

BP-39

Long-Term Annual Trend Analyses of Epilimnetic Water Qualities and Their Longitudinal Heterogeneities in the Soyang Lake

Hye-Won Lee, Kwang-Guk An, and Seok-Soon Park
Department of Environmental Science and Engineering,
Ewha Womans University, Seoul 120-750, Korea

The spatial and temporal trends of water qualities in Soyang Lake was statistically analyzed in this study. The water qualities include nutrients, ionic contents and chlorophyll-*a* (Chl-*a*) measured during 1993 - 2000. The rainfall intensity and runoff from the catchment appeared to play an important role in water quality trends in the lake. According to seasonal Mann-Kendall test, conductivity, TP, and Chl-*a* did not show any trends of increase or decrease over the 8 year period, while TN declined slightly. It was found that the variation of TP was a function of interannual inflow and rainfall. In the analyses of spatial trends, conductivity, based on the mean by site, showed a downlake decline over the eight year period. Minimum conductivity was found in the headwaters during summer monsoon of July to August and near the dam during October. This results indicates a time-lag phenomenon that the headwater is diluted by rainwater immediately after summer monsoon rain and then the lake water near the dam is completely diluted in October. During summer, TP and TN had an inverse relation with conductivity values. Concentrations of TP peaked during July to September in the headwaters and during September in the downlake. Also, TN increased during the summer and more than 1.5mg/L regardless of season and location, indicating a consistent eutrophic state. Values of Chl-*a* varied depending on location and season, but peaked in the midlake rather than in the headwaters during the monsoon. Regression analyses of log-transformed seasonal Chl-*a* against TP showed that value of R^2 was below 0.003 in premonsoon and monsoon seasons but was 0.82 during postmonsoon, indicating a greater algal response to the phosphorus during the postmonsoon. In contrast, TN had no any relations with Chl-*a* during all seasons.

Key words : Nutrients, Conductivity, Rainfall, Inflow, Chlorophyll-*a*, Soyang Lake