



## **Modelling dune erosion under two different climate change scenarios and storm waves conditions.**

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In this work we investigate the impacts in dune erosion due to sea level rise, also predicting the changes to the beach profile in Son Bou beach (Menorca, Western Mediterranean). This beach is a long sandbank (the aerial section is 2500 m long and 30 m width) with an extensive dune area behind it. The beach has been densely monitored: twelve cross beach profiles have been carried out since October 2011, approximately every six months (seven surveys in all). The model used to evaluate changes in the beach profile is XBeach, an open-source numerical model developed to simulate hydrodynamic and morphodynamic processes and impacts on sandy coasts. We first compare the modelled profiles with the seven observed profiles, to demonstrate the capability of the model to simulate the long term profile changes and dune erosion, resulting in a good agreement between them, with a RMSE around 0.65 m. We then assess the dune erosion and beach profile progression under two climate change scenarios, also considering storm and calm wave conditions. Sea level projections are retrieved from state of the art regional estimates, while wave projections are obtained from regional climate models. This process is repeated for each year from 2011 until 2100 showing the gradual changes of the beach.