



Multi-event behavior of El Golfo landslide (El Hierro Island, Canary Archipelago)

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Abstract

Based on the re-interpretation of a vast onshore-offshore data set, a new morpho-structural characterization of the El Golfo giant landslide in the island of El Hierro (Canary Archipelago, Spain) is presented. Offshore multibeam echosounder data, chirp sub-bottom profiles, multichannel seismic reflection data and onshore information from water wells and galleries have been analyzed to determine the nature of the event. The subaerial headscarp shows a non-continuous arcuate profile formed by two nested semi-circular amphitheaters that extend offshore along a smooth chute, suggesting the occurrence of at least two large retrogressive events. Channels/gullies and escarpments developed along the submarine sector of the scar also indicate smaller-scale events and predominance of sediment bypass. At the base of submerged island, two subunits within the related submarine mass transport deposit (MTD) are identified on multichannel seismic reflection profiles confirming the multi-event nature of the landslide. The MTD, identified as a debris avalanche, has a total estimated volume of 318 km³: ~84 km³ and ~234 km³, for the lower and upper subunits respectively. Data from wells and galleries show abrasion platforms with beach deposits at sea-level (0 masl) formed after the landslide scar and buried by the El Golfo post-collapse infill lavas, suggesting an age at least older than 23.5-82.5 ka for the landslide.

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