Application of the chemometric approach to evaluate the spatial variation of water chemistry and the identification of the sources of pollution in Langat River, Malaysia

ABSTRACT

The current study presents the application of selected chemometric techniques—hierarchical cluster analysis (HCA) and principal component analysis (PCA)—to evaluate the spatial variation of the water chemistry and to classify the pollution sources in the Langat River. The HCA rendered the sampling stations into two clusters (group 1 and group 2) and identified the vulnerable stations that are under threat. Group1 (LY 1 to LY 14) is associated with seawater intrusion, while group 2 (LY 15 to LY 30) is associated with agricultural and industrial pollution. PCA analysis was applied to the water datasets for group 1 resulting in four components, which explained 85 % of the total variance while group 2 extracted six components, explaining 88 % of the variance. The components obtained from PCA indicated that seawater intrusion, agricultural and industrial pollution, and geological weathering were potential sources of pollution to the study area. This study demonstrated the usefulness of the chemometric techniques on the interpretation of large complex datasets for the effective management of water resources.