

Towards an improved Land Surface Phenology mapping using a new MODIS product: A case study of Bavarian Forest National Park

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Past work in remote sensing of land surface phenology have mapped vegetation cycles at multiple scales. Much has been discussed and debated about the uncertainties associated with the selection of data, data processing and the eventual conclusions drawn. Several studies do however provide evidence of strong links between different land surface phenology (LSP) metrics with specific ground phenology (GP) (Fisher and Mustard, 2007; Misra et al., 2016). Most importantly the use of high temporal and spatial resolution remote sensing data and ground truth information is critical for such studies. In this study, we use a higher temporal resolution 4 day MODIS NDVI product developed by EURAC (Asam et al., in prep) for the Bavarian Forest National Park during 2002-2015 period and extract various phenological metrics covering different phenophases of vegetation (start of season / sos and end of season / eos). We found the LSP-sos to be more strongly linked to the elevation of the area than LSP-eos which has been cited to be harder to detect (Stöckli et al., 2008). The LSP metrics were also correlated to GP information at 4 different stations covering elevations ranging from approx. 500 to 1500 metres. Results show that among the five dominant species in the area i.e. European ash, Norway spruce, European beech, Norway maple and orchard grass, only particular GP observations for some species show stronger correlations with LSP than others. Spatial variations in the LSP-GP correlations were also observed, with certain areas of the National Park showing positive correlations and others negative. An analysis of temporal trends of LSP also indicates the possibility to detect those areas in the National Park that were affected by extreme events. Further investigations are planned to explain the heterogeneity in the derived LSP metrics using high resolution ground truth data and multivariate statistical analyses.

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