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Uncertainty analysis of a dry deposition model

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Stomatal flux of ozone is controlled by ozone concentration and by deposition velocity via parameterization of the canopy and stomatal conductances. Plant stomatal conductance plays an important role in most of all deposition models. In Jarvis model, multiplicative algorithm of stomatal conductance is applied. This type of model includes functions for the effects of photosynthetically active radiation, air temperature, soil water content, and other parameters on the stomatal conductance. The values of the model input parameters are very uncertain. Therefore, these parameters may give rise to uncertainties in simulation results. The nonlinear models can magnify the uncertainty of some parameters and damp it to each others. This means that models may overestimate or underestimate the stomatal ozone fluxes. Sensitivity analysis is an effective tool for the exploration of the relation between the output of mathematical models and the input data, which comprise the values of parameters as well as the initial conditions. To investigate the effects of the most important parameters on stomatal conductance of the ozone a Monte Carlo analysis has been performed. The large number of parameter sets is generated according to the probability density functions of these parameters. The model is simulated with each of these parameter sets, and the results are processed with statistical methods. Determination of the probability density functions of the model results based on the joint probability density functions of the parameters from measurements will be presented. Estimation of the high spatial variability of the stomatal ozone fluxes over Central Europe under continental climate region will be also discussed. For this purpose a coupled Eulerian photochemical reaction-transport model and a detailed ozone dry deposition model (TREX; TRansport–EXchange Model) have been developed, and it has been

coupled to ALADIN meso-scale limited area numerical weather prediction model.