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Wave breaking onset and spectral distribution of energy loss due to laboratory generated breaking waves ZHIGANG TIAN, MARC PERLIN, Naval Architecture and Marine Engineering, University of Michigan, Ann Arbor, MI 48109 USA, WOOYOUNG CHOI, Department of Mathematical Sciences, New Jersey Institute of Technology, Newark, NJ 07102 USA — A study of wave breaking onset and energy loss due to wave breaking is presented. A global wave steepness parameter that accounts for spectral amplitude shape change is proposed. This parameter has a threshold of 0.25 for wave breaking onset and it correlated strongly with breaking energy loss. It exhibits reduced dependence on the shape of the wave spectrum, and it may be a better indicator for breaking onset and energy loss. Spatial evolution of frequency spectra is presented. Noticeable energy loss due to viscous effects is observed near the spectral peak. Spectral redistribution of energy due to wave breaking is presented. High frequency waves lose energy while low frequency components gain as much as 50% of that energy loss. Energy near the spectral peak may increase or decrease, and is a function of the initial spectrum. In addition the change in the spatial distribution (i.e. wavenumber spectra) of energy loss will be presented.

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