



Off-line Numerical Weather Prediction over Montreal with the Canadian Urban Modeling System

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One of the objectives of the Environmental Prediction in Canadian Cities (EPiCC) project is to prepare a version of the Town Energy Balance (TEB) urban model optimized for Canadian cities and ready for implementation in the numerical prediction systems operational at the Meteorological Service of Canada (MSC). The present study focuses on the urban component of the off-line modeling systems developed at MSC. Two-dimensional simulations are run over the Montreal metropolitan area during the whole summer 2008 using 12 urban classes and using operational regional model outputs as meteorological forcing. Taking advantage of the surface measurement sites deployed during EPiCC (at urban, suburban and rural sites), the results are locally compared against measurements of the surface energy budgets and air temperature and humidity. The benefits of including an urban component in the off-line modeling system is evaluated by comparing results obtained with MSC's 15-km regional operational model. Secondly, radiative surface temperature maps are retrieved from satellite images to provide two-dimensional validation. The ability of the system to reproduce the observed urban heat island is analyzed. The interest of this system is first to predict surface and near-surface meteorology affecting city inhabitants, especially during summer heat waves. This new tool is also suitable to help the decision makers to develop urban planning strategies, by testing the influence of the materials and of the arrangement of new districts on human comfort and energy consumption.