



Predicting Submerged Beach sediment dynamics and resulting shoreline evolution

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Predicting beach processes and resulting shoreline evolution is a controversial scientific endeavor. Data from recent large-scale nearshore field experiments provide, for the first time, the ability to thoroughly test physics-based models for beach evolution. The importance of communicating both the promise and limitations of such nascent research tools and their predictions to coastal stakeholders is increasing with coastal development. Well-known exemplars of the problems surrounding shoreline evolution and prediction of beach processes are found in the Ostia submerged beach located along the eastern coast of Lazio Region (Italy).

The main objectives of the present study is to evaluate the rates and pathways of sediment transport based on 24 cross-shore section, collected between 2002-2005 via MULTIBEAM, compared with sediment samples collected along the same sections. Field observations were made also using a GPS handset against the reference points, to quantify shoreline variations caused by very high energy events or by events deriving from different quadrants. We finally compare the circulation and sediment transport patterns caused by different type of events showing that sediment dynamics of this region strongly influenced the shoreline evolutions.

Both dynamic and sediments perspectives better combined in physics-based models

shows to predict shoreline evolution in a more integrated way; and, in turn, the critical melding of both MULTIEBAM and GPS handset allow to obtain data more frequently and more easily in monitoring studies.