Improving the forecasting ability of ocean and climate by inclusion of surface wave

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Improving forecasting ability of ocean and climate is one of the main streams for oceanic and atmospheric sciences. Incorrect parameterizations of the ocean mixing processes essentially render the atmospheric and oceanic dynamics to be either decoupled or coupled incorrectly. We have established a new scheme on the non-breaking wave-induced vertical mixing (Bv) that will correct the systematic error of insufficient mixing. The numerical experiments suggest tidal mixing plays key role in the bottom boundary layer. Based on the above results, here we propose a solution for improving forecasting ability: To set up a high resolution surface wave – tide – circulation coupled model. The surface wave – induced vertical mixing can much improve the common simulation bias of the upper mixed layer in ocean models, which is important for marine ecosystem and climate system. And the inclusion of tide in a circulation model can improve the bottom structure of temperature, salinity and current.