

## **Controlling factors of groundwater hydrochemistry in a small island's aquifer**

### **Abstract**

Factor analysis was applied to the hydrochemical data set of Manukan Island in order to extract the principal factors corresponding to the different sources of variation in the hydrochemistry. The application of varimax rotation was to ensure the clear definition of the main sources of variation in the hydrochemistry. The geochemical data of dissolved major, minor and trace constituents in the groundwater samples indicates the main processes responsible for the geochemistry evolution. By using Kaiser normalization, principal factors were extracted from the data for each location. The analysis reveals that there are four sources of solutes: (1) seawater intrusion; (2) leaching process of underlying rock mediated by pH; (3) minerals weathering process and (4) dissolution of carbonate minerals characterized by high loadings of Ca, Zn and Mg. Such processes are dominated by the significant role of anthropogenic impact from the over abstraction of fresh water from the aquifer. Those factors contributed to the changes of the groundwater geochemistry behavior explain the effect of rising extraction of freshwater from the aquifer. © IRSEN, CEERS, IAU.