



Fire danger monitoring using satellite MODIS images: the case of 2007 fire summer season in the Basilicata Region (Southern Italy)

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Forest fires are one of the most critical issues in global change and a major cause of land degradation in the Mediterranean region (such as, loss of biodiversity, decrease in forests, alteration of landscape, soil degradation, increase in greenhouse). During the last decade the number of fires have increased dramatically in the Mediterranean countries (Portugal, Spain, Italy, Greece).

Fire danger estimation plays an important role in the framework of programs for fire damage mitigation, because it provides quantitative information on the degree of degradation and/or stress experienced by plants, which can facilitate the ignition and spreading of fire independently on the causes of ignition. The availability of dynamic information on the spatial and temporal patterns of areas most prone to fire is very useful for designing strategies related to the use and the distribution of the available fire fighting resources, which can prevent or at least minimize fire effects.

The characteristics (synoptic and repetitive views, spectral characteristics, and low costs) offered by imageries, such as NOAA-AVHRR, SPOT-Vegetation, and TERRA-MODIS appear particularly attractive for the dynamic (namely daily or weekly) estimation of fire danger. In fact, over the years, several satellite-based indicators have been developed for fire danger estimation most of which are based on AVHRR on board NOAA (National Oceanographic and Atmosphere Administration) satellites.

This work is focused on the use of satellite MODIS data to evaluate and map areas most prone to fire for supporting operational monitoring activities. The evaluation

was performed by using two vegetation indices the (i) Relative Greenness (RG) derived from NDVI (Normalized Difference Vegetation Index) time series and (ii) MSI (Moisture Stress Index) which is an index specifically developed for the estimation of live fuel moisture.

Pixels characterized by a decreasing in both Relative Greenness and vegetation moisture content are supposed to be related to an increase in fire danger. The investigations were carried out in the Basilicata Region for the whole 2007 summer season (Southern Italy).

Results obtained from the performed analysis showed a high potential for the identification and classification of areas most prone to fire by using a joint classification of RG and MSI vegetation indices. The satellite-based information can be easily integrated with long-term danger maps in order to obtain a complete estimation of vegetation fire-vulnerability.