



WEATHER AND AIR QUALITY PREDICTION MODELLING

The 2015 Pan American and Parapan American Games will take place this year in Toronto and surrounding areas from July 10-26 and August 7-15, respectively. The Toronto 2015 Games is the largest multi-sport event Canada has ever hosted, involving 7,600 athletes competing in 51 sports (36 Pan Am and 15 Parapan) in 30 different venues located in the Greater Golden Horseshoe Area. Environment Canada is providing state-of-the art, 24/7 dedicated, venue-specific weather alerting services and environmental emergency support for the Toronto 2015 Games. The TO2015 Games are also a catalyst for enhancing existing weather services through research and demonstration projects that will benefit future generations of Canadians.

What is Environment Canada doing?

Environment Canada research scientists are currently developing highly-sophisticated numerical weather prediction and air quality models that can be used to forecast weather and air quality at a very high resolution in urban settings such as Toronto.

What's new?

The high-resolution weather and air quality models will be run during the TO2015 Games, in addition to the standard forecast models. This will provide Environment Canada's Ontario Storm Prediction Centre forecasters and briefing teams with detailed predictions over the Games footprint, in support of a venue specific weather forecast and alerting program. Environment

Canada's enhanced Mesonet of weather observations, as well as air quality monitoring at the venues and other locations in the Games area of southern Ontario will be used to validate the models.

How is this better?

The new weather and air quality models have higher resolution (more grid points over a given area) than what is currently used in the operational models to produce Environment Canada's public weather and air quality forecasts. Weather parameters, such as temperature, wind and precipitation can be forecasted on a 250-meter grid, as compared to the 2.5-kilometre grid used operationally. Similarly, the air quality model will be run at a 2.5-kilometre grid resolution, compared to the 10-kilometre grid of the current operational model.



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The higher resolution means an improvement, for example, in cloud, precipitation and air quality forecasts. The models are also able to represent detailed effects of the city and surrounding area as well as lake breezes from the lower Great Lakes, something that has not been done yet in current operational models. High resolution air quality models are better able to resolve urban and industrial plumes and their maximum pollutant concentrations. An improved integration of real time air quality measurements with high resolution forecasts will provide more accurate spatial mapping of air quality in the GTA. Improved methods of post-processing model forecasts will provide more accurate air quality forecasts at the sporting venue locations.

What is the legacy for Canadians?

The high-resolution weather and air quality models represent the next generation of tools that will be used to better forecast significant events in urban areas such as Toronto. These models are expected to become part of the standard forecasting systems in the coming years.

