Long wave runup on plane and “non-reflected” beaches

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Runup of long sea waves on two kinds of coastal geometry is considered in the framework of the nonlinear shallow-water theory taking into account the wave breaking effects. The first slope is a plane beach widely used in laboratory and numerical experiments. The second one presents the so-called “non-reflected” beach with the profile $h(x) \sim x^{4/3}$ (where h is water depth and x is the offshore coordinate). For the waves of very small amplitude the shallow-water equations are solved analytically, and it is shown that the runup height on the non-reflected beach is bigger than on a plane beach. For large amplitude waves the numerical solution is obtained with the use of the CLAWPACK code. The breaking effects leading to the runup height decrease are significant on the non-reflected beach.