

A first insight into the origin and evolution of the Gollum and Kings channel systems, Porcupine Seabight, NE Atlantic, based on geomorphology and geophysical data

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The Gollum Channel System (GCS) is a submarine channel system stretching from the Irish Shelf to the Porcupine Abyssal Plain. Even though it is one of the few lengthy channel systems on the NE Atlantic margin and the only major system in the Porcupine Seabight, it has received relatively little research attention, especially compared to the Armorican canyons. These have been investigated extensively with regard to the deglaciation history of the European Ice Sheet. However, the GCS is thought to have served as a drainage system to the Irish Sea and therefore, the dynamics of the British-Irish Ice Sheet might be better resolved in this system. Additionally, since canyon-channel systems are the major pathways for material transport from shelf to basin, the temporal and spatial variability of their activity might have significant regional consequences. Bathymetric, 2D reflection seismic and oceanographic data are used here to provide first insights into the evolution of the GCS and the neighbouring, smaller, Kings Channels System (KCS). The GCS and KCS represent an area where bottom currents, turbidity currents, slope failures and hemipelagic processes have interacted in variable proportions throughout the Neogene and Quaternary periods.

The initial seafloor topography of the two systems was shaped by a laterally extensive erosional event representing a late Miocene-late Pliocene hiatus. Sediment transport within the channels was probably most active during Quaternary glacial periods, with terrigenous sediment sources situated closer to the channel heads. Sediment carried downslope by turbidity currents was likely thieved and transported northwards by contour currents, supplying material to the Belgica cold-water coral mounds.