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Beach and dunal system monitoring at Su Giudeu beach, Sardinia (Italy)

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Even if coastal floods are quite rare events in Sardinia (Italy) at present, they have had dramatic consequences for coastal communities, particularly in conjunction with river flooding. However, flood risk (defined as the product of event probability, vulnerability and value of assets) is expected to increase significantly in the future, due to climate change, defence degradation and sea level rise. Sardinia island has a costal length of approximately 1.900 km including minor neighbouring islands (25% of the entire Italian coasts) and the estimation of the potential exposure of coastal communities to flooding is therefore a critical task. To date methods for achieving this have been based on modelling of coastal inundation using hydrodynamic or GIS-based models of varying complexity. The Dept of Civil and Environmental Engineering and Architecture at the University of Cagliari is carrying out a comprehensive activity of coastal flooding risk mapping at the regional scale within the framework of a scientific collaboration with the Sardinian Regional Authority for the Hydrographic District, that includes monitoring and scientific activities along the entire Sardinian coast. Bathymetry and topographical surveys, sediment characterization, waves and currents measurements, hydrodynamic and morphodynamic modelling are planned, focusing on critical extended areas. In this paper we present an overview of the entire activity programme and give an in-depth account of the ongoing monitoring survey of the dunal system of the Su Giudeu beach (Southern Sardinia, 50 km far from the city of Cagliari). Su Giudeu is a sandy, bay-shaped beach, extending for about 1200 m between two headlands, evolving under waves with a predominant direction of 220-240°N (Scirocco wind). The survey is expected to provide evidence of the response of the remarkable dunal system to wave runup occurring during storm events, to be used in the verification of existing numerical models of dune erosion.