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Influence of wind on rogue waves due to dispersive focusing in finite depth

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Rogue wave generation can be explained on the basis of dispersive focusing. In previous works, wind was found to have a significant effect on the dynamics of such rogue waves in deep water (Touboul et al. (2006)). An experimental and a numerical investigation showed that this effect was explained on the basis of a modified Jeffreys sheltering mechanism, describing the separation of air flow over very steep waves (Kharif et al. (2008), Touboul et al. (2008)). The paper reports on a series of numerical simulations designed to analyze the action of depth on the role played by the wind.
In a first step, a focusing wave train in finite depth is obtained. To do so, a Gaussian freak wave, solution of Korteweg-De Vries equation, is first considered. It is propagated with this equation, and the transformation ($x \rightarrow -x$ and $t \rightarrow -t$) is applied to the surface previously obtained. This surface is a focusing wave train that will lead to the formation of a rogue wave.
Then, this initial condition is introduced in a numerical wave tank, resolving the fully nonlinear problem in potential flow theory (BIEM method). The dynamics of the wave packet propagated freely is compared to the dynamics of the packet propagated in the presence of wind. Wind is introduced in the numerical wave tank by means of a pressure term, corresponding to the modified Jeffreys' sheltering mechanism. The influence of wind on chirped wave packets propagating in finite depth is discussed.