



Holocene reconstruction of human impact and soil degradation for Southeast Spain

Veerle Vanacker and Nicolas Bellin

Georges Lemaître Centre for Earth and Climate Research, Earth and Life Institute, University of Louvain, Belgium
(veerle.vanacker@uclouvain.be)

The Mediterranean region is commonly reported as the European region that is most affected by soil degradation. The degradation of Mediterranean soils has often been linked to inappropriate agricultural practices during the last decades. Analyses of contemporary soil erosion problems often oversee the long history of degradation and recovery of the Mediterranean environment during thousands of years of human occupation. It is clear that the modern human landscape is the product of a long land use history. Despite intense archeological studies a lot of uncertainties about interactions between anthropogenic actions and the present landscape remain unresolved.

Soil erosion in southeast Spain is a complex process due to strong interactions between biophysical and human components. Significant progress has been made to understand spatial patterns of modern erosion rates in this kind of semi-arid degraded environments. Numerous European projects have contributed to the collection of modern erosion data at different spatial scales for Southeast Spain. However, these data are rarely analysed in the context of long-term changes in vegetation, climate and human occupation in that region.

In this paper, we present modern and Holocene denudation rates for small river basins (1 to 10 km²) located in the Spanish Betic Cordillera. Long-term erosion data were derived from cosmogenic nuclide analyses of river-borne sediment. Modern erosion data were quantified through analysis of sediment deposition volumes behind checkdams, and represent average erosion rates over the last 10 to 40 years.

Our data show that modern erosion rates are surprisingly low (mean = 1.40 t/ha/ yr; median = 0.61 t/ha/yr, n=36), given the rough topography of the Betic Cordillera. Preliminary data indicate that Holocene erosion rates are roughly of the same magnitude, but show strong spatial variation. Contrasting modern with Holocene erosion rates indicates that land degradation is a complex phenomenon, and that Holocene changes in vegetation, climate and human occupation should be considered in order to fully understand the present state of the environment.