

-11: A new Release of the Widely-Used Lagrangian Atmospheric Transport Model

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The Lagrangian atmospheric transport model FLEXPART is employed to investigate a broad spectrum of applications, including the transport of radioactive material emitted by nuclear events. Since its inception in 1998, FLEXPART has undergone many changes, with its last official release (version 10.4) published in 2019. At the same time, numerous versions have been developed across institutions to cater for specific needs. To make it easier to modify FLEXPART, while not having to diverge from the main version and its updates, we introduce a more modular way of organizing the source code. Instead of the distributed-memory parallelization with MPI used in version 10, now OpenMP parallelization is applied where possible, resulting in a reasonable scaling behaviour. For example, a run with a single noble gas release of one million computational particles scales almost perfectly up to 32 cores. Accuracy is improved by advection of particles by the mean wind on the original model levels, thus avoiding additional interpolations. This results in a reduction of absolute transport conservation errors of potential vorticity in the stratosphere by ~0.3% each time-step. Finally, a range of new user features have been added, e.g. printing selected particle properties to NetCDF files.

Promotional text

FLEXPART-11 shows improvements in computing speed, in accuracy, and modifiability of the source code. New user features include the possibility to print user-selected particle properties to files, and setting intervals for writing files used for restarting simulations.

Oral preference format

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