

Recent improvements and developments in ECCC's Operational Meteorological and Air-Quality forecasting systems at the urban scale.

R. Munoz-Alpizar^{1*}, S. Leroyer², S. Belair², C. Stroud³, S. Ren³, R. Pavlovic¹, etc...

¹Canadian Meteorological Centre Development division, Environment and Climate Change Canada, Montreal, Quebec

²Meteorological Research Division, Environment and Climate Change Canada, Montreal, Canada

³Air Quality Research Division, Environment and Climate Change Canada, Toronto, Canada

With increasing urbanization worldwide, the associated changes in urban landscapes and anthropogenic heating and pollution lead to higher urban temperatures than the surrounding suburbs. Thus, influencing weather, energy consumption and thermal comfort of its inhabitants, as well as, health, air quality (AQ) and climate. According to the 2011 Canadian census, about 81% of Canadians live in urban areas. In order to improve services offered to the Canadian community, Environment and Climate Change Canada (ECCC) has launched an initiative to develop a high-resolution meteorology and air quality forecasting prediction capability in urban areas across Canada. Hence, the inclusion of urban land surface schemes in urban-scale forecasting models is critical to consider processes associated with urban canopy, urban heat island, sub-surface roughness and boundary layers. Since the fall of 2018, the Town Energy Balance (TEB) scheme has been successfully included in the operational 2.5km National HRDPS forecast system at ECCC.

In addition, urban AQ is influenced by various factors, including meteorology, urban infrastructure (street canyons), local emissions and regional background. To assess AQ in urban areas, it is therefore important to combine all contributing factors into an integrated model system. Thus, the latest improvements in the 2.5-km HRDPS are the basis for the development of the urban-scale AQ forecasting system (HRAQDPS).

This presentation will describe these latest improvements and their impacts on model performance. Short and long-term planning for urban AQ forecasting will also be presented.

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