



## **Study of unstable atmosphere in early Summer over Ngoring lake in the Tibetan Plateau**

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The Tibetan Plateau harbors thousands of lakes; however few studies focus on impacts of lakes on local climate in the region. To investigate and quantify impacts of the biggest lakes (Ngoring Lake) of the Yellow River source region in the Tibetan Plateau on local climate, field experiments from 2011 to now and numerical simulation are performed. Unstable atmosphere has been observed over Ngoring lake of Tibetan Plateau in early summer from 2011-2013, contrasting with the stable atmosphere over temperate lakes in early summer. The phenomenon has been simulated well with CLM4.5 (Community Land Model version 4.5). Results show that the more radiation, high altitude and thin air density contribute a lot to the unstable atmosphere. Simulations using WRF-CLM (Weather Research and Forecasting model) model show that WRF-CLM model could provide realistic reproduction of surface observations and has better simulation after considering lakes; the warm lake can induce more precipitation and warm local climate.