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Verification of a new interpolation method for gridded precipitation data used in Lagrangian transport and dispersion models

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The distribution of wet deposition as calculated with Lagrangian particle transport models, e.g. FLEXPART (http://flexpart.eu) is governed by the intensity distribution of precipitation. Usually, meteorological input is taken from Eulerian weather forecast models, e.g. ECWMF (European Centre for Medium-Range Weather Forecasts), providing precipitation data as integrated over the time between two output times and over a grid cell. Simple linear interpolation would implicitly assume the integral value to be a point value valid at the grid centre and in the middle of the time interval, and thus underestimate peaks and overestimate local minima.

In FLEXPART, a separate pre-processor is used to extract the meteorological input data from the ECMWF archive and prepare them for use in the model. Currently, a relatively simple method prepares the precipitation fields in a way that is consistent with the linear interpolation as applied in FLEXPART. This method is designed to conserve the original amount of precipitation. However, this leads to undesired temporal smoothing of the precipitation time series which even produces nonzero precipitation in dry intervals bordering a precipitation period.

A new interpolation algorithm (currently in one dimension) was developed which introduces additional supporting grid points in each time interval (see companion contribution by Hittmeir, Philipp and Seibert). The quality of the algorithm is being tested at first by comparing 1-hourly values derived with the new algorithm from 3- (or 6-)hourly precipitation with the 1-hourly ECMWF model output. As ECWMF provides large-scale and convective precipitation data, the evaluation will be carried out separately as well as for different seasons and climatic zones.