



The precipitation oscillation on east and west lakeshore of Lake Selin Co and its mechanism based on observation and simulation

Yao Xiangnan and Yang Kun

Tsinghua, Department of Earth System Science, BeiJing, China

A lake may play an important role in affecting weather and climate of its surrounding area. On the Tibetan Plateau, the effect of a lake on atmosphere is still poorly understood, due to lack of site observation around lakes. We set up rain gauges surrounding Lake Selin Co and obtained rainfall data in summer of 2017 - 2018, and we found both site observation and GPM show large oscillation of precipitation amount on west and east lakeshore. We raise a hypothesis that the lake may have a great impact on precipitation amount in its surrounding area. In order to confirm this phenomenon, we conducted four sets of WRF simulations. First, a simulation with 3km resolution can reflect the pattern, while a simulation with 9km does not catch the distribution, indicating it's important to use high-resolution to simulate lake effects. Second, the lake momentum roughness length is increased to the magnitude of its surrounding area, but the model result still shows a higher amount on the west lakeshore, with a slightly smaller precipitation difference between the west and east; because of relatively small surface roughness compared to that of surrounding landcover, surface wind can be accelerated up when passing over the lake and slow down while reaching the land, which can cause divergence over lake and convergence over lakeshore. Third, when changing the lake into land in the model, the rainfall amount difference between west and east coast is greatly reduced, which is mainly caused by the change of thermal property in the initial lake area. So, Lake Selin Co does have great impact on weather of its surrounding area in the aspects of dynamics and thermodynamics, of which thermal influence is more important. Last, hills to the west of the lake also has an impact on the phenomenon and needs further analysis.