

Interactive comment on “Technical note: The Lagrangian particle dispersion model FLEXPART version 6.2” by A. Stohl et al.

Anonymous Referee #2

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General comments

This paper provides a detailed description of the latest version (6.2) of the Lagrangian particle dispersion model FLEXPART. The current model version considers long-range and mesoscale transport, diffusion as well as different removal processes like dry and wet deposition or radioactive decay of tracers from various sources. Furthermore, the paper describes how to run the FLEXPART model including descriptions of model parameters and the input/output data. Examples of the FLEXPART input files are given in a comprehensive appendix.

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The FLEXPART model was already applied and validated in various air pollution transport studies as shown by the list of references, but so far no citable description of the FLEXPART model is available. Therefore, I think the paper presents significant advances in atmospheric transport modelling techniques and is worthy of publication in ACP. However, I agree with referee #3 that the paper should be substantially shortened. Therefore, I suggest to move the appendix, the description of input/output data (e.g., section 2.1, section 10.1) as well as the parts of the manuscript describing model parameters or subroutines to a separate user manual. As already mentioned by referee #3, there is the possibility to provide more information like user manuals or program code as an electronic supplement. Otherwise the user manual could be made available from the model's web page what is currently done.

Specific comments

Since the overall presentation is well structured and clear, I have only a few additional comments.

- Page 4745, line 10: What means “appropriate” in this context?
- Page 4746, equation 4: R is not explained
- Page 4747: I was not familiar with the abbreviation “LST” (and also a lot of my colleagues were not). A short explanation could be useful.
- Page 4748, equation 10: The constant c is set to 2.0. On what does the value of c depend?
- Page 4751, line 13: What means “ τ_L ”? Maybe I missed a previous explanation.
- Page 4757: FLEXPART allows for particle splitting. After a constant time Δt_s (specified by the user) the particles are split into two. This process is repeated

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- after travel times of $2\Delta t_s$, $4\Delta t_s$, Depending on the initialisation, the number of particles might be immense at the end of a model run. What are typical values of Δt_s and of the initial number of particles? How does the run-time increase with increasing particle numbers?
- Page 4759: In section 5 it is mentioned that only one species can be simulated in a backward run. Is it possible to calculate further species by repeating a backward run? Is it possible to reproduce a backward run identically? I think there should be a random particle displacement associated with convection (section 4.6).
 - Page 4762: The purpose of the correction factors f_{r_l} and f_{r_c} is not explicitly mentioned in the text.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 4739, 2005.

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