

## **Spatial variation assessment of Malacca River water quality using multivariate statistical analysis**

### **ABSTRACT**

This study evaluates the spatial variation of river water quality and identifies major sources of water pollution along Malacca River using cluster analysis, discriminant analysis and principal component analysis. The data sets contain 23 water quality parameters from seven monitoring stations over a ten-year monitoring period (2002-2011). The seven stations were grouped based on similar characteristics of sampling stations using cluster analysis into low-polluted sites, moderately-polluted sites and highly-polluted sites. In discriminant analysis, the original 23 parameters were reduced to 12 and 15 of the most significant pollutants in forward and backward stepwise mode, respectively. In principal component analysis, the results showed that pollution sources for moderately-polluted sites and highly-polluted sites are related to point sources and non-point sources while in low-polluted sites, pollution is mainly due to non-point sources. This study demonstrates the effectiveness of multivariate statistical method for assessment and interpretation of bulky and complex river water quality data in order to design a better supervision network for successful management of water resources.

**Keyword:** Cluster analysis; Discriminant analysis; Principal component analysis; Water quality