다변량 통계방법을 이용한 에콰도르 Yahuarcocha Lake의 Spatial and Temporal Water Quality 분석

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Yahuarcocha Lake is being affected by eutrophication and pollution. Multivariate statistical methods, as Principal Component Analysis (PCA), Cluster Analysis (CA) and Discriminant Analysis (DA) were used to determine temporal and spatial variations on its water quality. The data set consisted on eleven physicochemical parameters (total coliform, E. coli, COD, PO4, NO3, chlorophyll-a, dissolve oxygen, pH, electrical conductivity, water temperature and turbidity) measured at seven sample sites in the period Aug 2013 – Aug 2014. PCA calculated seven components which showed 79.6% of the variance and identified potential pollution sources such as, poorly treated water, domestic and agricultural source, and point and non-point sources. CA merged two periods highlighting the dry and rainy months. And the seven sample sites into two groups based on pollution levels and physicochemical properties. The DA provided an important data reduction and showed the parameters that are responsible for variations in water quality.
Acknowledgements:This work was supported by the National Research Foundation of Korea(NRF) grant funded by the Korea government(MSIP) (No.2015R1A2A2A11001120)