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Title: Influence of Wave Breaking on Wave Statistics for Finite-Depth Random Wave Trains

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关键词: [wave breaking](#); [wave statistics](#); [wave height distribution](#); [skewness](#); [kurtosis](#)

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摘要: The influence of wave breaking on wave statistics for finite-depth random wave trains is investigated experimentally. This paper is to investigate the influence of wave breaking and water depth on the wave statistics for random waves on water of finite depth. Greater attention is paid to changes in wave statistics due to wave breaking in random wave trains. The results show skewness of surface elevations is independent of wave breaking and kurtosis is suppressed by wave breaking. Finally, the exceedance probabilities for wave heights are also investigated.

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参考文献/REFERENCES

- Banner ML, Peirson WL (2007). Wave breaking onset and strength for two-dimensional deep-water wave groups. *Journal of Fluid Mechanics*, 585, 93-115.
- Banner ML, Peregrine DH (1993). Wave breaking in deep water. *Annual Review of Fluid Mechanics*, 25, 373 – 397.
- Dean R (1990). *Freak waves: a possible explanation*. Tørum A, Gudmestad O, Water Wave Kinematics. Kluwer Academic, Dordrecht, 609-612.
- Ding L, Farmer DM (1994). Observations of breaking surface wave statistics. *Journal of Physical Oceanography*, 24, 1368-1387.
- Dong Guohai, Ma Xiaozhou, Teng Bin (2008). One-dimensional horizontal Boussinesq model enhanced for non-breaking and breaking waves. *China Ocean Engineering*, 22(1), 31 - 42.
- Duncan JD (2001). Spilling breakers. *Annual Review of Fluid Mechanics*, 33, 517 - 547.
- Forristall GZ (1978). On the statistical distribution of wave heights in a storm. *Journal of Geophysical Research (C5)*, 2353-2358.
- Goda Y (1997). Recurring evolution of water waves through nonresonant interactions. *Proceedings of 3rd International Symposium Waves on Ocean Wave Measurement and Analysis*, Virginia Beach, Virginia, 1-23.
- Goda Y (1999). A corparative review on the functional forms of directional wave spectrum. *Coastal Engineering Journal* , 41(1) , 1-20.
- Guedes SC , Cherneva Z, Antão E (2003). Characteristics of abnormal waves in North Sea storm sea states. *Applied Ocean Research*, 25 (6) , 337-44.
- Guedes SC , Cherneva Z, Antão E (2004). Steepness and asymmetry of the largest waves in storm sea states. *Ocean Engineering*, 31(8-9) , 1147-1167.
- Holthuijsen LH, Herbers THC (1986). Statistics of breaking waves observed as whitecaps in the open sea. *Journal of Physical Oceanography*, 16(2), 290-297.
- Johnson B, Cooke R (1979). Bubble populations and spectra in coastal waters: a photographic approach. *Journal of Geophysical Research*, 84(C7), 3761-3766.
- Khayyer A, Gotoh H, Shao S D (2008). Corrected Incompressible SPH method for accurate water-surface tracking in breaking waves. *Coastal Engineering*, 55 , 236 - 250.
- Kuznetsov SY, Saprykina YV (2004) . Frequency-dependent energy dissipation of irregular breaking waves. *Water Resources* , 31(4) , 384-392.
- Liu Shuxue, Hong KY (2005). Physical investigation of directional wave focusing and breaking waves in wave basin. *China Ocean Engineering*, 19 (1), 21 - 35.
- Longuet-Higgins MS (1952). On the statistical distribution of the heights of sea waves. *Journal of Marine Research* , 11(3), 245 - 266.
- Longuet-Higgins MS (1969). On wave breaking and equilibrium spectrum of wind. *Proceedings of the Royal Society of London, Series A*, 310, 151 - 159.
- Melville WK (1996). The role of surface-wave breaking in air-sea interaction. *Annual Review of Fluid Mechanics*, 28, 279 - 321.
- Mori N (2003). Effects of wave breaking on wave statistics for deep-water random wave train. *Ocean Engineering*, 30(2), 205 - 220.
- Phillips OM (1977). *The dynamics of the upper ocean*. Cambridge University Press, Cambridge, 3 - 4.
- Rapp RJ, Melville WK (1990). Laboratory measurements of deep water breaking waves. *Philosophical Transactions of the Royal Society of London, Series A* , 331 , 735-800.

Petrova P, Cherneva Z, Guedes SC (2006) . Distribution of crest heights in sea states with abnormal waves. *Applied Ocean Research*, 28 (4), 235-245.

Reul N, Branger H, Giovanangeli JP (2008). Air flow structure over short-gravity breaking water waves. *Boundary-Layer Meteorol*, 126 , 477-505.

Song J, Banner ML (2002). On determining the onset and strength of breaking for deep water waves. Part 1: unforced irrotational wave groups. *Journal of Physical Oceanography*, 32, 2541-2558.

Tang Jun, Shen Yongming, Cui Lei, Zheng Yonfhong (2008) . Numerical simulation of random wave-induced near-shore currents. *Chinese Journal of Theoretical and Applied Mechanics* , 40(4), 455-463. (in Chinese)

Tao Jianhua, Han Guang (2001). Numerical simulation of breaking wave based on higher-order mild slope equation. *China Ocean Engineering*, 15(2) , 269 -280.

Thorpe SA (1993). Energy loss by breaking waves. *Journal of Physical Oceanography*, 23(11), 2498-2502.

Thorpe SA (1995). Dynamical processes of transfer at the sea surface. *Progress in Oceanography*, 35, 315-352.

Xu Jinshan, Tian Jiwei, Wei Enbo (1998). The application of wavelet transform to wave breaking. *Acta Mechanica Sinica* , 14(4), 306-318 .

Zhang Shuwen, Yuan Yeli, Zheng Quan' an (2007). Modeling of the eddy viscosity by breaking waves. *Acta Oceanologica Sinica*, 126(16), 116-123.

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