Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Stochastic modelling of the oceanic eddies PAVEL BERLOFF, Woods Hole Oceanographic Institution — It is widely recognized that the mesoscale oceanic eddies are capable of driving the large-scale oceanic currents. These eddies are generally not resolved in comprehensive Oceanic General Circulation Models, therefore the models are rather inaccurate. Developing efficient mathematical models of the eddies is, arguably, the most important problem facing the physical oceanography. In this study, one of the main achievements is developing and testing a random-forcing model of the eddy effects. The random forcing acts on nonlinear reduced-dynamics equations with relatively few degrees of freedom that represent the large-scale circulation. The other result is formulation of a hierarchy of stochastic transport models that simulate Lagrangian dispersion of the passive tracer. The approach adopted allows one to model not only diffusive but also non-diffusive and even anti-diffusive eddy effects, which are a fundamental obstacle in ocean circulation theories and turbulence closures. The results are tested against a fluid-dynamic model that explicitly resolves the eddies.

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Date submitted: 13 Jun 2005 Electronic form version 1.4