



## **Groundwater quality analysis in volcanic area using R: a case from Bandung Basin Indonesia**

Dasapta Erwin Irawan (1), Ahmad Darul (2), Farzina Akter (3), and Willem Vervoort (3)

(1) Institut Teknologi Bandung, Bandung, Indonesia (erwin@itb.ac.id), (2) Institut Teknologi Bandung, Bandung, Indonesia (darul.gg04@gmail.com), (3) University of Sydney, Australia

Spatial analysis has been applied to 295 samples of shallow groundwater quality data from Bandung-Soreang Groundwater Basin (BSGwB) taken in 1997, 1998, 2007, 2010, and 2011. This paper discuss the use of variogram as a spatial analysis tool using "geoR" package and generalised additive model using "mgcv" package to identify the spatial distribution and possible mixing processes between groundwater and the river.

The variograms show significant water quality trend in north-south direction, and in the direction to the Cikapundung River. From the GAM tests using gaussian and gamma family, some significant elements can be identified. Geological control is introduced in the system as indicated by strong roles of Fe, Mn, Na concentrations. The second control is from agricultural activities, as derived by  $\text{NO}_2$  and  $\text{NO}_3$  concentrations. The third control is surficial control as show by EC,  $\text{CO}_3$ ,  $\text{CO}_2$ ,  $\text{SO}_4$  concentrations. This paper also suggests a close interaction between groundwater and river water and mixing processes.