Global solution for the one-dimensional Boussinesq-Peregrine system in the case of small bottom variation

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The Boussinesq-Peregrine system is derived from the water waves system in presence of topographic variation under the hypothesis of shallowness and small amplitude regime. The system becomes significantly simpler (at least in the mathematical sens) under the hypothesis of small topographic variation. In this talk we discuss the long time and global well-posedness of the Boussinesq-Peregrine system. First, We show the long time well-posedness and the continuity of the associated flow map in the case of general topography (i.e. the amplitude of the bottom graph $\beta = O(1)$). The novelty lies in the functional siting, H^s, $s > \frac{1}{2}$. Second, We give results concerning the global existence of solution for the Boussinesq-Peregrine system under the hypothesis of small amplitude bottom variation (i.e. $\beta = O(\mu)$). More precisely, the system admits unconditional unique global solution in the Sobolev spaces of type $H^s(\mathbb{R})$, $s > \frac{1}{2}$, as well as the continuity of the associated flow map. Third, we give the existence of a weak global solution in the Schonbek sense, i.e. existence of low regularity entropic solutions of the small bottom amplitude Boussinesq-Peregrine equations emanating from $u_0 \in H^1$ and ζ_0 in an Orlicz class as weak limits of regular solutions.