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Framing the patterns of biodiversity in the Mediterranean Sea in island biogeography theory

A broadly reported tenet of Mediterranean marine biodiversity is a gradient of decreasing species richness from its north-western to south-eastern sectors. This pattern contrasts with the general expectation of the latitudinal diversity gradient that posits that southern, warmer, areas host higher diversity than northern, cooler, ones (Forster's rule). I here posit that the pattern of biodiversity in the Mediterranean can be better explained in the context of island biogeography theory. By considering the Mediterranean basin the analogue to an island close to the continent (the Atlantic Ocean) where the Strait of Gibraltar serves the connectivity that enables the process of immigration, we can attempt explaining some of the best known expectations of island biogeography: the high rate of endemism in the Mediterranean Sea, dwarfism (the 'Levantine nanism') and distance-decay patterns (e.g. the more distinct species assemblages in the eastern Mediterranean and the Black Sea). To achieve this aim, we will here model taxonomic and functional diversity as a response to 'island' area and distance from the source pool, and additional predictors such as age of the sub-basin, environmental variables and habitat diversity including depth. Additionally, we will test the occurrence of filters across the basin. Furthermore, we will use two times with similar climatic conditions in the recent geological past as replicates of the onset of the patterns: the present day and the Last Interglacial (upper Pleistocene). Framing the observed patterns of Mediterranean biodiversity into island biogeography theory will allow explaining them quantitatively and predicting future trajectories in the context of global change, given the large body of empirical and theoretical studies on biodiversity loss in island-like settings.