



Assessment of land degradation susceptibility by scenario analysis. A case study in Southern Tuscany, Italy

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In the Mediterranean area land degradation phenomena are becoming more and more important due to future climate change and increasing climate variability as highlighted in recent global assessment projects such as the “Millennium Ecosystem Assessment” or “The Dialogue on water and Climate”. Thus, there are consistent evidences that extreme events such as droughts and floods are more frequent than before. On the other hand the Mediterranean area is strongly influenced by human activities such as cultivations over hundreds of years. However, in the last decades the cultivation methods and techniques are subject to profound changes such as mechanization, use of fertilizer and pesticides, remodelling of entire hillslopes etc.. This particular situation leads to, and aggravates the existing stress on land resources. As a result, land degradation and soil erosion phenomena are leading to decreasing soil productivity or the loss of fertile top soil and related water quality and quantity issues. The aim of this paper is to assess land degradation sensitivity by scenario analysis. As a proxy for land degradation surface wash erosion processes such as rill-interill erosion processes are chosen. These present day processes are identified by aerial photo interpretation and subsequently modelled with a simple RUSLE approach on a monthly basis. In this study boundary conditions such as future precipitation were taken from the A2 future climate scenario published by the International Panel on Climate Change (IPCC) - Special Report on Emission Scenarios (SRES). Moreover, current landuse was identified from aerial photographs and future land use scenarios were developed considering ecological and socio-economical issues for present day conditions of the test area. Subsequently, the different climate and landuse scenarios were analysed to study soil erosion susceptibility on the landscape scale. The study shows that even with a decline in precipitation volume till 2070, in some months higher erosion rates occur due to higher values in rainfall erosivities. Furthermore, landuse changes play an important role for soil erosion susceptibility.