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Geoscientific
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Discussions

Interactive comment on "A test of numerical instability and stiffness in the parametrizations of the ARPÉGE and ALADIN models" *by* M. Tudor

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Thank you for the effort in reviewing this article, the constructive comments and identifying points that need clarification.

Answers to specific comments:

Section 2.2 - the explanation of the test given in the first paragraph is improved to clarify the subject and give better introduction to the 2nd paragraph that was also improved by additional introductory sentence.

Section 3.2 - The reviewer correctly notices that "the stiffness is more likely to be exposed when time steps are increased and not when decreased". This is true for schemes that directly compute the future $t + \Delta t$ values. But, ARPEGE and AL-

ADIN parametrization schemes compute the vertical fluxes that are needed in order to achieve a "balance" state. These fluxes are actually larger when the time step is shorter, not longer. And the final $t + \Delta t$ values are computed from all of the fluxes using operational time step. This apparent paradox is now additionally explained in the text.

Abstract and Section 4 - Abstract contains a very simplified statement that wrongly suggests that one single term of one equation is responsible for stiffness. The text has been rewritten in order to clarify that the scheme is far more complex than a single equation. The tests where one of the parametrizations was switched off have shown that the fibrillations are not due to coupling to other parametrizations (actually some of them stabilize the problem). This is now made more clear in the text.

The technical corrections are performed as suggested.

Interactive comment on Geosci. Model Dev. Discuss., 5, 4233, 2012.

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