Vertical 2D Algebraic-Stress Turbulence Model of Shallow Water Flow in σ -Coordinates

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Abstract:

A vertical 2D numerical model for shallow water flow is developed based on the unsteady Reynolds-averaged Navier-Stokes equations. The equations are solved in the σ -coordinates system with semi-implicit time stepping. The eddy viscosity is calculated using algebraic-stress turbulence model. The boundary conditions at the bed for shallow water models only include the vertical diffusion terms using wall functions. The present model is used to simulate the water flow of 2D vertical plane through a steep-sided trench. The numerical results are in good agreement with the available experimental data.

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