Geophysical Research Abstracts
Vol. 13, EGU2011-3293, 2011
EGU General Assembly 2011

Net Seaward sEdiment Transport during Storms (NESTS) at the beach of Sète, NW Mediterranean Sea

Elena Brambilla (1), Frédéric Bouchette (1), Georgios Sylaios (2), Nicolas Robin (3), and Raphael Certain (3)

(1) Université Montpellier II, Geosciences Montpellier, Montpellier, France (elena.brambilla@gm.univ-montp2.fr), (2) Department of Environmental Engineering, School of Engineering, Democritus University of Thrace, Greece, (3) Institut de modélisation et d'analyse en géo-environnements et santé, Université de Perpignan, France

Hydrodynamic measurements (2.5 months of data) and bottom boundary model outputs are used to investigate the sediment transport at the beach of Sète, Gulf of Lion, NW Mediterranean Sea. N-NE and S-SE wind drive S-SE waves, which induce off-shore currents responsible for sediment resuspension and off-shore suspended sediment transport. Oppositely, the bed load transport is directed on-shore, although its magnitude is negligible compared to that of suspended transport. Thus, it is concluded that the suspended transport appears to be the most effective mechanism to displace bottom sediment.

Significant suspended sediment transport occurs only during the storm periods. During the four storms observed, the depth integrated suspended sediment transport vector is strongly variable, both in direction and magnitude. Nonetheless, the cross-shore component is constantly directed off-shore.

Its largest magnitude is estimated at the sand bar crest, contributing to an off-shore migration of the inner sand bar; while it is less important at the bar trough and off-shore. The spatial gradient of the cross-shore transport component, from the shore seaward, shows that during medium energy storms, the sediment does not cross the surf-shoaling zone limit. However, during the strongest storm, in the shoaling zone, suspended sediment transport is still different from zero and directed off-shore. This suggests that the role of the cross-shore component of suspended sediment transport is not limited to a sediment redistribution in the nearshore zone, but it appears to have an important impact on beach erosion, in agreement with recent geological surveys.