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From hyperextended rift to convergent margin types: mapping the outer limit of the extended Continental Shelf of Spain in the Galicia area according UNCLOS Art. 76

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Spain presented on 11 May 2009 a partial submission for delimiting the extended Continental Shelf in respect to the area of Galicia to the Commission on the Limits of the Continental Shelf (CLCS).

The Galicia margin represents an example of the transition between two different types of continental margins (CM): a western hyperextended margin and a northern convergent margin in the Bay of Biscay. The western Galicia Margin (wGM 41° to 43° N) corresponds to a hyper-extended rifted margin as result of the poly-phase development of the Iberian-Newfoundland conjugate margin during the Mesozoic. Otherwise, the north Galicia Margin (nGM) is the western end of the Cenozoic subduction of the Bay of Biscay along the north Iberian Margin (NIM) linked to the Pyrenean-Mediterranean collisional belt

Following the procedure established by the CLCS Scientific and Technical Guidelines (CLCS/11), the points of the Foot of Slope (FoS) has to be determined as the points of maximum change in gradient in the region defined as the Base of the continental Slope (BoS). Moreover, the CLCS guidelines specify that the BoS should be contained within the continental margin (CM). In this way, a full-coverage multibeam bathymetry and an extensive dataset of up 4,736 km of multichannel seismic profiles were expressly obtained during two oceanographic surveys (Breogham-2005 and Espor-2008), aboard the Spanish research vessel Hespérides, to map the outer limit of the CM. In order to follow the criteria of the CLCS guidelines, two types of models reported in the CLCS Guidelines were applied to the Galicia Margin.

In passive margins, the Commission's guidelines establish that the natural prolongation is based on that "the natural process by which a continent breaks up prior to the separation by seafloor spreading involves thinning, extension and rifting of the continental crust..." (para. 7.3, CLCS/11). The seaward extension of the wGM should include crustal continental blocks and the so-called Peridotite Ridge (PR), composed by serpentinized exhumed continental mantle. Thus, the PR should be regarded as a natural component of the continental margin since these seafloor highs were formed by hyperextension of the margin.

Regarding convergent margins, the architecture of the nGM can be classified according the CLCS/11 as a "poor- or non-accretionary convergent continental margin" characterized by a poorly developed accretionary wedge, which is composed of: a large sedimentary apron mainly formed by large slumps and thrust wedges of igneous (ophiolitic/continental) body overlying subducting oceanic crust (Fig. 6.1B, CLCS/11). According to para. 6.3.6. (CLCS/11), the seaward extent of this type of continental convergent margins is defined by the seaward edge of the accretionary wedge. Applying this definition, the seaward extent of the margin is defined by the outer limit of the ophiolitic deformed body that marks the edge of the accretionary wedge.

These geological criteria were strictly applied for mapping the BoS region, where the FoS were determinate by using the maximum change in gradient within this mapped region.

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