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## Assessment of turbulence closure models for resonant inertial response in the oceanic mixed layer using LES

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Large eddy simulation (LES) of the resonant inertial response of upper ocean to a strong wind forcing is carried out and the results are used to evaluate the performance of each of the two second-order turbulence closure models developed by Mellor and Yamada (1982) (MY) and by Nakanishi and Niino (2009) (NN). We find that the development of the oceanic mixed layer demonstrated by LES such as the strong entrainment at the base of the oceanic mixed layer and accompanying decrease of sea surface temperature is underestimated in MY and overestimated in NN, respectively, whereas the formulation of stability function in NN itself shows a better performance than MY in reproducing the vertical structure of turbulent heat flux obtained from LES. It is also found that the discrepancy is much diminished in the revised NN where the turbulent length scale is formulated so as to be more strongly restricted with the increase of density stratification than in the original NN.

Keywords: near-inertial shear, oceanic mixed layer, turbulence closure model, sea surface temperature, turbulent length scale, entrainment