Geophysical Research Abstracts
Vol. 14, EGU2012-6313, 2012
EGU General Assembly 2012


# Hydrological and Geomorphological impacts of land cover changes at different spatial scales. An introduction to ecosystem services from Mediterranean mountainous landscapes

JM García-Ruiz (1) and N Lana-Renault (2)

(1) Instituto Pirenaico de Ecología, CSIC, Campus de Aula Dei, Apartado 13.034, 50080-Zaragoza, Spain. (humberto@ipe.csic.es), (2) Area of Physical Geography, University of La Rioja, 26004-Logroño, Spain (noemi-solange.lana-renault@unirioja.es)

The main characteristic of the Mediterranean mountainous areas is the dramatic land use/land cover change that has significant hydrological and geomorphic consequences regardless of the scale considered. At the end of the 19th Century, depopulation and the modernization of the agricultural systems resulted in a generalized farmland abandonment in the hillslopes (both sloping and bench terraced fields, and shifting agriculture fields), and a reduction in livestock numbers, leading to a complex process of plant re-colonization, depending on soil characteristics, climate and the pre- and post-management of the hillslopes. The primary consequences are evident at the plot scale, where plant re-colonization has caused a rapid decrease in overland flow and soil loss. At the catchment scale, a decrease in sediment sources and channel incision in the secondary streams have been detected. At the regional scale, forests and shrubs cover a large part of the territory, where fifty or eighty years ago the cereal fields and communities of open shrubs prevailed on steep slopes. The most relevant consequences include the progressive lowering in the discharge of rivers, the lower sediment silting in the reservoirs (what increases the useful life of such infrastructures), the improvement of the water quality in the rivers, the decrease in the frequency of the most frequent floods, and changes in channel morphology, with, in general, the enlargement of riparian forests. Moreover, plant re-colonization results in a large homogeneous expansion of forests, favouring the risk of wildfires and a lowering of livestock production. All these processes occurring in the mountain areas have a great impact on the lowlands, where urban, industrial and irrigated areas, as well as tourist resorts are growing. The spatial interactions among land use and runoff generation, soil erosion, sediment yield and fluvial channel dynamics are complex and highlight the need of land management strategies with a multiscalar approach.