



Elongated ridges and depressions on glacial banks and troughs offshore north Norway: Modern or old features?

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A large mapping programme (MAREANO) has been started in the Lofoten - Southern Barents Sea area to investigate the physical, biological and environmental status of the seabed. The institutions behind this programme (Institute of Marine Research (IMR), Geological Survey of Norway (NGU), Norwegian Hydrographic Service (SKSK)) cooperate closely with several other institutions to perform the mapping. The results are available on the internet (www.mareano.no). NGU is responsible for mapping of seabed sediments and geological features, and is also responsible for mapping of environmental status, together with IMR.

Outside the Lofoten Islands and the coasts of Troms, the Norwegian continental shelf comprises shallow banks (50-200 m deep) alternating with deeper cross-shelf troughs (150-500 m deep). The mapping has highlighted numerous elongated ridges and depressions on banks. The deepest depressions (type 1) are semi-parallel and located on some shallow banks at water depth of 60-100 m. Video inspection shows that the sediments comprise very coarse deposits (gravelly sand to boulders). The depressions can be deeper than 5 m, longer than 10 km and 50 - 200 m wide. They always start on the southwestern parts of the banks and disappear in the northern part of the banks. We believe that these features were formed at very shallow water shortly after the deglaciation, probably due to a combined action of waves and strong longshore currents. Smaller depressions (type 2; <1m deep, longer than 10 km) cut into the type 1 depressions. They were probably formed with lower current than type 1 depressions.

They are covered by sand ribbons in some places, indicating local depositions of finer sediments after their formation. Type 3 depressions are rather small features (< 1m deep, < 1km length, 10-200 m wide). They occur on the banks and on landward slopes of the banks between 40 and 140 m depth, in sandy deposits. The depressions are characterized by coarser deposits than the surrounding areas (levees). Their shapes are quite similar to those of rippled scour depressions found on many modern shorefaces. Type 4 depressions (< 10 cm depth, < 200 m length) occur in some glacial troughs between 140 and 200 m depth. They are not visible in the bathymetric data. On the backscatter data, the depressions show also coarser sediments than the surrounding areas. Due to the lack of sediment fill inside types 3 and 4 depressions, they are likely in equilibrium with the hydrodynamic environment and then correspond to modern features formed under the actual hydrodynamic conditions.