Kinematics of solitary wave runup

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Abstract:

In Jensen et al. (2003) the dynamics of incident solitary waves on the verge of onshore plunging, on a 10.54° slope, were investigated with the PIV technique. Among other things, acceleration distributions leading to reversal of breaking in overhanging waves were reported. In Jensen et al. (2005) another set of experiments with runup of solitary waves on a 7.18° slope was studied. The velocity and acceleration distribution in massive onshore plungers are measured with PIV and computed by a VOF technique. This investigation aimed at recognition of cases leading to extreme runup and onshore impact of tsunamis and swells. The present study employs the same incidents waves as Jensen at al. (2005), but the inclination of the beach is lowered to 5.1° Waves may now develop large, but well defined, plungers as opposed to the collapsing breaker that was reported in Jensen et al. (2005). In some experiments a surface-piercing vertical plate, or a circular cylinder, is mounted at the beach. The aim of the these experiments is to correlate the pressure, which is measured at the wall with three probes, with wave kinematics and assess the magnitude of the wave loads.