Abstract theme: Land

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Abstract title:
Suitability of Sentinel-2 data for tree species classification

Abstract text:
One of the key parameters for the description of forest ecosystems is the tree species. Detailed and regularly updated information about the distribution of tree species is important for conservation issues, forest management and assessment of wildlife habitats. The changing growth conditions caused by climate change further increase the relevance of information about species occurrence.

Remote sensing data can provide suitable information for large areas with the possibility for regular updates. In this study we compare the potential of the new Sentinel-2 data (10 - 20m) and two common satellite sensors with both, higher (WorldView-2) and lower spatial resolution (Landsat-8). The Sentinel-2 data, as well as Landsat-8 (30m) and WorldView-2 (2m) scenes were acquired in summer (near vegetation peak) under cloudless conditions (Figure 1).

For the analysis all data sets were atmospherically corrected. Using this data set we focused on the spectral separability of Central European tree species based on mono-temporal satellite data. An object-based approach at forest stand level together with a Random Forest (RF) classification was applied to assess tree species separability. Our results clearly demonstrate the potential of Sentinel-2 for mapping tree species.

Figure 1: Comparison of the three input data sets (CIR band combination): Landsat-8 (5,4,3), Sentinel-2 (4,3,2), WorldView-2 (7,5,3). Only a small part of the total study area is shown to highlight the differences in ground sampling distance: Landsat-8 (30m), Sentinel-2 (10m) and WorldView-2 (2m).

Keywords: Classification, Forestry, Biodiversity, Tree species

Satellite data: Sentinel-2, Landsat-8, WorldView-2