

SENSITIVITY OF WRF MODEL TO INPUT-DATASETS AND SURFACE PARAMETERS FOR HEAT ISLAND

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Abstract

The urban heat island has been recognized for many years and many researchers have performed urban climate studies in order to mitigate the phenomenon.

Most of earlier studies were performed utilizing the approaches with the statistical analysis and observation in the urban climate field. However, recently, numerical simulation has also been one of the main methods in this field. For instance, the Weather Research and Forecasting Model (WRF), which is designed as next generation model after the MM5, has been recognized world-wide.

The WRF requires the inputs of atmospheric data, land surface data and sea surface data to create the initial and boundary conditions. Several statistical data, such as land use and terrain data are also needed. Additionally, when the model is run, it needs some parameter table files that contain surface parameter values for each land use type. If the users don't have their own datasets or parameter tables, they will have to use the default input datasets and table-files. In the default, the land use data is created by the United States Geological Survey (USGS), thus the surface parameter values are estimated based on the land cover in U.S. Therefore, it is necessary to retune these parameters and gear them towards the subsequent research area. If the performance of the WRF is sensitive to these input data or surface parameters, the forecast accuracy of the model will be improved by resetting the parameters or altering the input data. Several researches had individually estimated the sensitivity of the WRF to some of parameters and input-datasets in order to confirm the speculation. However, the sensitivity has not been sufficiently conducted yet.

In this study, we quantitatively estimate the sensitivity of the WRF to the input-datasets and surface parameters for surface temperature. Furthermore, we examine what the most sensitive factor is. In the presentation, we will show the results of these sensitivity experiments.

Keywords: WRF, sensitivity experiments, surface parameters, land use data