

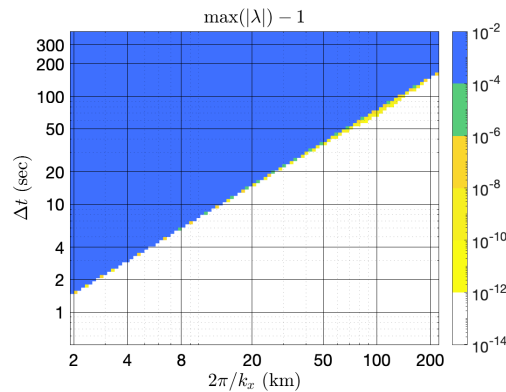
The paper is well introduced and clear in its scope and goals. I think some clarifications are in order and I have a few minor comments in reading order as follows.

1- Why are acoustic waves highlighted in the abstract and later? In particular in a HEVI implementation one hopes that the vertical acoustic waves are dissipated.

2- Formulation of the problem in Sec. 2.1: It would be great if variables are defined as scalars or vectors also please list the missing part of (6)-(7) so that this study is more self-contained and easier to follow. It should be clarified if subscripts are derivatives like in (8) or not.

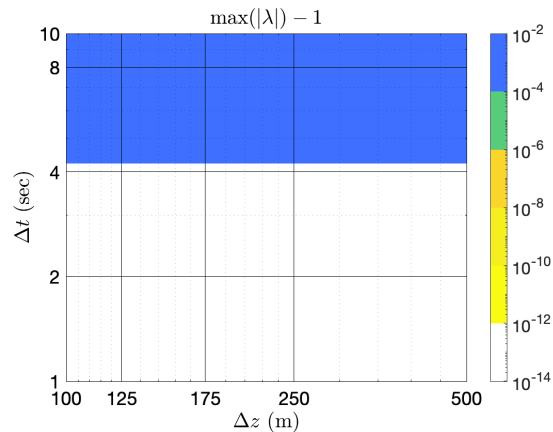
3- Sec 2.2: please clarify "spectrum of ODE" on line 81. Also it may be better to spell out BC on line 108 so it's not viewed as $B \cdot C$

4- Scheme ARK2(2,3,2) is misrepresented in Rokhzadi et al. (2018). The ARK2(2,3,2) is a family of methods parametrized by coefficient a_{32} in the explicit part. Rokhzadi et al. (2018) picked up the one used in the numerical experiments. This was chosen for accuracy considerations: explicit part of ARK2(2,3,2) is order 3 for linear terms and it minimizes errors globally, while maintaining L-stability. The implicit part of ARK2(2,3,2) with these properties is unique (no free parameters to optimize). A closer read of Giraldo et al. (2013) reveals that $a_{32}=0.5$ provides more stability in certain regimes of the compound IMEX method. Choosing $a_{32}=0.85$ for instance produces



that corresponds to Fig. 3(a) in the manuscript and looks really similar with results in Fig 3(b), does it not?

Also,



corresponds to Fig. 6(b) in the manuscript. As a side note, ARK2(2,3,2) with $a_{32}=0.5$ has a significantly higher SSP coefficient than IMEX-SSP2(2,3,3) - explicit radius is 1.7 and implicit 2.41 as opposed to IMEX-SSP2(2,3,2). But SSP is not relevant here or in the study by Rokhzadi et al. (2018) unless a monotonic discretization is being used and discontinuous solutions develop. As Giraldo et al. (2013) note in their study they did not observe remarkable differences for ARK2(2,3,2) methods with different a_{32} in practice but it may have had an impact on other regimes that were not tested exhaustively. I realize that the authors rely on the previous study. My only ask here is to acknowledge that only one method out of the ARK2(2,3,2) family has been used as it is hard to go back and fix previous published studies.

5- I cannot tell if the stability diagrams are scaled or not by the number of stages or if they should be.