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Studies in applicability of urban canopy schemes and parameters to high-density buildings thermal environment

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At present, the urban canopy schemes coupled to WRF model included Single-layer (UCM) scheme, Building Environment Parameterization (BEP) scheme and Building Environment Model (BEP+BEM) scheme. BEP and BEP+BEM need to confirm more parameters and waste more time than UCM, but whether they can improve the simulative effects requires further investigation. The defaults of buildings' morphological parameters which are appropriate to European and American cities whether can apply to Chinese high-density buildings is also uncertain. This paper intended to solve the above problems. Taken the typical montanic city(Chongqing) as the research object, combined the high-resolution GIS data (333*333m), we used three different urban canopy schemes coupled to WRF model to simulation Chongqing high-density buildings thermal environment for two days. Also, two group cases were designed to research the applicability of defaults of buildings' morphological parameters. The main results are as following: (1)With the high-resolution GIS data supported, results of BEP+BEM scheme is best and results of UCM scheme is worst. The RMSEs and Mean Bias(between observation and simulation) of BEP+BEM, BEP and UCM schemes are 1.3°,1.4°,2.1° and -0.5°,-0.8°,-1.4°, respectively(2)Good agreement on 2m temperature of three different schemes simulation and that measured by Automatic Weather Stations, but higher than that measure by National Basic Stations. (3) As the buildings' interval decreased, the 2m temperature could decreases during the day and increases during the night, and the variance at night are bigger . (4) As the buildings' height increased, the 2m temperature could decreases during the day and increases during the night, and the variance at night are bigger.5The defaults of the height and interval of buildings are inapplicable, the former slant small and the latter slant large, the best parameters are 20m for interval and 20%(15m)+60%(20m)+20%(25m) for height.