High Resolution Simulations of Alberta and Saskatchewan Using GEM-MACH: Comparing Continuous Emissions Monitoring versus Inventory Estimates

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Current Canadian national reporting regulations for emissions from large industrial stacks ("major point sources") require the submission of annual average mass totals for criteria air contaminants. Alberta provincial reporting regulations, on the other hand, include the reporting of hourly emissions data from continuous emissions monitoring (CEM), and in addition to hourly emissions, include stack operating parameters such as volume flow rates and exit temperatures. Here we examine the relative impact of the use of the more detailed emissions data on predictions of air quality using a 2.5-km resolution nested version of the GEM-MACH model, for a domain encompassing the provinces of Alberta and Saskatchewan. Three scenarios are examined: a "base case" utilizing the annual submitted emissions data, a "CEM mass only" scenario utilizing the CEM hourly emissions of SO_2 and NO_x, and a "CEM mass and temperature" scenario, utilizing hourly CEM emission and stack parameter information. Comparisons with surface monitoring observations will be used to describe the impact of the more detailed information on model performance.