



Shallow water rogue wave formation in inhomogeneous channels

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Rogue wave formation in shallow water is often governed by dispersive focusing and wave-bottom interaction. In this study we try to combine these mechanisms by considering dispersive nonreflecting wave propagation in shallow strongly inhomogeneous channels. Nonreflecting wave propagation provides extreme wave amplification and transfer of wave energy over large distances, while dispersive effects allow formation of short-lived wave of extreme height (rogue wave). We found several types of water channels, where this mechanism can be realized, including (i) channels with monotonically decreasing cross-section (normal dispersion), (ii) inland basin described by a half of elliptic paraboloid (abnormal dispersion) and (iii) underwater hill described by a half of hyperbolic paraboloid (normal dispersion). Conditions for variations of local frequency in the wave train providing optimal focusing of the wave train are also found.