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Sediment transport analysis at event scale in a semi-arid basin of Southern-Italy

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Erosion at basin scale is a main issue in nowadays research since it plays a role of first level in sustainable management of natural resources (land and water). In particular, in arid and semi-arid regions natural vegetative cover is sparse and runoff events cause high rates of sediment transport, while long periods of drought can be observed. Several types of erosion phenomena affect the torrents in the north-western area of the Puglia Region (Southern-Italy) where flood events are characterised by a considerable amount of suspended solids. In this area the solid load was monitored until 1989 by the National Hydrographic Service using manual sampling.
To accurately estimate the sediment transport during flood events and in order to improve the methodologies to assess and predict soil erosion, a watershed representative of the area (Carapelle torrent) was selected, where an experimental station was set up for the continuous measuring of suspended solids. The station is equipped with a dual function infrared sensor (turbidity/suspended solids), a remote data acquisition system, an electromechanical and an ultrasound stage meter.
A laboratory test of the turbidity sensor was preliminary performed to evaluate the dual functionality of the instrument (turbidity and suspended sediment concentration) in relation to the variations of sediment concentration and grain size distribution. Successively a field calibration was carried out to determine the relationship between optical and gravimetric data and to check the housing device.
Afterwards, the high temporal resolution data collected over a 3-years period (2007-2009) were used to analyze the sediment transport dynamics. The aim of the study is to investigate the relationships in unsteady flows between the sediment concentration and the discharge, and to analyze the relationships at event scale between the sediment budget and some hydrological variables, in order to select the model that best represents the local conditions.