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Applicability of KdV theory to tsunami modeling

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The Korteweg-de Vries equation (KdV) is among the most prominent completely integrable Hamiltonian systems, with applications ranging from plasma physics to water waves. On the basis of the time and length scales involved, we shed light on the applicability of the KdV to tsunami modeling. In particular, we show that given typical teleseismic tsunami wavelengths in the open ocean, the balance of linear and nonlinear contributions necessary for KdV dynamics to appear cannot be achieved on Earth.