Geophysical Research Abstracts
Vol. 16, EGU2014-8341-1, 2014
EGU General Assembly 2014

Monitoring beach evolution using low-altitude aerial photogrammetry and UAV drones

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Beach monitoring is essential in order to understand the mechanisms of evolution of soft coasts, and the rates of erosion. Traditional beach monitoring techniques involve topographic and bathymetric surveys of the beach, and/or aerial photos repeated in time and compared through geographical information systems.
A major problem of this kind of approach is the high economic cost. This often leads to increase the time lag between successive monitoring campaigns to reduce survey costs, with the consequence of fragmenting the information available for coastal zone management.
MIRAMar is a project funded by Regione Liguria through the PO CRO European Social Fund, and has two main objectives: i) to study and develop an innovative technique, relatively low-cost, to monitor the evolution of the shoreline using low-altitude Unmanned Aerial Vehicle (UAV) photogrammetry; ii) to study the impact of different type of storm events on a vulnerable coastal tract subject to coastal erosion using also the data collected by the UAV instrument.
To achieve these aims we use a drone with its hardware and software suit, traditional survey techniques (bathymetric surveys, topographic GPS surveys and GIS techniques) and we implement a numerical modeling chain (coupling hydrodynamic, wave and sand transport modules) in order to study the impact of different type of storm events on a vulnerable coastal tract subject to coastal erosion.