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Interactive comment on "The "ABC model" (Vn 1.0): a non-hydrostatic toy model for use in convective-scale data assimilation investigations" *by* Ruth Elizabeth Petrie et al.

Ruth Elizabeth Petrie et al.

r.n.bannister@reading.ac.uk

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Discussion paper

Response to referee 2

Interactive comment on "The "ABC model" (Vn 1.0): a non-hydrostatic toy model for use in convective-scale data assimilation investigations" by Ruth Elizabeth Petrie et al.

Anonymous Referee #2

We would like to thank referee 2 for his/her comments. The referee's comments that require attention to the paper are reproduced below preceded with "**Referee comment**", the authors' responses are preceded with "**Authors' response**", and our actions are preceded with "**Authors' changes**". We have produced a revised manuscript of the paper, but we understand that this is not meant to be uploaded with these comments. Only a brief explanation of the changes are given here and we hope that a revised manuscript will be requested where the detailed changes are given (in the text below we do refer to parts of the revised paper where any changes are made should a revised manuscript be requested).

- **Referee comment**: Having read the other review, I strongly agree with the request for a further analysis of the sample integrations in section 5, and their relation with the findings of the previous sections.
  - **Authors' response and changes**: please see report for reviewer 1.
- **Referee comment**: 1. Understandably, there are a lot of symbols. I believe it would be useful to have a list of symbols as an appendix. While reading the paper, I had to go back sometimes between sections to know the differences in variables, e.g. p vs p_0 vs p_{00}, or when are the variables calligraphic, when do they have a star, etc.
  - **Authors' response**: Thank you, agreed.

- **Authors' changes**: A table has been added to the end of the introduction section.

- **Referee comment**: 2. It was a little difficult to read the axes in some of the figures. In fact, could some of the panels be done larger? For example, a figure has 4 panels stacked vertically with a lot of white space to the sides, while a 2x2 grid would show them better.

  - **Authors' response**: Figure 6 does have four panels stacked vertically as stated. We could make this into a 2x2 grid, but we would like to maintain the correspondence with Figs. 8 and 9 so that the nth row of each Fig. can be compared directly.
  - **Authors' changes**: Figures 6, 8 and 9 have been made larger and the bottom-most panels of each has been made clearer. Figure 7 has also been made larger and clearer (and now has two panels, to show how energy is numerically not conserved when the grid resolution is increased – to answer the other reviewer's comments).

- **Referee comment**: Typos: There are some typos both in the text and in the equations. For instance \delta t = \delta t /N. These have been identified by the other reviewer so I am not repeating them.

  - **Authors' response**: Thank you.
  - **Authors' changes**: Corrections made (please see report for reviewer 1).