Accurate detection of year-to-year variability of growing season in a boreal forest in eastern Siberia

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Accurate detection of spatio-temporal variability of growing season in boreal forests is important to evaluate that of ecosystem functioning under rapid climate changes in the Pan-Arctic region. Towards this aim, satellite remote-sensing is useful but, from the ecological research view point, validation has not yet been sufficiently conducted. Here, (1) we have installed camera system in a larch forest in eastern Siberia (Spasskaya Pad site) in 2013 and then obtained daily canopy surface images. (2) Based on the ground truthing, we evaluated the spatio-temporal variability of the timing of growing season by analysing the Terra/Aqua MODIS-observed daily green-red vegetation index (GRVI) in eastern Siberia during 2003 and 2014. We found that (1) the timing of leaf-flushing and leaf-colouring of understory vegetation (birch) was about 1 week later and earlier than that of overstory vegetation (larch), respectively; (2) GRVI=0 showed the timing of leaf-flushing and leaf-colouring, respectively; and (3) the year-to-year variability of the timing of start of growing season detected by the tower-flux-based net ecosystem exchange (NEE) correlated with that by satellite-observed GRVI.