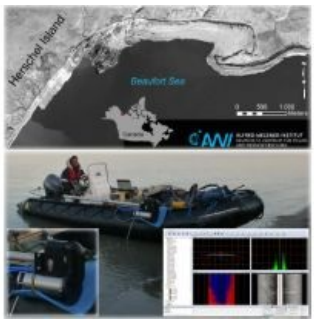
GeoTexture for Backscatter Data Processing Evaluation at AWI



Regarding co-registered, georeferenced backscatter data, the German Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI) has recently been evaluating the Kongsberg Geoacoustics GeoTexture software suite for backscatter data processing, mosaic creation and seabed classification. The software performance has been optimised for the analysis of GeoSwath Plus backscatter data, as it allows for beam pattern correction, vessel motion and sea-bottom topography, which substantially improve the quality of the mosaics and simplify image analysis and interpretation.

Back in 2012, AWI began assessing the pace of coastal erosion and the nature of sediment and organic matter transfer in nearshore areas of the southern Canadian Beaufort Sea. Coastal dynamics on arctic coasts are highly seasonal: ice is present from October to late June, thus the coast is armoured against wave erosion. In the short open-water season the coast is subject to the combined effects of mechanical and thermal processes resulting in high erosion rates along ice-rich permafrost coasts, such as the western Canadian Arctic. Current estimates show that there is about twice as much carbon stored in permafrost as in the atmosphere. Of special interest is the potential climate feedback triggered by carbon release into the nearshore zone by coastal erosion, in a region that according to many climate change models will experience disproportionate warming. A portion of the released carbon is deposited on the continental shelf, yet the nearshore dynamics and the possibility of sequestration in shallow waters remains an open question. Within the framework of the Coastal Permafrost Erosion research project (COPER), AWI scientists began investigating both the terrestrial coastal dynamics, as well as assessing the fate of sediments and carbon released into the nearshore.

An integral part of the fieldwork is seafloor mapping, for which AWI chose the Kongsberg Geoacoustics GeoSwath Plus Compact system. In the 2012 field season, c. 3.1 km^2 of survey data were collected, along with surface sediment samples. Survey depths ranged from 1-17m. 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 backscatter data. The data was collected using a Kongsberg GeoSwath Plus Compact bathymetric sonar and processed using GeoTexture software suite.

The surveys were carried out with an inflatable craft on which the splash protected (IP54) system was installed in a portable installation and powered by 24V battery. The sonar head was 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 ruggedised laptop.

Image: Compensated backscatter mosaic from the near-shore south-east of Herschel Island.