

Estimation of uncertainty in thermal environmental projection around Nagoya metropolitan area

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Urban canopy process is essential to investigate thermal environment in the near future, because surface air temperature (SAT) increase due to urban heat island is comparable to the one due to the global warming in the near future over major metropolitan areas in Japan. During the past 100 years, annual mean surface air temperature (SAT) increased about 2 °C in Nagoya, while the world mean SAT increased only 0.66 °C. The difference in the SAT is mostly caused by the effect of the urban heat island (UHI). This study investigates the uncertainty in the near future thermal environmental projection of Nagoya metropolitan area which is third largest metropolitan area in Japan. The present climate simulation is conducted using a high-resolution numerical climate model, the Weather Research and Forecasting (WRF) model, including an urban canopy sub-model. A future climate run is conducted using the pseudo-global-warming method, assuming the boundary conditions in the 2050s estimated by CMIP5 GCMs under the RCP scenarios.

Keywords: urban climate, urban heat island, climate projection, dynamical downscaling, regional climate modeling