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# Spatial patterns and trends in remotely sensed vegetation indices 1981-2016

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The current global state of vegetation and its evolution through the last decades is related with climate change issues. A few recent studies investigated the greening or browning vegetation tendencies at global and continental scales using remotely sensed data. However, the relatively short length of such data made it difficult to detect statistically robust trends in vegetation indicators. This study investigates global high-resolution (0.05°) spatial patterns and trends of vegetation conditions at a seasonal scale and over the period 1981-2016, by means of three indicators, the measured Normalized Difference Vegetation Index (NDVI) and the modelled Leaf Area Index (LAI) and Fraction of Photosynthetically Active Radiation (FAPAR). Using very high-resolution (300 m) land cover grids, this study tries to decompose such trends into the contributions from the single different plant functional types (PFTs). Moreover, this study investigates the correlations between the trends of selected PFTs with other proxies as aggregated land cover classes, climate classification schemes, and single types of trees (this last feature over parts of Europe only). Then NDVI, LAI, and FAPAR input data used are from the Climate Data Record Program (CDR) of the National Oceanic and Atmospheric Administration (NOOA) and were subjected to extensive quality-checks. The land cover grids (2000, 2005, and 2010) are from the Climate Change Initiative (CCI) of the European Space Agency (ESA). Tree species over Europe are from European Atlas of Forest Tree Species of the Joint research Centre (JRC). Climate classification schemes used follow the Köppen-Geiger and the Holdridge life zones formulations. Seasonal trends in NDVI, LAI, and FAPAR, together with their statistical significance, are presented in global maps to focus at seasonal greening and browning tendencies. Trends in single PFTs and their relationships with land cover, climate classes, and tree species are shown in tables and correlation matrices.