

Updating data-driven estimation of terrestrial carbon fluxes across Asia

*Kazuhito Ichii¹, Riku Kawase¹, Zhiyan Liu¹

1. Chiba University

Asia, which is characterized by monsoon climate and intense human activities, is one of the prominent understudied regions in terms of terrestrial carbon budgets and mechanisms of carbon exchange. To better understand terrestrial carbon cycle in Asia, data-driven approach, which relies on widely available network observation, provide important and independent datasets. We have been working on data-driven estimations using AsiaFlux observation network and remote sensing datasets (Ichii et al. 2017). In the previous study, we used MODIS Collection 5 datasets as input. However, issues on sensor calibration remains in the datasets (Wang et al. 2012). Therefore, update of MODIS data (from Collection 5 to 6) into our data-driven estimate was urgently required. In this study, we updated our data-driven estimation of terrestrial CO₂ fluxes across Asia using MODIS Collection 6 datasets. Since our estimation relies on MODIS datasets, we can evaluate the effects of updating MODIS data on estimated terrestrial CO₂ fluxes. We prepared all site-level and spatial inputs with MODIS C6 datasets, and trained and tested the model with updated input dataset. We found that site-level evaluation does not make significant changes between estimations based on MODIS C5 and C6. In addition, spatial patterns of GPP and NEE also did not change significantly. However, interannual variations show very large difference among MODIS version, and estimation with MODIS C6 shows significant increases in GPP across Asia from 2000 to 2019.

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