



High-Resolution Numerical Simulations over the Complex Urban Area of Vancouver, Canada

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Numerical simulations are performed over the Vancouver metropolitan area during a summertime Intense Observation Period (IOP of 14-15 August 2008) of the Environmental Prediction in Canadian Cities (EPiCC) observational network (<http://www.epicc.uwo.ca/>). The local atmospheric circulations over this city are rather complex due to its particular geography : the large urban area is surrounded by mountains and by an heterogeneous seashore landscape. During summertime, sea and land breezes develop over the Lower Mainland and interact with the city and the mountains. Four nested grids with 15km, 2.5km, 1km and 250m grid spacings are set-up over the metropolitan area. Surface physical processes are represented with the Town Energy Balance (TEB) model for the built-up covers and with the Interactions between the Surface, Biosphere, and Atmosphere (ISBA) land surface model for the natural covers. Lateral boundary conditions and initial conditions are provided by the 15-km Canadian regional operational weather forecast model. Results are compared with surface measurements (energy fluxes at EPiCC sites and permanent meteorological stations) and ground based atmospheric soundings, such as measurements from a ceilometer, a tethered balloon deployed during 24 hours, a Lidar, and a microwave radiometer. The influence of the city on local circulations is analysed using a simulation in which the urban surface is removed. It is found that the representation of the city has a positive impact on the results, even though the urban influence is moderate in this region for this particular case.