Session Application of Unmanned Aerial Vehicules
Thursday, 5 July 2018 (17:00 -18:30)
Bracco Classroom - Chairman: Fabio Giulio Tonolo

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Multitemporal comparison of in-situ and remotely-sensed vegetation indexes in temperate broadleaved forests

Long term monitoring is crucial for forestry research because it allows to understand the trends in forest coverage and health in response to management and climate changes. Remote sensing provides a unique way to obtain estimates of forest attributes at spatially extensive areas. The availability of standardized vegetation indexes over time allows also to make projections under different management scenarios. However, the analysis and extraction of quantitative information from remotely-sensed data require accurate cross-calibration with in situ forest measurements. This is particularly relevant in temperate broadleaved forests, which are characterized by high level of complexity, which can complicate the retrieval of vegetation attributes from remotely-sensed data. In this work we compare MODIS MOD15A2 products LAI (Leaf Area Index) and F_par (Fraction of photosynthetically active radiation) with a series of measure taken on the ground from 2000 to 2016. Ground measurements taken with LAI-2000 Plant Canopy Analyzer were available within the framework of the Project LIFE FutureForCoppiceS (www.futureforcoppices.eu) for seven forest stands, being representative of three most commonly diffused European Forest Types (mountainous beech forests, thermophilous oak forests, evergreen broadleaved forests). Forest inventory data are available since 1969, but we considered only the time frame starting from 2000, according to MODIS data availability. The chlorophyll content was measured in the same stands with a SPAD analyser. LAI showed a good correlation between satellite and ground data for most of the stands, and the pattern in seasonal changes were highly overlapping over the 16 year lag, while for the Clorophylle index results were less clear. We conclude that the remotely sensed LAI data are suitable for modelling and up-scaling indicators from the stands to larger areas.

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