Geophysical Research Abstracts
Vol. 15, EGU2013-1026, 2013
EGU General Assembly 2013

Suspended sediment levels and turbidity along the Guadalquivir river related to the hydrological regimes

Miriam Carpintero García, Eva Contreras Arribas, Alicia Jurado Lopez, Cristina Aguilar Porro, and María José Polo Gómez

Instituto Universitario de Investigación del Sistema Tierra en Andalucía(IIISTA),University of Cordoba, Cordoba, Spain (mimica_mon@hotmail.com)

In Mediterranean watersheds, soil loss is enhanced by the marked seasonality and torrential character of the rainfall regime, together with the usually predominant agricultural usesd. This fact determines the nature and amount of the discharges to the fluvial network in the Guadalquivir River (Spain), where the dense reservoir network within the contributing areas to the main stream alters the original sediment dynamics, and the transport and deposition patterns along the river, especially in the final stretch.

The Guadalquivir River basin is located in southern Spain, with a contributing area of 57500 km2. It is a Mediterranean basin with a mean annual rainfall of 600 mm year-1.The changes of soil uses in the basin are associated with an increase of the irrigated area (in 201290 ha until 2007 upstream) and olive area (in 311115 ha until 2007).The suspended sediment concentration in the river is very high, with extreme values up to 16 g/l in the final stretch, which includes the estuary, associated with persistent turbidity events forced by different combinations of conditions. The solids are very fine- textured due to the great length of the river and, mainly, the extreme trapping efficiency of the dense reservoir network upstream.

This work shows the spatial-temporal evolution of the suspended sediment concentration and turbidity regime along the Guadalquivir river and its relation with the different soil uses in the different contribunting areas within the watershed, together with the dependence on the hydrological annual regime. Turbidity trends are estimatedby means of data from Landsat-7 ETM that were validated with the quantified suspended sediment concentration values obtained from both field campaigns and automated monitored control points along the river. The results show a time lag between fluvial contributions and suspended sediment concentration due to the intense regulation in the watershed, that is dependent on the storage capacity upstream, the rainfall characteristics, and the antecedent soil conditions. The period of higher contributions corresponds in general with autumn-winter months, coinciding with intense rainfall data, with extremes values around 104 mg/l along the main channel. The higher contributions of sediments are detected in the upper stretch of the river due to higher slopes and large olive areas dominance