Abstract View

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Observations of Near-Inertial Waves in a Front

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ABSTRACT

Near-inertial with horizontal scales ~ O(10 km) dominate profiles of velocity finestructure collected in the North Pacific Subtropical Front during January 1980. Considerable spatial variability is observed. Two features in particular contain most of the energy: a 20 cm s^{-1} amplitude (λ_z = 100 m) wave on the warm edge of the front propagating downward and away from the front, and a low wavenumber (λ_z = 500 m) wave reflecting off the surface. The propagating wavegroup is four times as energetic as the local downgoing near-inertial wave field. Its spatial structure is not consistent with propagation in a homogeneous medium, which suggests that it may be interacting with the front. Possible mechanisms for the existence and properties of the wavegroup are discussed, including baroclinic/barotropic instability, wind-forcing and enhancement by wave-mean flow interaction. a wave-mean flow interaction model that predicts trapping and amplification of near-inertial flow interaction. A wave-mean flow interaction model that predicts trapping and amplification of near-inertial waves in regions of negative vorticity reproduces the observed features most consistently.