

Time Series Analysis Over Europe From AVHRR Data – Examples From The TIMELINE Project

Sarah Asam^{1*}, Christina Eisfelder¹, Igor Klein¹, and Claudia Künzer¹

*Corresponding author: sarah.asam@dlr.de

¹ German Aerospace Center (DLR), German Remote Sensing Data Center (DFD), Wessling, Germany

The TIMELINE project at the Earth Observation Center (EOC) of the German Aerospace Center (DLR) aims at generating long and homogenized time series of the National Oceanic and Atmospheric Administration (NOAA) and Meteorological Operational Satellite (MetOp) Advanced Very High Resolution Radiometer (AVHRR) data over Europe and North Africa. In the framework of the project an operational processing and data management environment is established to process 30 years of raw data into L1B, L2, and L3 products.

NDVI time series will be generated on basis of 1.1 km High Resolution Picture Transmission (HRPT) and Local Area Coverage (LAC) data from the historical AVHRR data archive of the German Remote Sensing Data Center (DFD) of DLR. The consistency of reflectance and thermal information is of highest importance for time series analysis. Therefore, a comprehensive and enhanced pre-processing is implemented, taking into account geometric distortions due to rotation and satellite clock errors, varying spectral responses of the different AVHRR sensors, calibration and orbit drift, sensor degradation, atmospheric and BRDF correction. Based on the L1B products, enhanced cloud mask, water mask, and snow mask products are developed. The scene-based L2 products will be aggregated to L3 daily, 10-days, and monthly composites in order to reduce the influence of noise, outliers, and data gaps on the time series analysis.

The objectives of the generation of the AVHRR NDVI time series are to enable long-term change detection analyses, to identify geoscientific phenomena, and to answer climate-relevant research questions. We therefore want to assess in this study the feasibility of the AVHRR NDVI time series to characterize patterns, anomalies, and trends of vegetation phenology such as spring green-up and senescence, as well as of seasonal ecosystem productivity. The time series will be provided to the public using a free and open data policy.

Keywords: AVHRR, time series, Europe, NDVI