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Desertification and land degradation investigations in the Mediterranean basin based on hydrological and remote sensing data interpretation.

A. Kallioras (1), E. Rokos (1), E. Charou (2), A. Perrakis (2), E. Vasileiou (1), and K. Markantonis (1)

(1) National Technical University of Athens, School of Mining and Metallurgy, Section of Geological Sciences, Athens, Greece (elvas@metal.ntua.gr), (2) National Center for Scientific Research – Demokritos, Institute of Informatics and Telecommunications, Computational Intelligence Laboratory, 153 10, Agia Paraskevi, Athens Greece.

As concluded in the relevant UN Convention in 1994, desertification has affected large areas within the European Mediterranean coastal regions and is threatening even larger territories. Desertification as a means of land degradation can be resulted from a series of factors including climatic changes and anthropogenic activities; while appears more pronounced in arid and semi-arid areas. With special reference to Greece, it is estimated that more than 35% of the country's surface area shows high risk of desertification; with the island of Crete having the highest potential for such environmental hazard. More specifically over 50% of the island is exposed to high desertification potential, especially in areas located at the south-eastern part.

Desertification in the island of Crete takes place as a consequence of: (i) climate conditions and (ii) anthropogenic activities causing intrusion of seawater into the mainland aquifers. The climate is semi-arid, with ephemeral rainfall events which are unevenly distributed in spatial as well as time extent. The average precipitation (P) is approximately 477.1mm and the evaporation is 350 mm (73%) -average temperature is 18.7oC- while the sum of runoff and percolation is app. 127.1mm (27%). On the other hand, the majority of the coastal aquifers are subjected to overexploitation -groundwater used for irrigation purposes- conditions which has led to encroachment of seawater towards the coastal freshwater aquifers. As brackish groundwater is used for irrigation purposes, this consequently results in salt accumulation on the soil surface, fact which severely degrades the soil by increasing salinity.

Remote Sensing techniques can be proved a useful tool in various fields of environmental research, while satellite image processing can be used for assessment and monitoring of environmental analysis, land cover/use changes, landscape mapping and soil analysis. In the case of Eastern Crete, remote sensing digital image analysis can be applied to monitor desertification process, by comparing Landsat images of different dates in order to detect changes in land cover and land use over time in the research area.

This research involves the interpretation of hydrological, hydrogeological and meteorological data in combination with remote sensing techniques in order to determine the extent of desertification in a critical area of Crete Island, Greece. The study area is envisaged to serve the needs of a reference site representing typical Mediterranean conditions with a high potential of desertification -due to climate conditions- and land degradation -as a consequence of soil salinization-.