OCeanOgraphiC IMPLICATIONS OF WAVE-INDUCED TURBULENT DIFFUSION

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Based on a recently developed theory of turbulent diffusion by random waves, we present estimates of horizontal diffusion coefficients for passive scalars for two types of wave motions - baroclinic inertia-gravity (BIG) waves and wind-generated surface gravity waves on deep water. The wave diffusion effect, though only of second order in the wave amplitude, is comparable to the diffusion caused by random fluctuations in the Stokes drift in nonlinear waves considered earlier by Herterich and Hasselmann. The BIG wave induced diffusion is shown to be negligible compared to the usual, eddy-induced diffusion on the largest scales. However, its relative importance increases at smaller scales (- 10km) and it may therefore significantly affect the subgrid diffusion constant used as input to eddy resolving ocean circulation models with mesh sizes on this scale.

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2. NP3 02: Turbulence and mixing in geophysical flows, effects of stratification and rotation, . . .

3. Jose M. Redondo

5. Oral