

## Evaluation for Water Temperature Stratification of ELCOM model in Yongdam Reservoir(Korea)

S.W. Chung<sup>1</sup>, K.H. Ahn<sup>2</sup>, K.T. Lee<sup>3</sup>, Y.J. Ban<sup>4</sup>, I.G. Ryu<sup>5</sup>

<sup>1</sup>Associate Professor, Dept. of Environmental Eng., Chungbuk National University,  
schung@chungbuk.ac.kr

<sup>2</sup>Researcher, Dept. of Dam and Watershed Management, K-Water, khahn@kwater.or.kr

<sup>3</sup>Director, Dept. of Dam and Watershed Management, K-Water

<sup>4</sup>Manager, Dept. of Dam and Watershed Management, K-Water

<sup>5</sup>Doctor's Course, Dept. of Environmental Eng., Chungbuk National University

Due to the turbid water problems that have occurred recently at Imha Dam and Soygangang Dam, the preparation of predictive and preventive reservoir management measures are urgently required. When preparing reservoir management measures, it is essential to analyze delicate hydrodynamic processes such as temperature structures. The accuracy of the water temperature simulation is important because vertical stratification is responsible for the depth of density flow, mixing intensity and contaminant transport in the stratified reservoir.

The purpose of this study is to validate the performance of 3D hydrodynamic and water quality models (ELCOM-CAEDYM) for Yongdam Reservoir which is located in the Geum River basin of Korea. The model was applied to the reservoir for the purpose of simulating the hydrodynamics of seasonal thermal stratification processes for the period of June to December of 2005. The results of the simulation were compared with temporal and vertical profiles of temperature and turbidity measures at 4 different monitoring stations at the Yongdam Reservoir. The model provided quality results for reproducing water balances and reservoir thermal structures. Consequently, the ELCOM-CAEDYM model is a recommendable 3D hydrodynamic and water quality model that can be effectively used for the water quality management of large and deep stratified reservoirs in Korea.

*Keywords:* 3D model, stratification, ELCOM-CAEDYM, Yongdam Reservoir

### References

- [1] Korea Water Resource Corporation (2005). *Water resource and environment monitoring to Yongdam reservoir.*
- [2] Korea Water Resource Corporation (2009). *3-D Hydrodynamic and Water Quality Modeling of a Reservoir, 2009.*
- [3] Hodges. B. and Dallimore. C. (2007). *Estuary, Lake and Coastal Ocean Model : ELCOM, Version 2.2 User Manual*, Centre for Water Research University of Western Australia.