Geophysical Research Abstracts, Vol. 8, 00180, 2006
SRef-ID: 1607-7962/gra/EGU06-A-00180

Application of Remote Sensing and GIS on soil erosion risk assessment and mitigation in mountain areas at Dangellia highlands, Permet, Albania.

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Assessment and inventory on soil erosion hazard are essential for formulation of effective soil conservation plans of a watershed for sustainable development.The objective of this study was to assess and map soil erosion hazard of Dangellia highlands(Permeti district, Albania) following GIS based scalogram modeling approach using remote sensing derived physiography - soil and land cover and DEM derived terrain slope mape and ancillary data of soil characteristics and rainfall as inputs. The method is based on analysis of temporal and spatial distribution of soil erosion and landslides occurred during the last 35 years and subsequent damages. Erosion rate evaluation and slope morphology evaluation in soil erosion areas represent very important scientific and practical problems. In this work detailed geomorphological investigation has been carried out in some areas of Dangelli Highlans characterized by very rapid morphological evolution. The Pliocene marine claystones outcropping in this area have been uplifted during the Quaternary up to 750 meters above sea level, and they are now undergoing particularly intense erosion, leading to considerable badland formation. Detailed geomorphologic field surveys have been made and some slopes, chosen as sample areas, have been monitored. Morphographic and morphometric analysis carried out in special measurement stations evidence that the values of erosion rate on the slopes range from 5 to 7.5 cm/year slope features, because of intense landslide and sheetwash action, changed from rectilinear to concave - convex becoming rectilinear again Soil erosion assessment is a capital-intensive and time-consuming exercise. A number of parametric models have been developed to predict soil erosion at drainage basins. While conventional methods yield point-based information, Remote Sensing (RS) technique makes it possible to measure hydrologic parameters on spatial scales

while GIS integrates the spatial analytical functionality for spatially distributed data. Some of the inputs of the model such as cover factor and to a lesser extent supporting conservation practice factor and soil erodibility factor can also be successfully derived from remotely sensed data. However, it includes numerous improvements, such as monthly factors, influence of profile convexity/concavity using segmentation of irregular slopes and improved empirical equations for the computation of LS factor. Digital Elevation Model (DEM) of Dangellia Highlands was created by digitizing contour lines and spot heights from the SOI toposheets at 1:50,000 scale. Modified Fournier index was used to derive parameters for modified erosivity factor. The modified LS factor map was generated from the slope and aspect map derived from the DEM. The K factor map was prepared from the soil map. Research, and spatial extent was introduced from land use/ cover map prepared from LISS III data. Maps covering each parameter (R, K, LS, C and P) were integrated to generate a composite map of erosion intensity based on the advanced GIS functionality. This intensity map was classified into different priority classes. Study area was further subdivided into 4 sub watersheds (Osumi, Lengarice, Lemnice, Kreshove) to identify the priority areas in terms of soil erosion intensity. Each sub watershed was analyzed individually in terms of soil type, average slope, drainage length, drainage density, drainage order, height difference, landuse/landcover and average NDVI with soil erosion to find out the dominant factor leads to higher erosion. The results indicate that satellite remote sensing and GIS techniques are indeed valuable tools for soil erosion hazard assessment by integration of soil erosion controlling soils cape, terrain and climatic parameters.