Geophysical Research Abstracts
Vol. 15, EGU2013-3692, 2013
EGU General Assembly 2013

The Theoretical Derivation of the Mixing Coefficient Induced by the Turbulence Generated by Sea Waves

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In the frame of ocean dynamical system, considering the nonlinearity and isotropy of the sub-small scale turbulence the paper derived the second order moment closure equations and according to the statistical theory of breaking waves gave the boundary conditions for the kinetic energy input and the mixing length on the sea surface first, which are the physic-mathematical description of the turbulence generated by sea waves. Considering the observation effect that the dissipation rate of the turbulence kinetic energy has power vertical distribution of sea waves, we derived the balanced solution of the variation equations for the turbulence characteristics and gave the analytical expressions of the kinetic energy and the dissipation rate , and then the analytic expressions of the mixing coefficients in the upper ocean according to the closure technique with high determinacy.The theoretical coefficients were applied to the numerical modeling of ocean circulation and then the substantive progress in qualitative and quantitative modeling was gained on the premise of no any coefficient tune-up.