



Extreme wave statistics in the surface elevation and the velocity field for waves propagating over a shoal

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It was previously shown that for irregular water surface waves evolving over a shoal the surface elevation field could experience a local maximum of kurtosis and skewness on top of the shoal, and a local minimum of skewness after the shoal. Raustøl (2014) showed experimentally that this behavior occurs when the depth is below a certain threshold, in qualitative agreement with earlier experimental results by Trulsen et al. (2012) and numerical results by Sergeeva et al. (2011), Zeng & Trulsen (2012), Gramstad et al. (2013) and Viotti & Dias (2014).

In a new series of experiments we have also measured the horizontal velocity field in the water close to the equilibrium water surface. We have found that while the skewness of the velocity field behaves qualitatively similar to the skewness of the surface elevation field, the kurtosis of the velocity field behaves qualitatively different. The kurtosis of the velocity field does not achieve a local maximum on top of the shoal, and instead achieves a local maximum after the shoal.

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References

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