Review of
A deep-atmosphere extension in a nonhydrostatic dynamical core: formulation and idealized tests
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egusphere-2026-2297 revised

The revised manuscript largely addresses the points I raised in my original review. However, some further points requiring revision, generally minor, are now more clearly visible, or have been introduced in the revisions themselves.

Specific points

Line numbers refer to the tracked changes version.

1. Abstract line 12. The word 'further' is unnecessary and confusing.

2. The vertical coordinate π is referred to as the 'hydrostatic dry air mass', though, in fact, it has dimensions of pressure. This has the potential to cause confusion, e.g., on line 152 where π_0 is a pressure and π_s is a mass (actually mass per unit area) but expressed in units of pressure. When π is first introduced (around line 98) it would be worth pointing out that it has been expressed in units of pressure using the constant reference gravitational acceleration g_0.

3. Line 143. The deep-atmosphere hydrostatic relation would involve dropping all terms from equation (2) except those involving $g(r)$ and g_0. Equation (14) is, in fact, the definition of the vertical coordinate π (except that ρ should be ρ_d). With the aid of (14) (with ρ replaced by ρ_d), the deep-atmosphere hydrostatic relation can be reduced to the familiar form

$$g(r) + \frac{1}{\rho}\frac{\partial p}{\partial r} = 0.$$

   Please check for other places where ρ should be ρ_d.

4. Line 250. It is unclear what 'The first term' refers to. The second part of the sentence appears unrelated to the first part; it should probably be a separate sentence.

5. Lines 250-270. The symbol F_e turns into $\mathcal{F}_e$. Please check for consistent notation.

6. Line 271. $K_c^{(v)}$ does not appear to be defined. The point of the blending coefficient α_K is obscure. Please explain or give a reference.

7. Line 286. Presumably the reference state is also horizontally uniform?

8. Equation (32) looks like a linearization of the horizontal pressure gradient force about the reference state, since it omits nonlinear terms such as $\alpha' \nabla p'$. If it is a linearization, rather than the full horizontal pressure gradient force, then you should draw attention to this fact and justify the approximation. Equation (32) also appears to omit several factors that appear in equation (1). Either correct the equation or justify any approximations made.

9. Section 3.1. Three different tests are discussed at the same time. The discussion would be clearer if the barotropic steady geostrophic flow and the unperturbed baroclinic wave cases were discussed first in a separate subsection.

10. Williamson et al. (1992) case 2 is a shallow water test case. It is not completely trivial to extend it to 3D in deep atmosphere geometry. Do you assume a solid-body rotation initial flow field or u independent of r? Is the temperature isothermal? How do you ensure that the initial flow is balanced, particularly the NCT contribution to vertical balance? It would be enough to give a reference if someone has done this test before or explained how to specify the initial state. Perhaps one of Staniforth's papers?

11. Line 427. The reference to 'non-convergence issues' is rather cryptic. Please explain or give a reference.

12. Figure 7. The caption says the left panel is for NHS but the text (line 573) says NHD.