

**Decay time scale of mixed layer inertial motion in the world ocean:  
Observations from Satellite Tracked Drifters.**

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The decay time scale of mixed layer inertial amplitude has been estimated using satellite tracked drifter trajectories from 1990 to 2004. From the inertial amplitudes within a small search radius, temporal correlation functions of the amplitudes have been obtained separately for the different ocean basins. The decay time scales are estimated as the e-folding time scale of the temporal correlation functions which have exponentially decaying shapes. The decay time scales clearly increase with latitudes in all basins except the North Atlantic. An analytical model with beta dispersion dynamics was employed to explain the observed global distribution of the decay time scales. De-phasing process by the beta effect leads meridional variation of the decay time scale in the North Pacific and the Southern Ocean, but average buoyancy effect in the North Atlantic seems to compensate the beta effect which leads to a lack of meridional variation of the decay time scale. The decay time scale and the mixed layer kinetic energy are combined to estimate the inertial energy flux out of the mixed layer, which suggests that a global map of inertial energy flux from the wind may not correspond to a map of inertial energy flux to the deep ocean.