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Interactive comment on "Quasi-hydrostatic equations for climate models and the study on linear instability" *by* Robert Nigmatulin and Xiulin Xu

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Dear Ilias Sibgatullin,

1. According to your comments and suggestions, we will change some formulations in the manuscript to make the derivations more rigorous. Changes would be make in the analysis for dp/dt. For convinence, please first refer to SC8. In SC8 and the manuscript, we drop the term $B = \overrightarrow{v}_{hor}\nabla_{hor}p$ by comparing it with $A = -g\int_z^H div\,(\rho\overrightarrow{v}_{hor})dz^{'}$.

   However, you are not satisfied with the process of estimating A. Thus, we only

give an estimation of B:

$$B = v_x \frac{\partial p}{\partial x} + v_y \frac{\partial p}{\partial y} = O\left(V_{hor} \times \rho\left(\frac{V_{hor}^2}{L_{hor}} + \frac{V_{hor}^2}{L_{cor}}\right)\right)$$

$$\frac{B}{\gamma p} = O\left(V_{hor} \times \frac{\rho}{\gamma p}\left(\frac{V_{hor}^2}{L_{hor}} + \frac{V_{hor}^2}{L_{cor}}\right)\right) = O\left(\frac{\mathbf{M}^2}{\tau}\right)$$

We then drop the term B due to the smallness of the Mach number $\mathbf{M}$ instead of comparing it with A, and only use the term A to estimate $\mathrm{d}p/\mathrm{d}t$. We would also change the manuscript in this point.

2. The purpose of this paper is to analyze the shortwave instability of the quasi-hydrostatic equations.

3. Please do not make any comments on anything that has nothing to do with the manuscript's content. Malicious comments on the authors are not welcomed.

Best regards,

Xiulin Xu