



Modeling and analysis of the impact of lakes on local climate in Yellow River source region in Tibetan Plateau

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The study of lake effects and the change of lakes on local climate are important to the economy development and living for the people who live surrounded the lakes or surrounded rivers that originates from Tibetan lakes. The two largest lakes in the headwater of Yellow River, Ngoring Lake and Gyaring Lake, are studied with the Weather Forecast and Research Model (WRF) coupled with a sophisticated 10-layer lake model. Both the WRF and lake models were developed by the National Center for Atmospheric Research. A more than one-year WRF simulation was performed over the period of May 2010 through July 2011, where the initial and lateral conditions were provided by the National Center for Environment Prediction Reanalysis data. The initial simulations were calibrated and evaluated with observations and the Moderate Resolution Imaging Spectroradiometer surface skin temperature. Results show that the coupled WRF-lake model can more realistically reproduce the surface observations. The lakes can warm the area encompassing the lakes from summer to early winter and increase the precipitation in the rain season. The effects on winter precipitation is negligible because the winter precipitation is too small.