



## The MAGICLAND (Marine Geohazards Induced by LANDslides) database: Early results on submarine landslide distribution and morphometrics offshore Portugal

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Submarine landslides are major geohazards occurring on distinct seabed domains ranging from shallow coastal areas to the deeper points of the ocean. The nature and relief of the seabed are key factors influencing the location and size of submarine landslides. Mass-failures on the continental slopes are frequent, but collapses on and along chains of oceanic seamounts and ridges can account also for a high frequency of events. Regardless of their area of occurrence, submarine landslides are a major hazard that needs to be recognised and categorised. For this purpose, numerous efforts have been made to compile databases of submarine landslides with the aim to better understand their distribution and characteristics on marine settings around the world.

This work presents the initial efforts of the MAGICLAND (Marine Geo-hazards Induced by underwater Landslides in the SW Iberian Margin) database which, based on bathymetric DEMs available through EmodNET, compiled geomorphological properties of 1552 morphological scars and submarine landslides offshore West and Southwest Portugal. These are distributed through seven morphological domains: 1) canyons incising the continental slope (232 landslide episodes); 2) continental slope (233 landslide episodes); 3) large seamounts (437 landslide episodes); 4) submarine ridges and small seamounts (263 landslide episodes); 5) Gulf of Cadiz (226 landslide episodes); 6) Gulf of Cadiz banks and channels (123 landslide episodes); and 7) Estremadura Spur (38 landslide episodes). A wealth of 43 parameters were measured or calculated, which include a subset of morphological quantifications for the evacuation and deposit sections for 347 occurrences where the latter was observed. We present the morphological data and any derived computations as measured on the 3D surface in order to increase their accuracy and mitigate the effect of slope gradient on map-based 2D analysis. The larger events were recorded on the large seamounts and the ridges domains, which also correspond to the larger recorded landslide heights (measured as the difference between minimum and maximum depths). Good correlations (coefficient of determination  $R^2 > 0.8$ ) were obtained for Area-Volume, Width-Area, and Length-Area relationships. Where evacuation and deposit sections were discernible, their area relationships present a better correlation compared to their lengths.

Further stages of the database development will involve the addition of still unmapped scars, as

well as further statistical analysis and integration with available geophysical and geotechnical datasets for the areas of study. This dataset will be made available for the free use and benefit of the international marine community. Further contributions or analysis based on, and complementing the MAGICLAND database will be welcome.

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