Abstract Submitted
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**An asymptotic model for rotationally-constrained non-penetrative thermal convection**[1] ANTONIO RUBIO, KEITH JULIEN, Dept Applied Mathematics, CU Boulder — Unsteady non-penetrative convection is found when a stable layer of fluid is sandwiched between an insulating thermal boundary condition and an adverse thermal boundary condition.[2,3] Unsteady non-penetrative convection is a canonical setup for a deepening mixed layer in which the effects of entrainment are either negligible or ignored for simplicity. Of particular interest is deep ocean convection in which the flow within the convective layer is rotationally-constrained and exhibits weak entrainment.[4] Non-penetrative convection is investigated using a straight-forward extension to an existing class of non-hydrostatic balanced geostropic equations (NHBGE)[5] valid in the low Rossby number limit. After a brief discussion of the model we show the results of the linear stability analysis, nonlinear single mode solutions as well as preliminary direct numerical solutions of the modified NHBGE.

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[2]Adrian, Ferreira and Boberg, Exp. Fluids. 4, 121-141 (1986)
[3]Fernando, Boyer and Chen, J. Fluid Mech. 228, 513-547 (1991)
[4]Julien, Legg, McWilliams and Werne, Dyn. Oc. Atm. 26, 259-262 (2001)
[5]Julien, Knobloch, Milliff and Werne, JFM. 555, 233-274 (2006)

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