



# Santa Maria di Leuca Province (Mediterranean Sea): Identification of Suitable Mounds for Cold-Water Coral Settlement Using Geomorphometric Proxies and Maxent Methods

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The Santa Maria di Leuca (SML) cold-water coral province (northern Ionian Sea) has the largest occurrence of a living white coral community currently known in the Mediterranean Sea. *Madrepora oculata* and *Lophelia pertusa*, identified as marking sensitive habitats of relevance by the General Fisheries Commission for the Mediterranean, have been observed heterogeneously distributed on the summits of several mounds. This particularly patchy and uneven distribution in addition to their importance for regional biodiversity highlights the need to better understand their environmental preferences and predict their distribution. Bathymetric data (40 m resolution) was used to derive seafloor characteristics. A fine scale index quantifying the landscape elevation (Bathymetric Position Index at 120 m resolution) was used to select all the elevated features considered as candidate morphologies for potential coral mounds. Statistics on 22 known coral topped mounds were computed. Two statistical methods were then used to identify other potential coral mounds based on predictive variables. The first method, the Geomorphometric proxies method, consists in computing basic statistics of terrain variables, using them for a step-by-step classification in a quantitative approach to select a subset of candidate morphologies. The second method consists in using a predictive Habitat Suitability Model (Maxent model). The Geomorphometric proxies method identified 736 potential coral mounds while the Maxent method predicted 1,252 potential coral mounds. A subset of 517 potential coral mounds was common to both methods. The analysis of the contribution of each variable with the Maxent method showed that the variable “Vector Ruggedness Measure” at a resolution of 5 pixels (200 m) contributed to 53% of the final Maxent model, followed by the “Terrain Texture” index (31%) at a resolution of 11 pixels (440 m). The common potential coral mounds are mainly located in an area characterized by a mass transport deposit, also called the mounds