

Abstract Submitted
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LES-based study of water wave effects on stably-stratified atmospheric turbulent flows. TAO CAO, LIAN SHEN, Univ of Minnesota - Twin Cities — Turbulent air flow over ocean waves is a key physical process in the marine atmospheric boundary layer. In this study, we use large-eddy simulation to investigate the effect of various water wave parameters on stably stratified air turbulence. By decomposing a physical quantity into three parts, namely the plane average, wave fluctuation, and turbulence fluctuation, we isolate wave-coherent fluctuation in the air flow from the turbulence fluctuation to quantify the interaction between wave-coherent fluctuation and turbulence. It is found that the effect of the wave-induced fluctuation on the turbulence depends on the wave age and wave steepness. The smaller the wave age and the larger the wave steepness, the stronger the coupling between the surface waves and the turbulence above, and the larger modification of the turbulence by the surface waves.

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