The Two-point Correlation of Potential Vorticity in Rotating and Stratified Turbulence BETH WINGATE, SUSAN KURIEN, Los Alamos National Laboratory, LESLIE SMITIH, University of Wisconsin — A framework is developed to describe the two-point statistics of potential vorticity in rotating and stratified turbulence as described by the Boussinesq equations. The Kármán-Howarth type of equation is derived for the dynamics of the two-point correlation function. Combinations of the Rossby, Froude, Prandtl and Reynolds numbers are used to investigate various limiting cases of the dynamics. Regimes in which one might expect a potential vorticity inertial range are identified. In the cases of large Rossby and Froude numbers and quasi-geostrophic dynamics, a result analogous to the Kolmogorov 4/5-law for the third-order velocity structure function is derived for the third-order mixed correlation between potential vorticity and velocity.

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