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Deep-water geomorphology of the glaciated Irish margin from high-resolution marine geophysical data

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The evolution of the northwest European continental margin was strongly affected by Pleistocene glaciations, particularly where ice sheets extended onto the continental shelf and transferred glaciogenic sediment onto the slope, contributing to the formation of canyon systems, submarine fans and slides. Research conducted on the British-Irish Ice Sheet (BIIS) strongly indicates that its western margin extended offshore onto the continental shelf around Ireland and Britain. However, until recently the study of submarine canyons and other slope and basin floor features has been limited by the low resolution of the available data. Recent advances in multibeam data processing and visualisation have yielded enhanced images. This study integrates high-resolution multibeam bathymetry and backscatter data with TOBI side-scan sonar data, resulting in a detailed geomorphological interpretation of the northwest Irish continental margin and an improved understanding of the effects of glacial forcing on the morphology and sediment architecture of the region. Correlation of the position and dimensions of glacial moraines on the continental shelf with the level of canyon evolution suggests that the sediment and meltwater delivered by the BIIS played a fundamental role in shaping the margin, including the upslope development of some of the canyon systems. Glacial influence is also suggested by the variable extent of the sedimentary lobes associated with the canyons which also provides an indirect measurement of the amount of glaciogenic sediment delivered by the ice sheet into the Rockall Trough during the last glacial maximum. The various slope styles observed on the Irish margin also represent snapshots of the progressive stages of slope development for a glacially-influenced passive margin and may provide a predictive model for the evolution of other margins.