



Applications of a MODIS-adjusted NDVI3g dataset in Central Europe between 1982 and 2013

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Normalized Difference Vegetation Index (NDVI) is widely used to study vegetation greenness, production, phenology and the responses of ecosystems to climate fluctuations. The extended global NDVI3g dataset created by Global Inventory Modeling and Mapping Studies (GIMMS) has an exceptional 32 years temporal coverage for the period of 1982-2013. Due to the methodology that was used to create NDVI3g inherent noise and uncertainty is present in the dataset.

We used Collection-6 MOD13 NDVI data for the overlapping period of 2000-2013 as a reference to evaluate the accuracy of NDVI3g at a regional scale and to perform statistical harmonization (adjustment) of the NDVI3g dataset for Central Europe. The applied MOD13A2 is one of the official products of vegetation indices created from measurements of the MODerate resolution Imaging Spectroradiometer (MODIS) sensor on board satellite Terra with 1 km × 1 km horizontal, and 16-day temporal resolution. Mean seasonal NDVI profiles, start, end and length of the growing season, anomalies, magnitude and timing of peak NDVI were calculated from NDVI3g (original, noise filtered and harmonized) and MODIS NDVI and compared with each other between 2000-2013. Results indicate that the harmonization of NDVI3g with MODIS NDVI is promising since the newly created dataset has improved quality for diverse vegetation metrics. As further application of the MODIS-adjusted dataset, we performed temporal trend analysis and crop yield estimations of winter wheat for the whole 1982-2013 period, indicating the reasonable applicability of the harmonized dataset in Central Europe. The presented results can help researchers to assess the expected quality of the NDVI3g-based studies in Central Europe and to exploit the information content of the adjusted NDVI3g.

Keywords: NDVI; NDVI3g; MODIS; phenology; trend analysis; crop yield estimation