

The sedimentary architecture of the Hatton Basin from new 2D seismic reflection and gravity data

Laura Berdi (1,2,3), Manel Prada (1,2), Brian O'Reilly (1,2), Peter Haughton (2,3), Patrick Shannon (2,3), Sara Martínez-Loriente (2,3)

(1) Dublin Institute for Advanced Studies, School of Cosmic Physics, Geophysics Section, Ireland
(laura.berdi@icrag-centre.org), (2) Irish Centre for Research in Applied Geosciences (iCRAG), (3) School of Earth Sciences, University College Dublin

The Hatton Basin is located at the western European Atlantic Margin, approximately 600 km west of Scotland and Ireland. It is bounded by the Rockall Bank to the east and by the Hatton High to the west. Little is known about its structure and evolution within the context of the North Atlantic opening. Here we present a preliminary interpretation of the large-scale sedimentary structure of the Hatton basin from new 2D regional long-streamer seismic reflection data and DSDP information. Gravity data and previous knowledge on the crustal structure of the basin are used to investigate its formation processes.

First interpretations of the seismic data suggest the presence of three megasequences referred to as Ha (Early Pliocene to Holocene), Hb (Late Eocene to Late Miocene) and Hc (Paleocene to middle Eocene), which are bounded by regional unconformities C10 (intra-Early Pliocene), C30 (intra-Late Eocene) and C40 (base Cenozoic) respectively. The C20 (intra-Early Miocene) surface is absent in the basin but is locally identified to the south of the study area. The mapped regional reflectors are recognized throughout the European North Atlantic.

Below the Cenozoic succession, the presence of Mesozoic and/or older rocks in the basin is proposed based on the seismic character of the reflectors and the apparent rotated fault blocks. In the lowest Cenozoic megasequence (Hc), a prograding sedimentary wedge system was identified at the basin margins that implies a relative sea level fall during this period. In Late Paleocene–Early Eocene times, the basin was affected by extensive magmatism that resulted in the emplacement of volcanic intrusives and extrusives of basaltic origin. The deposition of megasequence Hb was controlled by strong bottom current activity as a consequence of rapid subsidence and deep marine conditions. The transition from sequence Hb to Ha is marked by the C10 unconformity, which records the late Cenozoic uplift and erosion of Ireland and Britain. Megasequence Ha is locally eroded and is characterized by contourite, debris flow and mass transport deposits.

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