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Study of ocean wave field reconstruction and effect of control parameter selection JIE WU, XUANTING HAO, LIAN SHEN, University of Minnesota, Twin Cities & St, Anthony Falls Laboratory — In this research, we study the reconstruction of ocean wave field by optimizing the initial wave field for wave-phase-resolved simulation to best fit measurement data with noise. In reality, the measured data often contains only part of the information needed to reconstruct the entire wave field or is contaminated by noises. We investigate the effect of different control parameter selections on the wave field reconstruction performance using synthetic wave data. The initial condition of the wave field is constructed from the JONSWAP spectrum and its evolution is simulated using the high-order spectral method. Random noises are added to the wave field at each observation time instant to serve as the measurement error. The results show that by incorporating relationship between the free surface elevation and the free surface velocity potential, the error between the reconstructed wave field and the true wave field can be reduced appreciably. This study provides guidance on choosing appropriate control parameters to improve the reconstruction and prediction performance in ocean wave applications.

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