Dry deposition processes in the surface layer for admixtures with gravity sedimentation

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It seems that the "big leaf" approach to the dry deposition assessment will be the one followed by the model developers in the near future. The resistance against turbulent transport of the component close to the surface - the aerodynamic resistance, is one of the major factors of dry deposition. The most popular parameterization schemes treat the aerodynamic resistance and the gravity deposition independently, most often by simply adding the gravity deposition velocity. As the gravity deposition modifies the admixture profiles and thus the turbulent fluxes in the Surface Layer (SL), this approach is obviously incorrect.

The present paper suggests a more general approach, based on the exact solution of the pollution transport (turbulent and gravity deposition) equation in the SL, which provides a correct expression for the aerodynamic resistance, accounting also for the gravity deposition effects. Some results from simple calculations, which demonstrate the importance of a joint treatment of turbulent transport and gravity deposition while calculating the aerodynamic resistance, are also shown in the paper.