Geoscientific
Model Development
Discussions

Interactive comment on "*ConvectiveFoam1.0*: development and benchmarking of a infinite-Pr number solver" *by* Sara Lenzi et al.

Sara Lenzi et al.

sara.lenzi@igg.cnr.it

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1. As suggested by the referee, the structure has been modified to make it more readable. Three appendices now include the more technical parts of the work, keeping the mathematical aspects and the main code features unchanged. In particular, numerical details and related considerations are reported in appendix A, the main part of the benchmark can be consulted in appendix B while further studies can be found in appendix C.

2. Section 4.2 and 4.3 have been extended with more physical interpretations and related references. In particular we referred to the following:

- *Krishnamurti, R.: On the transition to turbulent convection. Part 1. The transition from two-to*

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three-dimensional flow, JFM, 1970a.

- *Krishnamurti, R.: On the transition to turbulent convection. Part 2. The transition to time-dependent flow, JFM, 1970b.*

- *Krishnamurti, R.: Some further studies on the transition to turbulent convection, JFM, 1973.*

- *Busse, F.: The oscillatory instability of convection rolls in a low Prandtl number fluid, JFM, 1972.*

- *Busse, F. and Whitehead, J.: Oscillatory and collective instabilities in large Prandtl number convection, JFM, 1974.*

- *Busse, F. H. and Whitehead, J.: Instabilities of convection rolls in a high Prandtl number fluid, JFM, 1971.*

Section 2 has intentionally left short for readability reasons.

3. Considering rotation in Eq.2a, our intention was to develop the more general treatment to show that, adopting $Ek \approx 10^{12}$, rotation effects are negligible in Earth Mantle convection. In this new version, we removed the rotation terms to simplify the presentation.

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