

**STUDY THE TRACE ELEMENT MOBILITY IN
GROUNDWATER AROUND PADIYATHALAWA
THERMAL SPRINGS**

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by

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Abstract

The present study was carried out around the Padiyathalawa Marangalawahawa thermal spring cluster, situated 10 km south of Padiyathalawa town in the Eastern province. The major objective of the study was to study the mobility of trace element in ground water around Padiyathalawa thermal springs. Other objectives of the research were study the origin of heat source of the thermal springs and identify the possible mineral deposits using trace elements in ground water.

The geographical location of each well was determined with a handheld GPS. pH, Eh, Total Dissolved Solids (TDS) and Electrical Conductivity (EC) of groundwater were measured in-situ.

Concentrations of Na, K, Mg, Ca and Trace elements (Cs, Cu, Fe, Li, Mn, Rb, Sr and Zn) were analyzed on atomic absorption spectrometer using Flame Absorption Method. Anions such as HCO_3^- , SO_4^{2-} and Cl^- were analyzed using titration method, Turbidimetric method and Argentometric method respectively.

GW_Chart software was used to plot the piper diagram and Arc GIS 9.3 software package was used to prepare the concentration maps. Minitab 14 software was used to calculate the correlation matrix of trace elements.

The study classified thermal spring's waters as Sodium-Potassium, Bicarbonate-chloride-sulphate type.

This study reveals that most waters taken from hot springs has high values of EC, TDS, bicarbonates (HCO_3^-), sodium (Na) and Sulphate (SO_4^{2-}). High TDS, Na and HCO_3^- are mainly due to dissolution of these ions from rock bearing minerals of the study area.

There are strong positive relationships between Na-K, Na-Ca, Na- SO_4^{2-} , K-Rb, K-Sr, K- SO_4^{2-} , Mg- HCO_3^- , Mg- Cl^- , Ca- HCO_3^- , Rb- SO_4^{2-} and Mn- Cl^- . But in this study area can't exist strong negative relationships.

There are moderate positive relationships between Na-Rb, Na-Sr, Na- Cl^- , K-Mn, K- Cl^- , Ca-Mg, Mg-Mn, Ca-Sr, Ca- SO_4^{2-} , Ca- Cl^- , Sr-Rb, Rb-Li, Rb-Mn, Mg-Sr, Sr-Li Sr-Mn, Sr- SO_4^{2-} , Sr- Cl^- and HCO_3^- - Cl^- . There is a moderate negative relationship between Na and Cs.