Geophysical Research Abstracts,
Vol. 11, EGU2009-2665, 2009
EGU General Assembly 2009


# Identification of active erosion areas and areas at risk by remote sensing: an example in the Esera—Isabena watershed, the Central Spanish Pyrenees

L.C. Alatorre (1) and S. Beguería (2)

(1) Instituto Pirenaico de Ecología (CSIC), Avda. Montañana 1005, Zaragoza, Spain. PO Box 202, 50080, Fax: +34 976 716 145, E-mail: lalatorre @ipe.csic.es , (2) Estación Experimental de Aula Dei (CSIC), Zaragoza, Spain.

Maps of active erosion areas and areas at risk of erosion are of great potential use to environmental (governmental and private) agencies, as they allow erosion prevention efforts to be concentrated in those places where the benefit will be highest. In this study remote sensing data and a classification method based on the ROC (receiver operating characteristic) curve were used to determine erosion and erosion risk areas in a badlands landscape in the Ésera—Isábena watershed (Central Spanish Pyrenees). The method involved several steps: i) application of a supervised classification algorithm (maximum likelihood) for obtaining a spectral distance map to the bare soil signature characteristic of badlands on marls; ii) selection of a classification threshold based on the ROC curve; iv) two classification performance statistics, the model's sensitivity and specificity, were calculated as a means of expressing the uncertainty—omission and commission errors—associated to both maps; and finally, v) DTM was used as a primary tool for morphological exploration. This study has demonstrated the utility of remote sensing data in basic and applied geomorphologic research at regional scales (between 10 and 10,000 km2). The use of a supervised classification method based on the maximum likelihood algorithm plus the ROC curve analysis for choosing the most appropriate classification threshold enabled reliable mapping of areas with active erosion. The erosion risk areas bordering the badlands coincided with transition zones from badlands to forest, where the soil was poorly covered by vegetation (10−50% cover). The geomorphologic analysis by means of the DTM showed an asymmetry in the development of badland areas as a function of the slope exposure, with more development of badlands on shady hillsides because of weathering. In contrast, the slope gradient did not appear to have a significant effect on badlands formation in the study area.