



Global Environmental Multiscale model – a platform for integrated environmental predictions

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The Global Environmental Multiscale model was developed by the Government of Canada as an operational weather prediction model in the mid-1990s. Subsequently, it was used as the host meteorological model for an on-line implementation of air quality chemistry and aerosols from global to the meso-gamma scale. Further model developments led to the vertical extension of the modelling domain to include stratospheric chemistry, aerosols, and formation of polar stratospheric clouds. In parallel, the modelling platform was used for planetary applications where dynamical, radiative transfer and chemical processes in the atmosphere of Mars were successfully simulated. Undoubtedly, the developed modelling platform can be classified as an example capable of the seamless and coupled modelling of the dynamics and chemistry of planetary atmospheres.

We will present modelling results for global, regional, and local air quality episodes and the long-term air quality trends. Upper troposphere and lower stratosphere modelling results will be presented in terms of climate change and subsonic aviation emissions modelling. Model results for the atmosphere of Mars will be presented in the context of the 2016 ExoMars mission and the anticipated observations from the NOMAD instrument.

Also, we will present plans and the design to extend the GEM model to the F region with further coupling with a magnetospheric model that extends to 15 Re.