Forest type inventory using MODIS and MERIS remote sensing images. Study case: Janowskie forest

Karol Szymankiewicz, Jaroslaw Zawadzki, and Karol Przezdziecki
Warsaw University of Technology, Environmental Engineering, Poland (karol_szymankiewicz@is.pw.edu.pl)

Annual inventory of forest change is essential to provide appropriate information on forest ecosystems in terms of wood resource estimation, forest condition, impact of anthropological or industrial activity. High resolutions remote sensing is rather costly, difficult to interpretation and very often can not provide a sufficiently high time resolution, especially when inventory is carried out on large forest areas. Therefore, medium or low resolution methods for satellite observations of forests are still indispensable.

We propose method of annual, large-scale inventory of forest type (coniferous, deciduous, and mixed) using medium and low resolution remote sensing images. The method uses vegetation indices (NDVI, LAI, FAPAR, LAIxCab) calculated from MODIS and MERIS satellites data. The main idea of the method is the use of observation of seasonal variation of vegetation for each type of forest. The ratio of each above-mentioned vegetation indices (ratio index) was calculated taking into account value of each pixel from middle and beginning of vegetation period. Significant differences for each type of forest were observed when compared ratio indices. The imagery data in conjunction with ground measurements were also analyzed in the Janowskie Forest (Eastern Poland). Ground data were derived from CLC (Corine Land Cover) database developed by European Environment Agency.

The results showed that in spite of the low MERIS (250m) and MODIS resolutions (1000m) the proposed method gave surprisingly good classification accuracy of the forest type for both satellites. Therefore, presented method could serve as quick and low-cost alternative for high resolution, expensive method of forest classification, when annual inventory is needed.

Keywords: forest inventory, forest classification, remote sensing, MERIS, MODIS, vegetation indices, Corine Land Cover