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Geoscientific Model Development Discussions

Interactive comment on "FALL3D-8.0: a computational model for atmospheric transport and deposition of particles, aerosols and radionuclides. Part I: model physics and numerics" *by* Arnau Folch et al.

Anonymous Referee #2

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The manuscript presents the latest version of FALL3D, a well-known and widely used Eularian pollutant dispersal model. The model code has been rewritten from scratch to remove legacy issues and add new features such as a new solving strategy to reduce numerical diffusion, new species (up till version 7.x the code only included tephra and SO2), and a new much-improved parallelisation strategy. For all intents and purposes FALL3D-8.0 is practically a new model and as such I believe merits publication of a new paper.

The manuscript is well-written, introduces the additions and changes to the code so

that users of the previous versions can understand the differences, but also reintroduces critical but unmodified concepts to keep the paper suitable for new users. There are only a few minor changes that I think would benefit the paper (listed below and in the attached PDF), so I would suggest accepting the manuscript after minor revisions.

First, a small point about the naming. As a user of FALL3D 7.x I find that the change from version 7.x to 8.0 as detailed in the manuscript is so significant that, in my opinion, the authors could be presenting a new (but familiar) model (similar to for example the change from MM5 to WRF). In this respect I feel that just changing the version number in a sense undersells the radical changes in the code presented. But I can understand the authors decision in order to keep the familiarity with the model name (although not all of the species fall anymore!).

Aside from some technical comments that are shown in the attached PDF, the main change that I would like the authors to implement would be to add an appendix or a supplemental document highlighting the changes aimed at previous users. For example it would help to add a table listing the removed "deprecated" options (e.g. ln 73, 143), with perhaps a one-sentence explanation of why the option was removed when appropriate. For most of the removed options I can understand the logic, but I feel that it would be a good addition to have these changes summarized at some point.

Another point that I would like to note is that, after downloading the code from gitlab, I found that even though the compiling and execution process has been streamlined considerably, and the namelist file has been reworked to be more user-friendly, it has changed to the extent that previous users require some guidance to adjust to the modified workflow (i.e. the change in the run directories, scripts, etc). I understand that this might be better suited as a subsection in the new version's manual rather than this manuscript, but I would appreciate either summarizing these changes as a supplemental document to the paper, or at least, after the model is properly released and advertised, making sure to add such a section to the new version of the manual.

Overall, this is a very exciting step for the model and for the relevant modelling communities. I would like to wish the writers the best of luck with the revisions and I'm looking forward to using the new iteration of the model.

Minor and technical comments: See manuscript for minor comments (blue) and technical corrections (green).

Please also note the supplement to this comment:
https://www.geosci-model-dev-discuss.net/gmd-2019-311/gmd-2019-311-RC2-supplement.pdf

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