

Abstract Submitted  
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**Perturbations from 2D Navier-Stokes: rapidly rotating and weakly stratified Boussinesq flow**<sup>1</sup> JARED WHITEHEAD, BETH WINGATE, Los Alamos National Laboratory — Relying on the derivation of “slow” equations in the limit of rapid rotation (Rossby number 0) and weak stratification (Froude number 1), we demonstrate that the 3D Boussinesq equations (for any Rossby and Froude numbers) can be written as 2D Navier-Stokes plus a Reynolds stress, and two passive advection equations (with additional active Reynolds stresses). The impact this formulation has on the exchange of horizontal and vertical kinetic energy with potential energy is discussed, as well as the breakdown of the potential enstrophy into components relative to a passive density stratification. These results are elucidated with direct numerical simulations that consider rapid rotation (small but finite Rossby number) with weak stratification.

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