

Predictability of Precipitation on Seasonal Scale and the Role of Land-Atmosphere Interactions

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The GEWEX Global Land-Atmosphere Coupling Experiment (GLACE) has conducted a highly controlled numerical simulation in boreal summer (June to August) with a dozen of Atmospheric General Circulation Models (AGCMs) and suggested the global distribution of land-atmosphere coupling strength (hereafter, CS). As the result of GLACE, large CS for precipitation has been found over the Great Plains of North America, the Sahel, equatorial Africa, and India. This could lead that the global initialization of soil moisture may enhance precipitation prediction in boreal summer. However, seasonality of CS has not been revealed in GLACE. This study investigated the seasonal variation of land surface CS for precipitation in CCSR/NIES (Center for Climate System Research, the University of Tokyo and National Institute for Environmental Studies) AGCM5.6. We found that large seasonal variation of CS over central North America, East China, and South East Asia. Over central North America, CS is hardly seen in autumn and winter despite of large CS in spring and summer. Meanwhile, large CS is estimated over some regions of East China and South East Asia in autumn where CS is small in June to July. To put it differently, the degree of improvement of accuracy on seasonal prediction is highly dependent on season even if the routine monitoring of land surface states (e.g., soil moisture and snow cover) is densely performed in both spatial and temporal scales.