Determining Urban Effects on Precipitation Patterns Utilizing Ensemble Climate Experiment Approach

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Abstract

The present study firstly discusses uncertainties of the standard sensitivity experiment on a convective rainfall event over the Tokyo metropolitan area by the WRF model. Similar to the previous studies, we obtain the positive impact of urbanization from the sensitivity experiment for a certain event. However, negative or neutral impacts have also been found when the experimental design is marginally changed. Our results indicate that the standard sensitivity experiment is not reliable due to the strong Chaos influence in rainfall simulation. Second, an approach similar to an ensemble climate simulation, which uses different four boundary data created from NCEP-FNL, JRA25, JMA-RANAL, JMA-MANAL objective analysis data, is attempted to decrease the characteristic of the initial value problem. Sensitivity experiments for eight Augusts (2001-2008) period based on this method gives some indication of the possibilities of urban impact on the precipitation.