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Interactive dust-radiation modeling with two Radiation Parameterizations in RegCM4 over China

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The radiative process is an important physical process in climate model and medium-term numerical weather prediction models. This paper mainly through the comparison of parameters of radiation parameterization schemes :RRTM radiation scheme and CCSM radiation scheme, to provide a reference for further improvement and development of regional climate model In the latest version of the International Centre for Theoretical Physics (ICTP) regional climate model, RegCM4. Through the simulation of dust weather in 2011, the results show that the CCSM scheme has more detailed description of shortwave radiation flux than RRTM, also better reflects the characteristics of clear sky and cloud area difference. Long wave radiation flux is significantly affected by surface. RRTM simulation results are more detailed, more closer to the high, low value regions and closer the actual terrain range. Effects of long wave cooling rate is more important than shortwave heating rate. Effect of radiation scheme on temperature decreased with the increase of height. Due to the radiation process of increasing the temperature gradient inside the cloud, and the cloud layer node tends to be unstable, in this way the precipitation increases . In theory, considering the radiation scheme to forecast the precipitation is more closer to reality than without considering the radiation scheme.