

Beaufort's Dyke is a submarine depression located in the North Channel of the Irish Sea. With a maximum depth of 312 m, the dyke is one of the deepest areas within the European continental shelf. Integration and interpretation of 450 km of sparker seismic data and full-coverage bathymetric data derived from multi-beam echo sounder surveys allow for the investigation of the formation processes of Beaufort's Dyke and the evolution of geomorphological features within it. The dyke, formed by composite subglacial processes dominated by subglacial meltwater discharge, is interpreted as a tunnel valley. The regional isolation of Beaufort's Dyke may be explained by the bounding of the North Channel by the bedrock masses of Ireland and Scotland, coupled with the exploitation of structural weakness along a fault plane and presence of halite in the eroded substrate enhancing the erosive potential of the overlying glacier. Beaufort's Dyke has probably been maintained as an open feature by strong rectilinear tidal currents. The morphology of lunate sediment waves and a large parabolic bedform towards the south of the dyke contradict the observed dominant S–N mean hydrodynamic flow recorded within the North Channel, suggesting an alternative hydrodynamic regime either within the dyke or during bedform creation