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Aspects of internal rogue wave formation in the ocean (joint work with Andrey Kurkin)

Rogue waves on the ocean surface have attracted great attention over the last ten years. A number of mechanisms for such wave generation have been suggested. Some of them may be applied for the theoretical description of the occurrence of internal rogue waves. Due to the rich dynamics of internal waves in density-stratified waters, some additional specific mechanisms of internal rogue wave formation may take place. One of these is based on nonlinear internal wave dynamics into a horizontally variable ocean, even in only one direction. For a good explanation of this phenomenon, we describe internal wave dynamics by an evolution equation (derived by an asymptotic theory), which is often used in horizontally variable media. It is shown that the formation of huge amplitude solitary internal waves from initial small amplitude internal solitary waves, or from an initial small amplitude nonlinear wave packet, arises only due to variability of the nonlinear coefficient's variability in the evolution equation. The possibility of such mechanisms acting on real oceanic shelves is shown for conditions on the North West shelf of Australia.

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