



The Lagrangian particle dispersion model FLEXPART version 10

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The Lagrangian particle dispersion model FLEXPART was in its first original release in 1998 designed for calculating the long-range and mesoscale dispersion of air pollutants from point sources, such as after an accident in a nuclear power plant. The model has now evolved into a comprehensive tool for atmospheric transport modelling and analysis. Its application fields are extended to a range of atmospheric transport processes for both atmospheric gases and aerosols, e.g. greenhouse gases, short-lived climate forces like black carbon, volcanic ash and gases as well as studies of the water cycle. We present the newest release, FLEXPART version 10. Since the last publication fully describing FLEXPART (version 6.2), the model code has been parallelised in order to allow for the possibility to speed up computation. A new, more detailed gravitational settling parametrisation for aerosols was implemented, and the wet deposition scheme for aerosols has been heavily modified and updated to provide a more accurate representation of this physical process. In addition, an optional new turbulence scheme for the convective boundary layer is available, that considers the skewness in the vertical velocity distribution. Also, temporal variation and temperature dependence of the OH-reaction are included. Finally, user input files are updated to a more convenient and user-friendly namelist format, and the option to produce the output-files in netCDF-format instead of binary format is implemented. We present these new developments and show recent model applications. Moreover, we also introduce some tools for the preparation of the meteorological input data, as well as for the processing of FLEXPART output data.