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An Experimental Study on the Movement of Turbidity Current

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As a sediment-laden flow enters a reservoir, coarser sediments settle in the headwater reach to form the delta. The finer particles flow through the delta and move further downstream. After the flow passes the delta, the flow velocity decreases due to the increase of cross sectional area. The sediment-laden flow then gradually becomes stratified and it may plunge into the bottom of the reservoir, if the densimetric Froude number reaches certain criterion. Afterward, the sediment-laden flow moves as turbidity current. If the upstream supply of sediment discharge is continuously provided, the turbidity current can travel a long distance to reach the dam site.

Many researches of turbidity currents have been reported. However, few of them focus on the whole process of turbidity current movement. In the present study, experiments are conducted in the flume to observe the characteristic of density current movements under conditions by imposing different sediment supply concentrations and reservoir depths. A numerical model is also adopted to simulate the velocity and concentration profiles of the turbidity currents. The numerical results and measured data are plotted together at 8.7 (m) upstream from the dam site in Fig. 1. The comparison shows good agreements.

Key Words: Turbidity current, sediment-laden flow

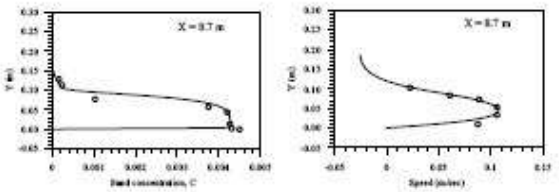

Figure 1: The comparison of measured and simulated data