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Theme 2: Emission Forecasting

Title: New Developments in Wildfire Emission and Dispersion Forecasting with FireWork, the Operational Canadian AQ Forecast System with Near-real-time Biomass-Burning Emissions

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Abstract:

FireWork, Environment and Climate Change Canada's air quality forecast system with near-real-time biomass burning emissions, was recently upgraded to operational status so that wildfire smoke forecasts are now available to the general public. FireWork is based on augmenting ECCC's operational GEM-MACH regional air quality forecast model with inputs from Natural Resource Canada's near-real-time Canadian Wildland Fire Information System (CWFIS). FireWork's ability to model the transport and diffusion of wildfire smoke plumes has proved to be valuable to regional air quality forecasters and emergency first responders. There are, however, identified weaknesses in FireWork with respect to the estimation of biomass burning emissions and short-term, near-source smoke dispersion. Development is continuing to improve the estimates of fuel consumption from identified fire sources as well as the parameterization of plume rise and vertical distribution of wildfire emissions within the GEM-MACH model. This presentation will show operational case studies where the vertical distribution of fire emissions resulted in poor $PM_{2.5}$ forecasts at the surface and present results from model sensitivity simulations that attempt to address this deficiency. In addition, we will show preliminary results from the use of the new Canadian Forest Fire Emissions Prediction System module (CFFEPS) within the FireWork system with alternate treatments of emission estimate and vertical emissions distribution.