Performance Analysis of the Canadian Operational Statistical Air Quality Post-Processing Package

R. Pavlovic[1*], S. Antonopoulos[2*], S. Gilbert[1], D. Davignon[1], and M.D. Moran[3]

[1]Air Quality Modeling Applications Section, Environment and Climate Change Canada (ECCC), Montreal, Quebec, Canada
[2]Weather Element Section, ECCC, Montreal, Quebec, Canada
[3]Air Quality Research Division, ECCC, Toronto, Ontario, Canada

The Canadian Regional Air Quality Deterministic System (RAQDPS) includes a post-processing bias-correction package named Updateable Model Output Statistics for Air Quality (UMOS-AQ). It is a software package developed by Environment and Climate Change Canada that performs statistical corrections of operational air quality forecasts for locations in Canada with AQ measurements. In addition, 2-D surface forecast fields prepared by a second package named UMOS-AQ/MIST are generated by merging RAQDPS forecasts with site-specific UMOS-AQ forecast values. These post-processing products are then used in the calculation of the Air Quality Health Index (AQHI) values that are disseminated to the public.

A performance analysis of UMOS-AQ/MIST will be presented. Case studies of RAQDPS over- and under-predictions will be included, and particular attention will be given to extreme pollution events, both observed and forecasted, which are challenging for bias-correction tools. The evaluation of RAQDPS forecasts and UMOS-AQ/MIST fields against observations will be assessed for 3 pollutants (O_3, $PM_{2.5}$, NO_2) using different metrics, including continuous statistics for hourly values and daily maxima and categorical scores. Limitations of RAQDPS statistical AQ post-processing package will also be addressed.

*Corresponding Authors: Radenko Pavlovic (e-mail: Radenko.Pavlovic@canada.ca)
Stavros Antonopoulos (e-mail: stavros.antonopoulos@canada.ca)

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