Sediment Mobility as an Indicator of Vulnerability to Climate Change on a Mediterranean Beach: A Modelling Approach with Several Sediment Transport Formulae

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In a context of climate change, we will present the methodology of the modeling approach to analyze the sensitivity of a Mediterranean beach to forcing conditions changes. This paper discusses the abilities of numerical models to predict the nearshore evolution and to set-up vulnerability indicators of sandy beaches against the climate change predictions for 2030.

The objectives which we want to reach during this study are multiple. First, we are going to set up a procedure of linking of three codes (the waves, the flow field and the bed evolution models (Telamac)) to be able to simulate realistic climates. This procedure is validated from the point of view of the hydrodynamics and morpho-dynamic evolution (Larroudé, 2008). This technique of simulation will then use to compare and studied the contribution of the various formulae of sedimentary transport (as in Camenen and Larroudé, 2003) on the site of Sète (Languedoc-Roussillon, France). Located in a microtidal, swell-dominated coastal environment, this beach is a linear beach of about 2.5 km length with double straight bar system. The mean significant offshore wave height is about 0.5 m increasing to 3–6 m during storms, (Certain and Barusseau, 2006). We improve this methodology to simulate the Rising-Apex-Waning of a two specific storm event (Robin et al., 2010). We also present a comparison of the velocity at these different periods of the storm. We will present simple indicator methods to analyze the vulnerability of a sandy beach based on the results of simulations for different scenarios. The first method is based on the method described in Idier et al. (2006). In the present study, we calculate the maximum grain size potentially mobilized but with a simpler approach, based on analysis in different point on several cross shore profile

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