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Analysis of MODIS NDVI time series for Hungary in 2007: detecting the phenological impacts of the summer heatwave

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Normalized Difference Vegetation Index (NDVI) calculated from remotely sensed data is widely used to monitor the state of the terrestrial vegetation. NDVI contains essential information about plant phenology and productivity, it acts as a proxy for scrutinizing the state of vegetation, start of growing season, etc.

Our investigations are based primarily on data provided by the MODerate resolution Imaging Spectroradiometer (MODIS) sensor onboard satellites Terra and Aqua. The data were received by the Direct Broadcast MODIS receiving station located in Budapest, Hungary. Using the original, high resolution data stream received by the station, monitoring of the state of vegetation is possible on a daily basis thus exploiting the original high temporal resolution data. The MOD13 NDVI data product provided by the U. S. National Aeronautics and Space Administration (NASA) is only available as 16 days (or longer) composite images, thus, short term (few days long) phenological changes can not be tracked with them.

In the second half of July 2007 an extreme and long lasting heatwave occurred in Hungary, as well as in Central Europe, affecting huge areas and causing fires in many forests and shrublands all over the region. Using the 250 meter resolution daily MODIS data vegetation greenness degradation is investigated for different plant func-

tional types in the region of Hungary. The decrease of NDVI during the period is clearly attributable to the heatwave. It is assumed that the absence of precipitation during this heatwave resulted in clear degradation of NDVI. Temperature and precipitation data provided by the European Centre for Medium-Range Weather Forecasts (ECMWF) are used to analyze the meteorological aspects of the event.