

Study on Density Currents in a Stratified Reservoir

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Abstract. The river flows into a reservoir with high suspended sediment concentrations during floods can impact water quality. Generally many reservoirs in Korea have a strong thermal stratification and the various types of density currents such as plunging flows, overflows, and interflows occur when they enter the reservoir. The density currents with high sediment concentrations have been observed in Imha reservoir during typhoon “Rusa” in 2002 and “Mami” in 2003 with 1,200NTU and 880NTU. In this study, the impacts of incoming rivers with time varying sediment concentrations and temperature on the stratified reservoir were investigated using field measurements at the inflow tributaries and inside the reservoir, together with three-dimensional hydrodynamic model. The model showed good performance in reproducing the behavior of density currents as overflows, interflows, and plunging flows under the condition of seasonal stratified reservoir. The numerical model and turbidity modeling framework applied in this study can be used as a supportive tool for the management of water quality affected by high turbidity in the reservoir.