Evaluating and Comparing NDVI and NBR Indices Performance for Burned Areas in Terms of PBIA and OBIA in Aegean Region Turkey

Asli Sabuncu and Haluk Ozener (Turkey)

Key words: Remote sensing

SUMMARY

Forest fires are one of the most destructive frequent natural hazards not only affecting the ecosystem adversely and vitally, but also causing serious problems in economic and social life internationally. A great number of wildfires may be human induced for various purposes, such as the increasing demand for land in Turkey especially near the shoreline. In Turkey, 58125 forest fires were occurred and 298.699 hectares of forest were burnt between 1988 and 2015 based on the statistical data of General Directorate of Forestry. Natural conditions also cause forest fires in Turkey, especially during the summer season, along the Mediterranean and Aegean region, where high temperature with low humidity bring about wildfires. Between 1978 and 2010, the biggest 20 fires occurred in these regions with forest loss ranging from 1200 to 14000 ha.

To extract different levels of fire severity, fire damages and burned areas different satellite images (Landsat, MODIS, SPOT, etc.) have being used in many scientific studies with different methods. In this study, Seferihisar-Izmir, which is located in Aegean Region is selected as the study area. In 2009 August, one of the largest fires was occurred in this region. In this analysis, pre and post- fire Landsat 5 images acquired in July 2009 and August 2009 were used to detect the extent of forest fire within the region.

The performance of Normalized Burn Ratio (NBR) and Normalized Difference Vegetation Index (NDVI) indices derived from Landsat 5 images were analyzed in order to evaluate the fire severity and compare the results. The Normalized Difference Vegetation Index (NDVI), Normalized Burn Ratio (NBR), differenced Normalized Burn Ratio (dNBR) and differenced Normalized Difference Vegetation Index (dNDVI) were calculated from Landsat at-sensor-reflectance data. All processes were carried out by using pixel based image analysis and object based image analysis. Discussion of the object based classification and comparison with the pixel based classification will be

introduced in this paper. Based on these two significant methods, it can be concluded that the results are compatible and rational.