

## SEGMENTATION BASED ANALYSIS OF HIGH RESOLUTION REMOTELY SENSED DATA FOR FOREST DIVERSITY CHARACTERIZATION

P. Corona <sup>a</sup>, G.Chirici <sup>b</sup>, A. Lamonaca <sup>a</sup>, R. Bertini <sup>c</sup>

<sup>a</sup> University of Tuscia, Dipartimento di Scienze dell'Ambiente Forestale e delle Sue Risorse, Viterbo, Italy;  
piermaria.corona@unitus.it.

<sup>b</sup> University of Molise, Dipartimento di Scienze e Tecnologie per l'Ambiente e il Territorio, Isernia, Italy;  
gherardo.chirici@unimol.it

<sup>c</sup> University of Firenze, Dipartimento di Scienze e Tecnologie Ambientali Forestali, Firenze, Italy;  
roberta.bertini@unifi.it

Several structural indexes are commonly used for the characterization of the spatial organisation of trees within forest. Such indexes are usually based on data acquired in the field recording characteristics and position of trees within sampled plots. These information are frequently used as one of the components for the evaluation of potential forest biodiversity or as a proxy variable of habitat naturalness supporting sustainable forest management choices.

Multispectral remote sensing is now able to provide information of geometric very high resolution (Quick Bird has a pixel of 0.7 m in the panchromatic channel). One of the most providing methodology to elaborate such images is based on segmentation techniques, which are frequently adopted to produce land use/land cover maps both with manual photointerpretation or semi-automatic classification protocols.

The aim of the present work is to evaluate possible quantitative relationships between structural heterogeneity evaluated on the basis of field data and spectral heterogeneity calculated on the basis of a high resolution remotely sensed image. The test area for such a study is located in a beech forest on the Appennini mountains (M.te Cimino, Viterbo, central Italy) where a number of information was acquired in the field within a group of plot areas. For the same area a QuickBird image was acquired and, after common pre-elaboration, was segmented using several driving variables.

The relationship between spectral heterogeneity calculated on the segmented image and field data seems to be statistically meaningful, enabling possible downscaling procedure to map forest structural diversity on the basis of high resolution remotely sensed images. Such information could be of very high relevance in operatively supporting the implementation of indicators of Sustainable Forest Management especially in the framework of standardization initiatives (such as criteria & indicators developed by the Ministerial Conference on the Protection of Forest in Europe) or certification processes (such as Forest Stewardship Council).