RESOLUTION EFFECTS ON FEEDBACKS BETWEEN SOIL REDISTRIBUTION AND LAND USE CHANGE IN THE GUADALHORCE VALLEY, ALORA, SPAIN

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Landscape processes such as erosion by water and ploughing, are related to land use changes. They are controlled and influenced by multiple bio-physical and socio-economic driving factors, resulting in a complex multi-scale system. Consequently in landscapes where water driven and or gravity driven processes are very active, land use changes should not be analysed in isolation without accounting for both on-site and off-site effects of these landscape processes. To investigate the interactions between land use, land use change and landscape processes, a renewed case study for the Álora region in southern Spain is carried out, Starting from a baseline scenario of land use change, different levels of interaction and feedbacks are added to the coupled model framework: i) effects of land use change on soil erodibility, ii) a perception feedback mechanism including the influence of farmers' perception of erosion features on the (re-)location of land use activities, and iii) a bio-physical feedback mechanism where bio-physical restrictions resulting from landscape processes. Quantities and spatial patterns of both land use change and soil redistribution are compared between the baseline scenario without interactions and with each of the interaction mechanisms implemented consecutively. All as a function of spatial resolution.

On-site land use changes triggers major off-site soil redistribution dynamics. These off-site effects are attributed to down slope or downstream changes in sediment transport rates and or discharge caused by changes in surface characteristics. This study provides insight into the interactions between different processes at different spatial and temporal scales combining biophysiscal and socio economics drivers within landscapes and the influence of different feedbacks on the landscape development. The linked model representation and calibration and validation of the coupled modelling system is a major difficulty. Rather than focusing on detailed disciplinary processes within the sub-systems themselves, specific research focussing on the interactions between sub-systems is needed to better understand the importance and representation of the dynamics in landscapes, especially in the context of spatial and temporal resolution and extent.