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Modeling drift-induced maritime connectivity between Cyprus and its surrounding coastal areas during early Holocene

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Maritime connectivity between Cyprus and other Eastern Mediterranean coastal regions on the mainland constitutes a critical factor towards understanding the origins of the early visitors to Cyprus during the onset of the Holocene (circa 12,000 years before present) in connection with the spread of the Neolithic in the region (Dawson, 2014).

In this work, ocean circulation modeling and particle tracking are employed for characterizing drift-induced sea-borne connectivity for that period, using data and assumptions to approximate prevailing paleo-geographical conditions (re-constructed coastline from global sea level curves), and rudimentary vessel (rafts, dugouts) characteristics, as well as present-day weather conditions. The Regional Ocean Modeling System (ROMS, Shchepetkin and mcWilliams, 2005), forced by Copernicus Marine portal hydrological data, with wave and wind forcing derived from a combination of global reanalysis data and regional-scale numerical weather predictions (ERA5 and E-WAVE project products), are employed to provide the physical domain and atmospheric conditions. Particle-tracking is carried out using the OpenDrift model (Dagestad et al., 2018) to simulate drift-induced (involuntary) sea-borne movement. The sensitivity of the results on the hydrodynamic response (e.g. drag) of rudimentary vessels, such as rafts of postulated shape, size, and weight, that are believed to have been used for maritime travel during the period of interest, is also investigated. The simulation results are used to estimate the degree of maritime connectivity, due to drift-induced sea-borne movement, between segments of Cyprus coastline as well as its neighboring mainlands, and identify areas of both coastlines where landing/departure might be most favorable.

This work aims to provide novel insights into the possible prehistoric maritime pathways between Cyprus and other Eastern Mediterranean coastal regions, and is carried out within the context of project SaRoCy (<https://sarocy.cut.ac.cy>), a two-year research project implemented under the “Excellence Hubs” Programme (contract number EXCELLENCE/0198/0143) of the RESTART

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