



Improving the modelling of temperate grass dynamics in the Community Land Model using remote sensing Leaf Area Index datasets

Lexin Zhang, Zhentao Cong, and Dawen Yang

Department of Hydraulic Engineering, Tsinghua University, Beijing, China (zhang-lx14@mails.tsinghua.edu.cn)

Vegetation plays an essential role in terrestrial ecosystems and affects the land surface and atmosphere coupling. Hence, it is important to predict the vegetation dynamics correctly for understanding the present and future state of Earth system. In this study, we compare the grass dynamics simulated with the Community Land Model (CLM) to that derived from remote sensing Leaf Area Index (LAI) datasets in a temperate grassland in Northeast China. It is found that though CLM partly captures the seasonal patterns of LAI in grass-dominated regions, disagreements exist: erroneous senescence during summer takes place in most areas; the growing season LAI is overestimated due to the long maturity period; and there is a 1-year lag between the inter-annual variation of CLM LAI and that of remote sensing LAI. We improve the modelling of temperate grass LAI by ascertaining a group of optimization parameters in CLM. The R^2 between 8-day LAI values of CLM and that of remote sensing increases from 0.37 to 0.89, and the root mean squared error (RMSE) decreases from 0.52 to 0.19. As for inter-annual variation of growing season LAI, the R^2 increases from 0.33 to 0.72, and the RMSE decreases from 0.43 to 0.10. We also discuss some of the effects of the improved grass dynamics on regional water and carbon cycles in CLM.