

Interactive comment on “Source-receptor matrix calculation for deposited mass with the Lagrangian particle dispersion model FLEXPART v10.2 in backward mode” by Sabine Eckhardt et al.

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We thank referee #2 for the positive evaluation of our paper. The referee's only major concern was that gravitational settling is not included in the backward application. However, this is not true. We missed to mention this explicitly (perhaps because settling is not very important for the species considered in the paper), but gravitational settling is in fact included. Thus, we can apply the new method also to particles of larger sizes such as desert dust or volcanic ash.

In FLEXPART, gravitational settling influences two aspects of particle transport and deposition:

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1) a settling velocity is calculated at every time step and added to the other velocity components (grid-scale, turbulent) that determine particle transport. In backward mode, settling is reversed and leads to an additional upward drift of a particle. This is already included in backward calculations for (aerosol) concentrations and no additional development was needed.

2) the settling velocity enters the calculation of the dry deposition velocity. This is reversed in the backward calculation as described in the paper. The reversion includes the settling component, although we did not explain that, unfortunately.

In summary, gravitational settling is fully considered, but we realize that we should have explained this explicitly. This will be done in a revised version of our paper.

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