Analysis of Multipsectral Time Series for supporting Forest Management Plans

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Adequate forest management requires specific plans based on updated and detailed mapping. Multispectral satellite time series have been largely applied to forest monitoring and studies at different scales tanks to their capability of providing synoptic information on some basic parameters descriptive of vegetation distribution and status. As a low expensive tool for supporting forest management plans in operative context, we tested the use of Landsat-TM/ETM time series (1987-2006) in the high Agri Valley (Southern Italy) for planning field surveys as well as for the integration of existing cartography.

As preliminary activity to make all scenes radiometrically consistent the no-change regression normalization was applied to the time series; then all the data concerning available forest maps, municipal boundaries, water basins, rivers, and roads were overlapped in a GIS environment.

From the 2006 image we elaborated the NDVI map and analyzed the distribution for each land cover class. To separate the physiological variability and identify the anomalous areas, a threshold on the distributions was applied. To label the non homogenous areas, a multitemporal analysis was performed by separating heterogeneity due to cover changes from that linked to basilar unit mapping and classification labelling aggregations. Then a map of priority areas was produced to support the field survey plan.

To analyze the territorial evolution, the historical land cover maps were elaborated by adopting a hybrid classification approach based on a preliminary segmentation, the identification of training areas, and a subsequent maximum likelihood categorization. Such an analysis was fundamental for the general assessment of the territorial dynamics and in particular for the evaluation of the efficacy of past intervention activities.