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Mapping giant mass transport deposits (MTDs) for delineating the extended Continental Shelf of Spain to the West of Canary Islands according UNCLOS Art. 76

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On 19 December 2014, Spain presented a third partial submission for the delineation of the Extended Continental in the area west of the Canary Islands to the Commission on the Limits of the Continental Shelf (CLCS) according to the United Nations Convention on the Law of Sea (UNCLOS). The Canary Islands are located within a NE-SW 1,350 km long ridge of hotspot-inferred volcanic islands and seamounts (composed by more of 100, from Lars to Tropic seamounts). This submission has been documented with an extensive dataset specifically obtained for the project during ten oceanographic cruises between 2010 and 2014 aboard the Spanish research vessels Hespérides, Sarmiento de Gamboa and Miguel Oliver. This new dataset allows to investigate an area of 440,000 km2 with acoustic backscatter images and multibeam echosounder bathymetric (MBES) data (Simrad EM-12, EM-120 and EM-302, and Atlas HYDROSWEEP DS), a dense network of 65,800 km of very-high resolution (VHR) seismic lines (including chirp parametric source TOPAS PS-18 and Atlas PARASOUND P-35) and 4,471 km of multichannel seismic reflection lines (MCS) acquired with an array of air-guns yielding a total volume of 4,600 inch^3 (75.38 L) and a 3,500 m long streamer composed of 280 channels.

In order to determine the Foot of Slope (FoS), the Base of Slope (BoS) region has been traced following geomorphological arguments based on the morphology of the mass transport deposits (MTDs) extended downslope west of the Canary Islands. Based on backscatter and MBEs mapping, and VHR lines, the BoS has been traced by means of a detailed mapping of the debris flow deposits widespread along the slope. Therefore, the seaward limit of the BoS has been traced following the termination of the debris flow sourced from the Canary Island. Otherwise, the landward limit of the BoS has been defined following the morphological changes in the debris flow forced by the breaking in the slope gradient, which form distributary lobes downslope. Finally, the Foot of Slope (FoS) has been determined on the basis of MBES profiles at the maximum change in gradient (MCG) within the BoS region, according to Art. 76(4b). Some FoS points coincide with morphological features formed at the end of the debris flow lobes, but MCG have been only determined after calculation of the second derivative of the MBES bathymetry.

The database and mapping carried out for this submission offers new insights on the morphology of deep-water giant submarine landslides triggered by hotspot-induced massive collapse/volcanic events in the central eastern Atlantic Ocean.

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