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**Understanding Spatiotemporal Vegetation Patterns and Phenology Over the Alps Based on Medium Resolution Satellite Remote Sensing Data**

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Monitoring the inter-annual variability of phenology under varying site conditions in mountain areas is of high interest, since alpine ecosystems are assumed to be strongly affected by climatic changes. To derive spatial information on plant development, remote sensing data have been used increasingly during the last decades, known as land surface phenology. However, mountain phenology patterns and trends have been insufficiently analyzed, with hardly any studies covering the entire European Alps. In addition, the available studies rely on coarse remote sensing data of 1-8 km resolution. Considering that mountains are heterogeneous landscapes with strongly varying altitudinal gradients and microclimatic conditions, this is a limiting factor. In this study, we aim at i) closing this gap by using the highest possible spatial resolution of MODIS data (250 m) for deriving the Normalized Difference Vegetation Index (NDVI) and ii) at identifying the temporal and spatial variability of vegetation patterns in dependency of altitude and exposition on an alpine-wide scale. NDVI and phenological metrics show spatially distinct distribution patterns according to topography. The SOS at different altitudes [100 – 3000 m] has a time lag of 45 – 75 days, while the inter-annual variability of mean SOS in different altitudes ranges from 17 to 32 days, with a higher variability in higher altitudes. Over the last 16 years, SOS has advanced in average by 0.27 days per year. In order to prolong the MODIS time series, we plan to use NDVI from AVHRR and Sentinel-3 at 1 km and 300 m spatial resolution, respectively.