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A phase-independent expression for the energy flux associated with inertia-gravity waves

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For diagnosing the effect of stationary Rossby waves on atmospheric circulation, a phase-independent expression for the wave activity flux has been developed by Takaya and Nakamura (2001) using quasigeostrophic equations. On the other hand, concerning inertia-gravity waves, a phase-expression has not been derived in previous studies. Recently we have developed a phase-independent expression for both the energy flux and the pseudo momentum flux associated with inertial-gravity waves. We have investigated the performance of the new expression using high-resolution simulations for internal waves in the ocean, such as internal gravity waves generated by a moving storm (figure) as well as tidal internal waves in JCOPE-T. The new expression for the energy flux may be used to reduce a noise associated with sampling errors in a model output, while the new expression for the pseudomomentum flux may be used for the diagnosis of mountain waves.

Keywords: inertia-gravity waves, energy flux, phase dependency