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Daily monitoring of pre-fire vegetation conditions using satellite MODIS data:

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Forest fires have an important influence on the environment causing removal of vegetation, alteration of the vegetation structure, soil erosion and desertification processes, long-term site degradation and alteration. In the recent years, Basilicata region has been characterized by an increasing incidence of fire disturbance which also tends to affect protected (Regional and national parks) and natural vegetated areas. FIRE_SAT project has been funded by the Civil Protection of the Basilicata Region in order to set up a low cost methodology for fire danger/risk monitoring based on satellite Earth Observation. To this aim, NASA Moderate Resolution Imaging Spectroradiometer (MODIS) data were used. The spectral capability and daily availability makes MODIS products especially suitable for determining real-time fire danger monitoring.
This paper presents significant results obtained during the first year 2008 of FIRE-SAT project.
Modis data were also used for identifying and mapping fuel properties in terms of type and loading.

Fuel moisture, Fuel properties, and Fire danger maps were obtained as follows:

a) Fuel moisture from MSI (Moisture Stress Index) which is an index specifically developed for the estimation of live fuel moisture.

b) Fuel type map from supervised classification techniques and spectral analysis methodologies performed at sub-pixel level;

c) fire danger maps from both the (i) Relative Greenness (RG) derived from NDVI series and (ii) MSI (Moisture Stress Index)

Areas characterized by a decreasing in Relative Greenness and moisture content are supposed to be related to an increase in fire danger.
Fire danger maps obtained for the 2008 summer season were compared with actual forest fire data.
Results from this comparison suggested that the MODIS-based model identified the main fire risk zone and the integration of the fuel type map and fuel moisture daily maps into a single, integrated model properly described fire-proneness.