Data assimilation experiments with MODIS LAI observations and the dynamic global vegetation model SEIB-DGVM over Siberia

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In the previous study, Arakida et al. (2017) developed a data assimilation system with the SEIB-DGVM (Spatially Explicit Individual-Based Dynamic Global Vegetation Model, Sato et al. 2007) and assimilated satellite-observed Leaf Area Index (LAI) successfully at a flux measurement site in Siberia. In this study, we extend the experiment to a large domain in Siberia and estimate the vegetation functions and structures, and model parameters related to the phenology of the deciduous needle-leaved tree and the undergrowth. At the annual meeting in 2017, we presented the results of total LAI, tree LAI, above ground biomass, carbon flux, and the model parameters. This year, we present further comparisons with the previous studies: carbon flux (FLUXCOM: Tramontana et al., 2016, Jung et al., 2017) estimated by a machine learning method using in-situ flux measurements and various explanatory data, tree LAI (Delbart et al., 2005, Kobayashi et al., 2010) estimated by a radiative transfer model and satellite observations, and above ground biomass (Liu et al., 2015) estimated by satellite observations. The results showed high correlations between this study and the previous studies except for above ground biomass. This is probably because above ground biomass of Liu et al. [2015] is estimated from microwave-based observations, different from optical-based observations in this study, Kobayashi et al. [2010], and FLUXCOM. The results suggest that the type of the satellite sensor affect the estimation results. Most of the estimated variables by DA were highly correlated with the observed LAI and the previous studies, indicating that the DA system generally performed well over Siberia.

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Keywords: data assimilation, vegetation model, satellite data