

Fluctuation of hydraulic head and temporal variation of important chemical parameters of the groundwater in Jaffna limestone aquifer

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Abstract

The investigation was focused on temporal fluctuation of hydraulic head variation of important chemical parameters of groundwater in Jaffna limestone aquifer. Forty wells were selected and the latitudes and longitudes were obtained from GPS and elevations from the mean sea level were derived from two feet contour map using Arc mapping soft ware. The measurements of fluctuation of measuring the hydraulic head, water samples were collected center of the vertical column for the measurement of pH, electrical conductivity (EC) and chloride. The results showed that the hydraulic head fluctuated temporally and a similar pattern was observed in all the wells estimated. The hydraulic head did not rise significantly due to short peak rainfall in *Yala* while *Maha* rainfall was responsible for significant rise of hydraulic head. The pH values of ground water ranged from 6.8 – 8.54 and varied in forty wells in all months. All the measured data fall in between Sri Lankan permissible levels of 6.5 to 9.0. EC values ranges from 218 – 69,400 $\mu\text{S}/\text{cm}$. EC of three wells were above the permissible level of Sri Lankan standard. Because these wells are close to lagoon and high EC values were due to intrusion of salt lagoon water. The temporal variation of chloride concentration was observed during dry and wet seasons. The concentration of chloride was well within the safe limit of WHO for most of the wells. And the chloride concentration exceeded the limit of WHO in 25% of the well water due to lagoon effect. The negative relationship was derived between the hydraulic head of groundwater and chloride concentration. Since it is very difficult to reverse the flow of poor quality water to a well, it is of extreme important to continuously monitor the quality of groundwater from wells, and early, appropriate measures should be taken if the quality is suspected to be deteriorating.

Keywords: Ground water, Head fluctuation, Quality

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