

Shoreline Prediction Modelling as a Base Tool for Coastal Management: The Catania Plain Case Study (Italy)

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Abstract	Coastal dynamic is the complex result of multiple natural and human processes, and past and future coastal behavior studies become fundamental to support coastal zone management. However, the reliability of coastal evolution studies is strongly dependent on the analyzed time interval. The longer the period is, the more reliable the past shoreline change analysis and the forecast of shoreline position will be. The present study showed the 50-years shoreline evolution of the Catania coastal plain (Southern Italy), a densely populated area where human-induced processes profoundly changed natural dynamics. Landsat and Sentinel imageries were used to extract shorelines' position over the time between 1972 and 2022 and the DSAS tool was used to calculate the shoreline change rates. The shoreline evolution in 2032 and 2042 was performed by the Kalman filter method, a tool largely applied to forecast short-term shoreline future position. Most of the Catania coastal plain was mainly retreating over the last decades. However, the most significant changes were registered in correspondence with the coastal structures and the river deltas. The reliability of the forecasting model was highly related to the coastal morphology. As such, the lower RMSE values were calculated in correspondence with the uniform coastal subsectors.
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