Horizontal dispersion of particles by random gravity waves

O. Buhler and M. Holmes
New York University, Courant Institute of Mathematical Sciences, New York, United States (obuhler@cims.nyu.edu)

The horizontal dispersion of particles along stratification surfaces is considered theoretically and numerically by combining the nonlinear methods of wave-mean interaction theory with Monte-Carlo simulations for a random wave field.

Detailed results are presented for a shallow water test model and for a three-dimensional Boussinesq model aimed at mid-ocean conditions. In both cases the Coriolis force is seen to have a crucial impact on the effective diffusivity of the particle dispersion.

Finally, the results are used to assess the contribution of this process to the sub-mesoscale horizontal particle dispersion observed during the North Atlantic Tracer Release Experiment.