

Spatio-Temporal Water Quality Network Design of Kyeong-An Stream in Korea

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This study presents a statistical water quality monitoring network design of Kyeong-An stream in Korea. Water quality data for the study was simulated by a QUAL2E model. The observed water quality data from March to November of 2000 in the Kyeong-An stream has been applied to the study. Hec-Ras model was used for hydraulic parameter estimation. Before the water quality parameter estimation, FORA(First Order Reliability Analysis) was used to reduce the uncertainty, and then water quality parameters were calibrated with a monthly average data that was observed in March. Data of April was used for the validation. This study divided the simulated data into low flow and average flow according to the outflow. The numbers of optimal location and station were estimated by kriging theory and branch & boundary method. Next, Proportional sampling method was applied to estimate the sampling frequency. It was determined by the variance of water quality, considering the significant level and confidence interval. When the flow condition is low, more sampling frequency were demanded than average flow condition. Spatially, sampling frequency in the upper station of a river has more frequencies than downstream station. If the result of this study is used for water quality network design, we could get more economical and reliable data.