

MAPPING TECHNOLOGY

MAREANO

Future - Ultra high data resolution & automatic mapping

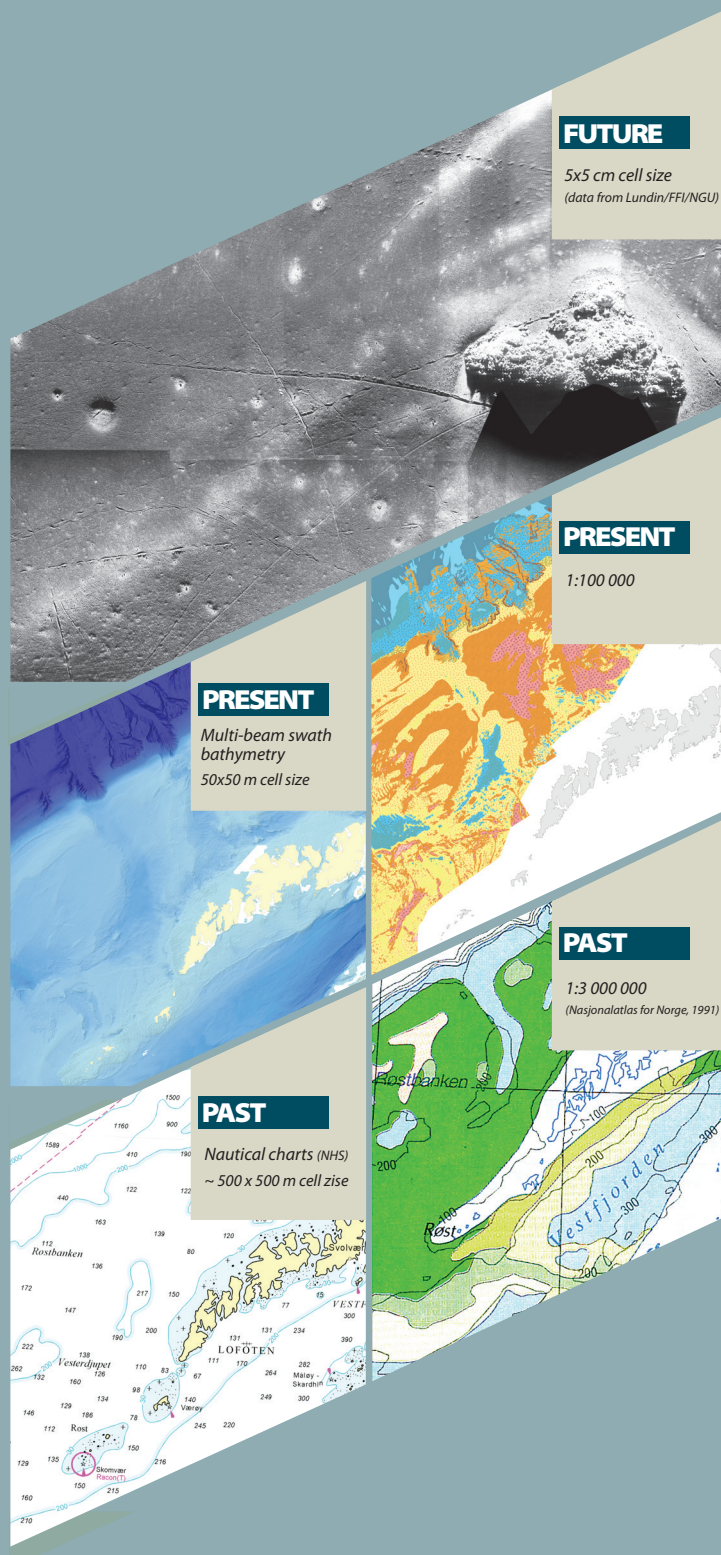
Maritime industries and society as a whole depend on increasingly detailed information about the seafloor to ensure sustainable ocean management. New technologies allow data to be acquired more efficiently and in greater detail than ever before. Unmanned underwater vehicles (AUVs) which can be equipped with a range of instruments (from echosounders to gas detectors), and be programmed to scan the seabed at a few metres altitude, offer great potential for seabed mapping. New software solutions enabling increasingly automated data analysis will also contribute to improvements in digital mapping. The example shown here is imagery from an ultra high resolution synthetic aperture sonar mounted on an AUV (5 cm resolution over swath widths of more than 300 metres). The use of AUVs makes it possible to retrieve invaluable, new information, about seafloor processes and geomorphic features in unprecedented detail. Examples include pockmarks, carbonate crusts resulting from gas seepage, coral reefs, and human impacts on the seabed such as trawling.

Present - high spatial data resolution & digital mapping

Norway's national offshore mapping programme MAREANO combines the use of acoustic remote sensing with direct observations of the geology and biology of the seabed. The Norwegian Hydrographic Service undertakes baseline mapping using hull-mounted multibeam echosounders which provide bathymetry data (left) showing the seabed topography at a level of detail well matched to regional mapping (5 to 50 m resolution). The Geological Survey of Norway process these multibeam data further to produce maps of acoustic backscatter which give a first indication of the nature of the sediments at the sea floor. On the basis of this background information, the Institute of Marine Research and the Geological Survey of Norway determine sites for direct observation of sediments, benthic fauna and environmental contaminants, which are documented using underwater video and physical samples. Finally, the Geological Survey of Norway interprets all these data (using GIS programs) to produce a range of seafloor maps (1:100 000 scale) showing grain size (right), genesis, sedimentary environment, landscape & landforms. Maps showing results of biotope modelling and geochemical analysis are also produced at this stage by the Geological Survey of Norway in co-operation with the Institute of Marine Research. All the maps are made available at www.mareano.no.

Past - limited spatial data resolution & manual mapping

Before MAREANO, seafloor sediment maps from Norwegian waters were based on a combination of bathymetric soundings used to produce nautical charts (left; equal to ca. 500 m resolution), a grid of seismic and side-scan sonar lines (ca. 10 km spacing between lines), and a very limited number of sediment samples (compared with today's MAREANO standard). These maps (right) provided a representation of the sediments occurring in the uppermost few metres of the seabed rather than those found directly on the surface of the seafloor.



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