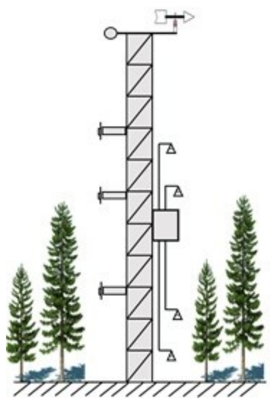
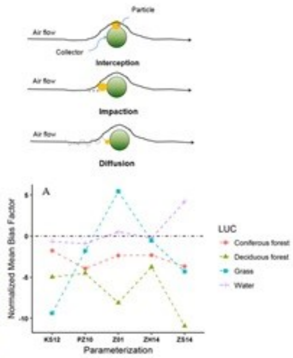
Environmental Engineering Graduate Seminar





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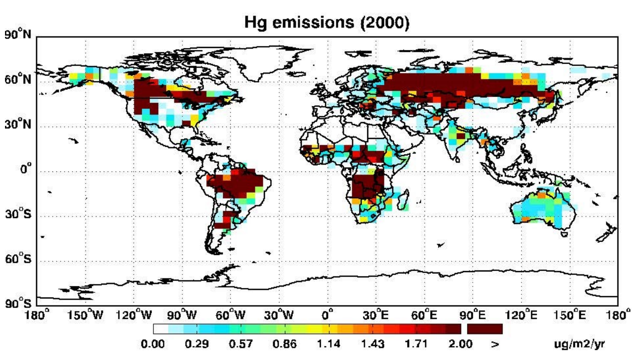
Evaluation of five dry particle deposition parameterizations for incorporation into atmospheric transport models

Abstract:

Current knowledge has been inadequate to propose quantitative measures of the relative performance of available dry particle deposition parameterizations for atmospheric transport models. In this study, a comprehensive performance evaluation of five dry deposition parameterizations (denoted as *Z01*, *PZ10*, *KS12*, *ZH14*, and *ZS14,* respectively) was performed in terms of their accuracy, model output uncertainty, and parameter sensitivity. Results suggest that *ZH14* parameterization is the most accurate for five land use categories (LUCs) except for coniferous forest, for which it is second most accurate. Of the five parametrizations, the uncertainty range for the *ZH14* (11-20%) has the lowest upper bound across the five LUCs for particle size (d_p) ranging from 0.005-2.5 µm. Except for giant particles (d_p = 10 µm), friction velocity is one of the three most sensitive parameters in all parameterizations. Because it is the least complex of the five parameterizations, and it has the greatest accuracy and least uncertainty, we recommend that the *ZH14* parameterization is currently superior for incorporation into atmospheric transport models.



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Mercury emissions from wildfires: present day estimates and impacts of 2000-2050 global change

Abstract:

Mercury (Hg) is a toxic and persistent pollutant in the global environment. Wildfires constitute an important source of atmospheric mercury. Current estimates of wildfire mercury emissions are uncertain with global total emissions in the range of 104-1330 Mg/year. Significant changes in global vegetation coverage are expected in the coming decades driven by either climate change (land cover change) or anthropogenic land use change. Furthermore, predicted warmer temperatures in the future together with alterations in precipitation patterns driven by climate change could result in significantly different fire regimes from the present day. We have developed a fire emissions model based on the classical biomass burning equation to estimate the global Hg wildfire emissions for present-day and the potential impacts from the 2000-2050 changes in climate, land use and land cover following the Intergovernmental Panel on Climate Change (IPCC) A1B scenario. The model is driven by global data for vegetation and crop coverage, fire frequencies from a fire parameterization and burned area from a statistical model. Our results indicate that the future evolution of climate, land use and land cover are all-important factors affecting Hg wildfire emissions in the coming decades.

Monday, October 2, 2017 @ 3PM **GLRC Room 202**