Water quality assessment of Marine Park Islands in Johor, Malaysia

ABSTRACT

This study applied agglomerative hierarchical clustering (AHC) and principal component analysis (PCA) to investigate the spatial water quality patterns of Johor islands and identify possible sources of pollution in the Johor Marine Park waters. AHC was applied to 18 sites and grouped them into three categories, i.e. marine parks, development and protected islands. A second AHC carried out for the 13 marine park islands generated three groups, based on the islands's size, population and distance from the mainland. To a certain extent, the PCA was successful in providing an indication of pollution source, identifying six factors explaining more than 70% of the total variance in the data. The factors indicate possible pollutant loading originating from: natural sources of variation, sewage and waste pollution, wood preservatives (heavy metals), and boating activities. Additional findings from this study revealed that some analytical equipment sensitivity level did not satisfy the thresholds of the Marine Water Quality Criteria and Standard (MWQCS).

Keyword: Marine Park; Island water quality; Chemometrics; Principal component analysis; Agglomerative hierarchical cluster analysis