

BP-30

Epilimnetic Silica Dynamics In a Morphologically Complex Reservoir And The Significance of Flow Regime And Internal Processes to Their Dynamics

안광국

이화여자대학교 공과대학 환경학과

Spatial and temporal dynamics of silica (SiO_2) were examined in a morphologically complex reservoir, based on collected between the high-flow year and the low-flow year. SiO_2 averaged 3.4 mg/L and varied from 0.1 to 9.7 mg/L depending on the year and the location. The paired sample test of SiO_2 showed that in the mainstem sites, SiO_2 was significantly ($t = 3.577$, $p < 0.01$) greater in the high-flow year than in the low-flow year, and this pattern was similar to that of the embayment sites, indicating an importance of flow regime on silica loading. During the high-flow year, SiO_2 was significantly ($t = 3.577$, $p < 0.01$) greater in the mainstems than in the embayments, but during the low-flow year, there was no statistical difference between the two reaches. Thus, SiO_2 showed a sharp longitudinal decline from the headwaters to the dam in the high-flow year, but was modified by the plunging of metalimnetic density current in the mid-lake reach. Seasonal fluctuation of SiO_2 was influenced by internal nutrient cycling and diatom populations. Dominant phytoplankton abundance had an inverse relation between the two algal populations of bluegreens and diatoms during August-December of the low-flow year. In other words, bluegreen algae dominated at the low SiO_2 (< 2.5 mg/L) during the summer period of the low-flow year, whereas diatoms dominated with the increase of SiO_2 in fall overturn. Overall results suggest that increasing of silica in this system is primarily regulated by interannual flow regime, but the internal loading during fall overturn and biological up-take by seasonal growth of diatom community were also considered as an important process controlling the input of silica.

Key words : silica, flow regime, longitudinal gradient, seasonal pattern, diatoms