



Interactive comment on “Implementation of splitting methods for air pollution modeling” by M. Schlegel et al.

Anonymous Referee #2

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This paper presents an parallel implementation of a multirate-IMEX scheme for atmospheric modeling, which results from a splitting approach proposed by the author previously in Schlegel et al (2009, 2011) (see references in the paper). Multirate schemes are of great interest for solving advection-diffusion-reaction equations in air pollution modeling. Several important implementation issues have been well addressed by this paper. So definitely the author made a contribution to the Geoscientific community.

Though the title of the paper is about “implementation of splitting methods”, most of time the author is actually talking about multirate splitting method (IMEX splitting method is mentioned but not fully addressed.). The description will be more accurate if the author can narrow down the title.

In addition to the technical comments and language corrections pointed out in another
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referee comment, the following issues should be addressed:

1. P. 2942, line 5: explain “macro time step” and “micro time step”.
2. P. 2942, line 12: please add a reference here to let readers know where the proof can be found.
3. P.2944, line 5: do you mean that “the code is mainly written in . . . and uses a few C libraries”
4. P. 2944, line 26: “data such as”.
5. P. 2945, line 4: I have never heard of “address distance”. Do you mean “distance in memory”?
6. P. 2945, line 6: Reformulate the sentence “For each advection step . . .”.
7. P. 2945, line 8: Can you explain a little bit more what kind of “structure” these arrays have?
8. In the first paragraph of section 3.1, concentration arrays and difference arrays are mentioned. Is the extended array declaration in the third paragraph related to concentration arrays or both types of arrays? Please clarify it explicitly.
9. P. 2949, line 10: “For method . . .” should be “For the method . . .”.
10. P. 2953, line 13: change to “with N denoting . . . , L the block’s time level and C the number of columns within the block”.
11. P.2953, line 19: change to “tradeoff between constraints and idle times”.
12. P. 2953, line 22: duplicate definition of Lmax (Already exists in line 16).
13. P. 2954, line 1: please state clearly that “it is not needed for the first . . .” is only for the third case.
14. P. 2954, line 9” change to “Thus it is generally . . .”.

15. 2957, line 10: please explain why the blocks containing the point sources are distributed evenly for less than eight processors but unevenly for more than eight processors.

Interactive comment on Geosci. Model Dev. Discuss., 4, 2937, 2011.

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