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Monitoring and simulation of water, heat, and CO2 fluxes in terrestrial ecosystems based on the APEIS-FLUX system

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The Integrated Environmental Monitoring (IEM) project, part of the Asia-Pacific Environmental Innovation Strategy (APEIS) project, developed an integrated environmental monitoring system that can be used to detect, monitor, and assess environmental disasters, degradation, and their impacts in the Asia-Pacific region. The system primarily employs data from the moderate resolution imaging spectrometer (MODIS) sensor on the Earth Observation System- (EOS-) Terra/Aqua satellite, as well as those from ground observations at five sites in different ecological systems in China. From the preliminary data analysis on both annual and daily variations of water, heat and CO2 fluxes, we can confirm that this system basically has been working well. The results show that both latent flux and CO2 flux are much greater in the crop field than those in the grassland and the saline desert, whereas the sensible heat flux shows the opposite trend. Different data products from MODIS have very different correspondence, e.g. MODIS-derived land surface temperature has a close correlation with measured ones, but LAI and NPP are quite different from ground measurements, which suggests that the algorithms used to process MODIS data need to be revised by using the local dataset. We are now using the APEIS-FLUX data to develop an integrated model, which can simulate the regional water, heat, and carbon fluxes. Finally, we are expected to use this model to develop more precise high-order MODIS products in Asia-Pacific region.

Paper (PDF)

关键词: APEIS-FLUX system; Asia-Pacific Environmental Innovation Strategy (APEIS); CO2 flux; Integrated Environmental Monitoring (IEM); MODIS; water vapor flux doi: 10.1360/gso5