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Analysis of vegetation by the application of a physically-based atmospheric correction algorithm to OLI data: a case study of Leonessa Municipality, Italy

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Remote sensing techniques allow to estimate vegetation parameters related to large areas for forest health evaluation and biomass estimation. Moreover, the parametrization of specific indices such as Normalized Difference Vegetation Index (NDVI) allows to study biogeochemical cycles and radiative energy transfer processes between soil/vegetation and atmosphere.
This paper focuses on the evaluation of vegetation cover analysis in Leonessa Municipality, Latium Region (Italy) by the use of 2015 Landsat 8 applying the OLI@CRI (OLI ATmospherically Corrected Reflectance Imagery) algorithm developed following the procedure described in Bassani et al. 2015. The OLI@CRI is based on 6SV radiative transfer model (Kotchenova et al., 2006) ables to simulate the radiative field in the atmosphere-earth coupled system.
NDVI was derived from the OLI corrected image. This index, widely used for biomass estimation and vegetation analysis cover, considers the sensor channels falling in the near infrared and red spectral regions which are sensitive to chlorophyll absorption and cell structure. The retrieved product was then spatially resampled at MODIS image resolution and then validated by the NDVI of MODIS considered as reference. The physically-based OLI@CRI algorithm also provides the incident solar radiation at ground at the acquisition time by 6SV simulation.
Thus, the OLI@CRI algorithm completes the remote sensing dataset required for a comprehensive analysis of the sub-regional biomass production by using data of the new generation remote sensing sensor and an atmospheric radiative transfer model. If the OLI@CRI algorithm is applied to a temporal series of OLI data, the influence of the solar radiation on the above-ground vegetation can be analysed as well as vegetation index variation.