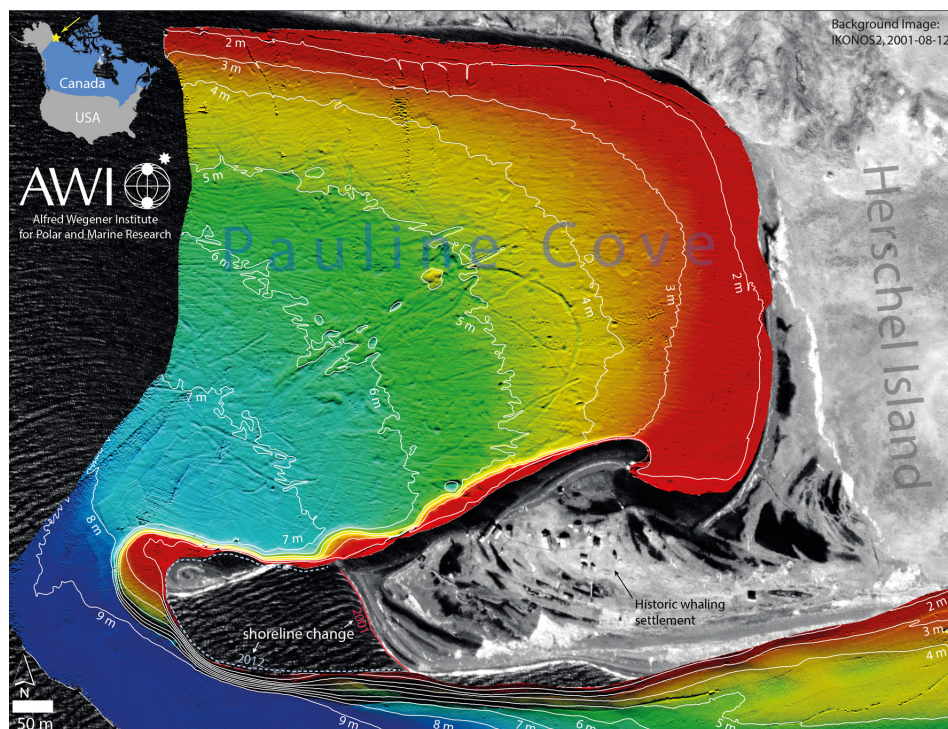
Seafloor Mapping in Permafrost - Herschel Island, YT, Canada

The Alfred Wegener Institute for Polar and Marine Research (AWI) in Germany has engaged in the coastal permafrost erosion research project (COPER) funded by the Helmholtz Association and the institute.

A stark seasonal contrast characterizes coastal dynamics on arctic coasts. During the winter the coast is protected by sea- and landfast ice from wave erosion. In absence of ice the coast is exposed to mechanical and thermal erosion processes with high erosion rates. Forecasts of many climate change models indicate, the Arctic region will experience disproportionate warming in coming decades, which will further increase



Survey vessel, an inflatable craft with the GeoSwath Plus Compact sonar head installed on a retractable pole together with peripheral sensors, motion reference unit, GPS and sound velocity probe. The splash protected deck unit is powered by batteries and operated via a ruggedized laptop.



Bathymetry map of Pauline Cove on Herschel Island, YT, Canada. The area was chosen as the natural laboratory for coastal erosion processes in permafrost regions. The bathymetry is the baseline for long time studies. Note the dredge marks caused by sea ice processes.

the rate of coastal erosion and also liberate vast quantities of carbon stored in permafrost leading to an important potential climate feedback, as the carbon released from permafrost might contribute further to the warming trend.

The research projects looks to describe and quantify the erosion and related carbon release by using air- and space- born methods together with field research.

Herschel Island in the Beaufort Sea, Yukon Territory, Canada, was selected as a natural laboratory for the long term field study.

An integral part of the fieldwork is seafloor mapping for which AWI has chosen the Kongsberg Geoacoustics GeoSwath Plus Compact system. The system delivers high resolution bathymetry with coverage of up to 12 times the water depth in this shallow water environment and co-registered

geo-referenced side scan data, which can be used for detailed seafloor classification. In the 2012 field season c. 3.1 km² has been collected, mapping Pauline Cove with water depth of 1 – 17 m in five short survey days. This dataset represents a baseline to which future surveys can be compared to. Future expeditions are planned to re-survey and expand the area to other parts of the island.

Decisive factors in operating in remote and harsh environments are the portability and reliability of the equipment. The remote location makes it necessary to airlift all equipment and personnel. The survey was carried with an inflatable craft on which the splash protected (IP54) system was installed in a portable installation and powered by battery (24 V).

GeoSwath Plus Compact

The *GeoSwath Plus Compact* shallow water multibeam offers efficient simultaneous swath bathymetry and side scan seabed mapping with accuracies that exceed the IHO standards for hydrographic surveys. The applied phase measuring bathymetric sonar technology has an insonification angle of 240°, providing seafloor coverage beyond 12 times the water depth and makes it possible to image structures up to the water line without the need of tilting the sonar head. The lightweight, splash protected system is readily installed on small vessels of opportunity including inflatable crafts, RIBs and jet-skis. The system is available in two frequency versions, 500 kHz and 250 kHz

GeoSwath Plus Compact set-up

The typical set-up for over-the-side installation for small boat operations comprises the wet-end transducer t-plate, which holds the sonar head consisting of two transducers moulded into a single element for easy calibration. In addition it holds a sound velocity sensor (MiniSVS) and a motion reference unit (MRU). The sonar head is deployed on an over-the-side pole together with the GPS and heading sensor. This way the sonar system is separated from the vessel, which facilitates the calibration and makes the system truly portable.

Features

- Ultra high resolution swath bathymetry
- IHO SP-44, special order
- Co-registered geo-referenced side scan
- Frequency versions: 250, 500 kHz
- Up to 12 times water depth coverage
- 240° view angle
- Compact splash protected deck unit
- 24 V power supply, 40 W
- Operation from laptop PC
- Dual transducer sonar head
- Full software solution included: data acquisition, processing, presentation
- Interfaces to all customary peripheral sensors



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