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THE USE OF FUSED SATELLITE DATA (ERS-2 & SPOT-2 XS) FOR MAPPING OF ENVIRONMENTALLY SENSITIVE AREAS IN EROSION: THE CASE STUDY IN KORINTHOS AREA (NE PELOPONNESE, S. GREECE)

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EXTENDED ABSTRACT

The study area is located in the NE part of Peloponnese (Korinthia prefecture). It is a typical agricultural area cultivated mainly by vines, olive and citrus trees. The broader area is characterized by a quasi-linear coast and a flight of about 10-20 terraces of marine origin (most of them well preserved), south and west of the city of Korinthos. These terraces were formed through a combined action of faulting and sea level changes. The number of terraces and their altitudes are increased from east to west because of the intense uplift of north-central Peloponnese. Streams are flowing through V-shaped, deeply incised valleys resulting in a serious transverse erosion of the terraces. The lithology, active tectonic, intense rainstorms and human activities (crop practices, fires, overgrazing, etc.) promote the intense phenomenon of erosion. Today, the erosion risk composes, more and more, one of the main problems related with the environment protection.

Remote sensing potentially offers a relatively low-cost approach for examining active environmental processes that may have an impact on agricultural and physical environment leading to desertification problems.

This study demonstrates the benefits resulted from the synergism of SAR data (ERS-2) and optical data (SPOT2-XS) in order to monitor and map prone areas to intense erosion. Due to the disparate nature of optical and microwave sensors their imagery depicts different characteristics of the features observed. These data give different and complementary information since the radar signal depends mostly on topography and surface roughness, whereas the visible/infrared channels provide spectral information mostly on vegetation and land use/cover.

Three multisensor merging techniques have been investigated and compared. Multisensor data fusion (or data merging) is a method, which integrates two different images from two different sensors into one that is supposed to contain both kind of information with a minimum loss or distortion of the original data. To test the quality of the merging methods analyzed, both numerical and visual comparisons of the spectral characteristics were made among the final products and the original data.

The application presented here was focused on the analysis of the information extracted from the merging and the assessment of the synergism of SAR and optical data as regards the erosion monitoring and mapping, and the improvement of terrain interpretation. Finally, the integration of remote sensing imagery with conventional data, such as Digital Elevation Model (DEM), thematic maps and field work, in a GIS, is an efficient tool for the more accurate identification, assessment and mapping of high erosion risk areas.

Key words: Remote sensing, ERS-2, SPOT-2 XS, data fusion, erosion mapping, GIS, Korinthos.