Inferring the Chemical and Physical Parameters of Groundwater of some Villages in Sri Lanka for the Occurrence of Fluoride

Physico-chemical and chemical parameters of groundwater in some areas of dry and wet zones of Sri Lanka are explained. Hydrochemical data from the groundwater are used to evaluate to identify the processes that govern fluoride levels in water. The pH-Eh stability shows that nitrate, phosphate and iron does not co-exist with fluoride under prevailing redox condition. Physical parameters show that fluoride values increase in slightly alkaline in pH, relatively low EC and highly oxidized water. Further, the results indicate that fluoride levels in the dry zone are very high compared to the wet zone water. The nutrients concentrations and chemical oxygen demand in both regions inferred that higher fluoride levels reported in the groundwater are not due to anthropogenic effects. Movements of groundwater in shallow regolith aquifers of the country are mainly controlled on Joint and fault system in the partially weathered basement. This study observed that their variation in the dry and wet zones is a major parameter for the control fluoride levels in water. Thus less fractured rocks in the dry zone water discharge areas show higher values and may be due to lesser mixing of water with non-fluoride sources. Conversely, highly fractured rocks are predominant in the wet zone and hence mixing of fluoride poor and rich waters in both recharge and discharge regions in the zone results in low fluoride levels.

Key words: groundwater, fluoride, physical properties