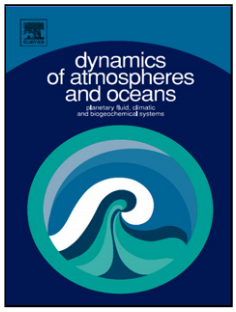


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# Hydraulic Jump and Bernoulli Equation in Nonlinear Shallow Water Model

by

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**Highlights:**

- Quasi steady(QS) simulations agree with Houghton-Kasahara(HK) short term integration.
- QS-result with hydraulic jump has unphysical solutions (i.e. complex numbers).
- QS Flow with jump becomes critical flow with real solutions in final steady state.
- Bernoulli equation cannot be applied to a flow with singularity.
- Continuous mass flux potential can be used to predict the property across the jump.

**Abstract:**

A shallow water model was applied to study the hydraulic jump and Bernoulli equation across the jump. On a flat terrain, when a supercritical flow plunges into a subcritical flow, discontinuity develops on velocity and Bernoulli function across the jump. The shock generated by the obstacle may propagate downstream and upstream. The latter reflected from the inflow boundary, moves downstream and leaves the domain. Before the reflected wave reaching the obstacle, the short-term integration (i.e., quasi-steady) simulations agree with Houghton and Kasahara's results,