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the Improvements in FLEXPART's wet Deposition Output After Accounting for Correct Precipitation rate Disaggregation and Interpolation of Cloud-Related Parameters

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Wet scavenging is a vital process in atmospheric transport modelling to determine the distribution of masses. Therefore, using precipitation fields from the European Centre for Medium-Range Weather Forecast (ECMWF) data sets, which refer to a temporal integral rather than being a point value in time, as all other parameters in the Lagrangian dispersion model FLEXPART, is distorting the results by smoothing or shifting precipitation into dry periods. A new disaggregation scheme preparing precipitation rates as point values has already been implemented in the pre-processor tool flex_extractv7.1.2, which prepares ECMWF data for use in FLEXPART. Consistency, continuity and mass conservation of precipitation within each time interval is now secured. In combination with the newly added temporal interpolation of all scavenging-related meteorological fields in FLEXPART, the results show a substantial improvement in multiple case studies. The first case highlights the effects with a high resolution output grid that demonstrates that artificial checkerboard and banded structures present in the output from previous algorithms have disappeared. Further evaluations show the improvement of wet deposition results by comparing against measurements and previous case studies, such as the lifetime analysis of aerosol particles and the transport of mineral dust and black carbon.

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Promotional text

How to eliminate banded or artificial checkerboard structures in high resolution wet deposition results from atmospheric transport modelling by numerical improvements and parameterization changes.

Oral preference format

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