MODELING CONCENTRATION VARIANCES IN AIR QUALITY MODELS AT MESOSCALE

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Air quality models are run at mesoscale to evaluate air pollution abatement strategies and to estimate the impact of air pollution on human health and vegetation. Such models usually can give only one value of concentration for every grid cell. This value can be seen as an ensemble average and a volume average over the grid cell volume. However, in particular for human exposure studies, information on the variability of the concentration is needed. Such variability can come from several sources, among the others turbulence, heterogeneity of emissions, small scale deterministic structures, etc.

In this contribution, we propose a parameterization to estimate the variability of pollutant concentrations due to turbulence and emissions. The formulation relies on the resolution of a prognostic equation for the concentration variance based on a k-l turbulence closure used in a mesoscale model. The parameterization is firstly implemented in a 1D column model and tested against large eddy simulations of convective and shear driven atmospheric boundary layers, and then in a realistic 3-Dimensional mesoscale simulation.

EXTENDED ABSTRACT NOT SUPPLIED