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Sensitivity of Rogue Waves Predictions to the Oceanic Stratification QIUCHEN GUO, MOHAMMAD-REZA ALAM, None — Oceanic rogue waves are short-lived very large amplitude waves (a giant crest typically followed or preceded by a deep trough) that appear and disappear suddenly in the ocean causing damages to ships and offshore structures. Assuming that the state of the ocean at the present time is perfectly known, then the upcoming rogue waves can be predicted via numerically solving the equations that govern the evolution of the waves. The state of the art radar technology can now provide accurate wave height measurement over large spatial domains and when combined with advanced wave-field reconstruction techniques together render deterministic details of the current state of the ocean (i.e. surface elevation and velocity field) at any given moment of the time with a very high accuracy. The ocean water density is, however, stratified (mainly due to the salinity and temperature differences). This density stratification, with today's technology, is very difficult to be measured accurately. As a result in most predictive schemes these density variations are neglected. While the overall effect of the stratification on the average state of the ocean may not be significant, here we show that these density variations can strongly affect the prediction of oceanic rogue waves. Specifically, we consider a broadband oceanic spectrum in a two-layer density stratified fluid, and study via extensive statistical analysis the effects of strength of the stratification (difference between densities) and the depth of the thermocline on the prediction of upcoming rogue waves.

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