MODELLING OF TURBULENCES IN 2D SHALLOW MIXING LAYER

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ABSTRACT

The 2D shallow shear mixing layer was investigated numerically by the depth-averaged two-dimensional flow equations. Since the shallow water has a unique characteristic of coexisting of two turbulent length scales i.e. “large-scale transverse-shear-generated" turbulence and the “small-scale bed-generated” turbulence. To couple these effects and investigate the performance of chosen turbulent models, four cases of simulations were set: 0-equation, depth-averaged k-e model, two turbulent length-scales, and spatial subgrid model. These turbulence models are evaluated by comparing the numerical results with the available experimental data. The time-averaged quantities can be successfully simulated for all model cases. Therefore, in shallow mixing layer, 0-equation is practically adequate to predict the mean flows. It was also found that the bottom-generated turbulence dominates the transverse-shear turbulence in the mixing layer which velocity difference is small. The two length-scales model then are required in the simulation. In addition, due to fine resolution of grid, the subgrid model performed a little contribution to the results in present work.

KEYWORDS **:** k-ε model, Mixing Layer, Subgrid, Shallow Water, Turbulence, Two-dimensional Flow