



Contrasting Trends in Land Surface Phenologies since 2000 in Western Russia and Northern Kazakhstan

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Since the collapse of the Soviet Union, land cover dynamics across Northern Eurasia have exhibited significant regional heterogeneity resulting from natural disturbances and anthropogenic impacts. We focus here on two regions of significant change in land surface phenologies since 2000. We calculated the NDVI from MODIS NBAR Collection 5 Climate Modeling Grid products that have a spatial resolution of 0.05 degrees and a temporal resolution of 16 days. We evaluated the image time series for trends on a pixelwise basis using the nonparametric Seasonal Kendall test as corrected for first-order temporal autocorrelation. Two hotspots of contrasting change emerged: (1) highly significant positive trends occur in a triangular region east of Moscow bounded by Kovrov east to Perm and southwest to Samara; and (2) highly significant negative trends occur in a thick band from Volgograd east to Pavloda. The proximate and approximate causes of these contrasting trends were investigated using higher spatial resolution (500 m) MODIS products, Landsat TM (30 m) change pairs, weather and climate data, and geospatial data. Three scales of analysis spanning more than five orders of magnitude suggest that the contrasting trends arise from different socio-economic processes and the widespread influence of drought in Northern Kazakhstan.