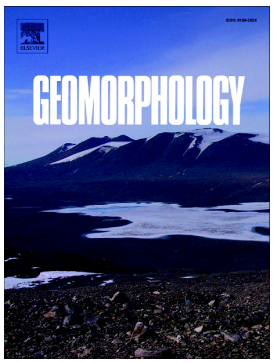

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Geomorphological and sedimentary processes of the glacially influenced northwestern Iberian continental margin and abyssal plains

Estefanía Llave[a], Gloria Jané[a], Adolfo Maestro[a,b], Jerónimo López-Martínez[b], F. Javier Hernández-Molina[c], Sandra Mink[a]

[a] Dept. Investigación y Prospectiva Geocientífica, Instituto Geológico y Minero de España, IGME, Calera 1, 28760 Tres Cantos, Madrid, Spain

[b] Dept. Geología y Geoquímica, Facultad de Ciencias, Universidad Autónoma de Madrid, Carretera de Colmenar, Viejo km 15, 28049 Madrid, Spain

[c] Dept. Earth Sciences, Royal Holloway University London, Egham, TW20 0EX, UK

E-mail address corresponding author: e.llave@igme.es

Abstract

The offshore region of northwestern Iberia offers an opportunity to study the impacts of along-slope processes on the morphology of a glacially influenced continental margin, which has traditionally been conceptually characterised by predominant down-slope sedimentary processes. High-resolution multibeam bathymetry, acoustic backscatter and ultrahigh-resolution seismic reflection profile data are integrated and analysed to describe the present-day and recent geomorphological features and to interpret their associated sedimentary processes. Seventeen large-scale seafloor morphologies and sixteen individual echo types, interpreted as structural features (escarpments, marginal platforms and related fluid escape structures) and depositional and erosional bedforms developed either by the influence of bottom currents (moats, abraded surfaces, sediment waves, contourite drifts and ridges) or by gravitational features (gullies, canyons, slides, channel-levee complexes and submarine fans), are identified for the first time in the study area (spanning ~90,000 km^2 and water depths of 300 mto 5 km). Different types of slope failures and turbidity currents are mainly observed on the upper and lower slopes and along submarine canyons and deep-sea channels. The middle slope morphologies are mostly determined by the actions of bottom currents (North Atlantic Central Water, Mediterranean Outflow Water, Labrador Sea Water and North Atlantic Deep Water), which thereby define the margin morphologies and favour the reworking and deposition of sediments. The abyssal plains (Biscay and Iberian) are characterised by pelagic deposits and channel-lobe systems (the Cantabrian and Charcot), although several contourite features are also observed at the foot of the slope due to the influence of the deepest water masses (i.e., the North Atlantic Deep Water and Lower Deep Water). This work shows that the study area is the result of Mesozoic to present-day tectonics (e.g. the marginal platforms and structural highs). Therefore, tectonism constitutes a long-term controlling factor, whereas the climate, sediment supply and bottom currents play key roles in the recent short-term architecture and dynamics. Moreover, the recent predominant along-slope sedimentary processes observed in the studied northwestern Iberian Margin represent snapshots of the progressive stages and mixed deep-water system developments of the marginal platforms on passive margins and may provide information for a predictive model of the evolution of other similar margins.

Keywords: morphological features; along-slope and down-slope processes; neotectonic; northwestern Iberia