Geophysical Research Abstracts
Vol. 14, EGU2012-6297, 2012
EGU General Assembly 2012

Post-fire erosion risk mapping using Landsat TM: results from the case of 2007 fire in Mt. Parnitha Greece

G. Mavrakakis (1,2), G.P. Petropoulos (3), I. Papanikolaou (1,4), and O. Kairis (5)

(1) Mineralogy-Geology Laboratory, Agricultural University of Athens, Iera Odos 75, 118-55, Athens, Greece , (2) Laboratory of Natural Hazards, Faculty of Geology and Geoenvironment, National and Kapodistrian University of Athens, Panepistimioupolis, 15784, Athens, Greece, (3) Institute of Geography and Earth Sciences, University of Aberystwyth, Wales, United Kingdom (petropoulos.george@gmail.com) , (4) AON Benfield UCL Hazard Research Centre, Department of Earth Sciences, University College London, WC 1E 6BT, London UK, Email: (i.papanikolaou@ucl.ac.uk), (5) Department of Natural Resources Development and Agricultural Engineering, Agricultural University of Athens, Greece

Wildfires have significant geomorphological and hydrological impacts, such as the increasing of soil erosion and instability phenomena to fire-affected environment. In comparison to traditional methods, such as field inventories, remote sensing provides a cost-effective and rapid option in mapping the spatial and temporal variability of wildfires. The influence of the wildfires to soil erosion / sediment transport and their impact to the erosional and depositional environment and equilibrium and overall to the longer-term geological framework is often neglected in these studies.

In this study, we examine whether the absence of vegetation due to the wildfires is indeed the main triggering mechanism for high erosional rates and try to quantify these parameters. In particular, the objective of the present study has been to assess the changes in soil erosion risk in Mediterranean setting as a result of a wildfire using remote sensing and Geographical Information Systems (GIS). As a case study is selected an area located close to the capital of Greece, in which a destructive wildland fire occurred in the summer of 2007, a year of the most catastrophic fires occurred in Greece in recent times. Landsat TM satellite imagery available before and shortly after the firebreak was utilised. Erosion risk maps before and after the fire event were estimated on the basis of the Revised Universal Soil Loss Equation (RUSLE) model. Ancillary data used in RUSLE implementation included the ASTER Global Digital Elevation Model, a geology map and field inventory conducted in the studied region. A soil erosion risk map with five classes (very low, low, medium, high) before and after the fire event was eventually developed from RUSLE within a GIS environment.

In overall, areas having a minimal soil erosion risk before the fire showed a considerable increase in erosion risk after the fire, as a result of natural environment destruction occurred from the fire outbreak. Soil erosion risk changes were particularly evident in the steep sloping mountainous areas of the Mediterranean ecosystem of our study site. All in all, the methodology implemented herein proved capable in obtaining rapidly and cost-effectively a cartography of soil erosion risk and its changes in a Mediterranean environment.

Keywords: erosion, erosion risk, RUSLE, wildland fires, Landsat TM, remote sensing, Geographical Information Systems, Greece.