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Land Processes and Feedback to Climate Forcing in Coupled Model Intercomparison Project Phase 6 (CMIP6)

The Influence of Land Process on the Regional Climate

The solid and liquid water, notably snow and soil-moisture, stored at the land surface has a large influence on the regional climate. Land states (namely soil moisture, snow and vegetation) can provide predictability in the window between deterministic (weather) and climate (O-A) time scales.

Contribution to the CMIP6

CMIP has coordinated climate model experiments since 1995, aiming to advance scientific understanding of the Earth system. CMIP model simulations have also been regularly assessed as part of the IPCC Climate Assessments Reports and various national assessments. As the 6th phase of CMIP has started in 2016, the Land Surface, Snow and Soil-moisture Model Intercomparison Project (LS3MIP) was designed to provide a comprehensive assessment of land feedbacks on climate variability and climate change, and to diagnose systematic biases in the CMIP6 ESMs.

Impacts of Renewable Energy Development on Global Climate Variability

Considering the impact of fossil fuel combustion CO₂ emission on the global warming and the projected depletion, it is expected that renewable energy will play an important role in the future. However, most of the previous researches have demonstrated climate consequence of renewable energy deployment within regional scales. In this research, it is aimed to estimate impacts of solar photovoltaics deployment on climate variability at the global scale. A general circulation model (GCM), Model for Interdisciplinary Research on Climate (MIROC) 5.0 is used in an atmospheric GCM mode for 10-year experiment span (1998-2007). As expected, temperature decreased in regions where solar photovoltaics were installed, but at the same time, remote impacts were also found in some regions. This indicates that some areas are subject to a shift of mean state change in temperature, which urges to take the impacts on global climate into consideration before large-scale solar photovoltaic deployment.

