EFFECT OF A SHORT-TERM RESERVOIR FLUSHING ON DOWNSTREAM WATER QUALITY DURING DROUGHT SEASON

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Since the self-purification capacity of rivers in Korea is significantly controlled by environmental maintenance flow supplied by upstream reservoirs during drought season, it is obviously important to operate the river and reservoir systems considering not only water quantity aspect but also conservation of downstream water quality and ecosystem. In this study, an unsteady river water quality model was employed as a tool for evaluating the impact of reservoir operations on the downstream water quality. The model parameters were calibrated and verified using field data obtained in Geum River on September and October of 2002, respectively. Intensive data sampling was performed on November 22, 2003 to investigate the effect of a short-term flushing discharge of Daecheong Reservoir, which increased outflow from 30 m^3/s to 200 m^3/s for 6 hours, on downstream water quality. The model performance was evaluated by comparing simulated results with observed data including hydraulics, biochemical oxygen demand(BOD_5), nitrogen and phosphorus species during the flushing event. It showed very good performance in predicting the travel time of flushing flow (Fig.1) and water quality variations of dissolved forms of nitrogen and phosphorus species (Fig.2), while revealed large deviations for BOD_5 possibly due to missing the effect of organic matters resuspension from river bottom sediment during the wave front passage.

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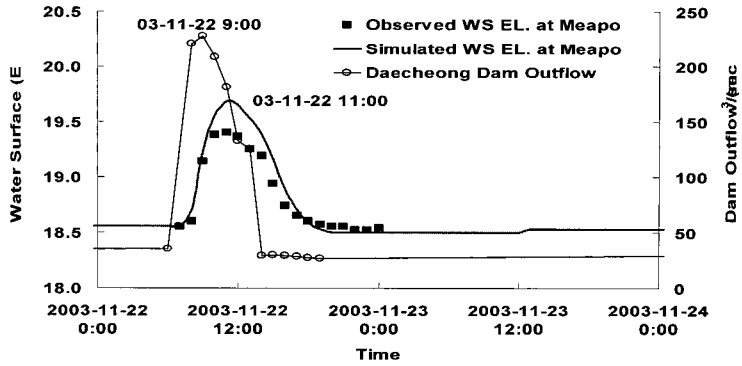

Fig. 1 Comparisons of observed and simulated water surface elevations

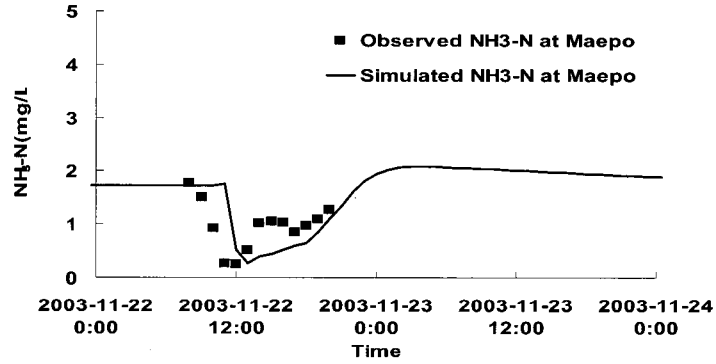

Fig. 2 Comparisons of observed and simulated water quality (NH_3-N)

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