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ORIGIN OF THERMAL SPRINGS OF SRI LANKA

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There are nine known thermal springs in Sri Lanka. They have been under observation and study over the last 80 years. Pearsons studied the springs at Marangalla, Maha Oya and Kapurella and reported their temperatures. To him, the origin and cause of the springs were "obscure" and the recharge to them was "probably not meteoric". Daniel on studying the spring at Mahapelessa found the source of water to be a "mystery". Chanumgam covered some aspects of thermal springs. Fonseka et al studied the geological and geochemical aspects of five thermal springs at Kanniyai, Maha Oya, Kapurella. They classified the waters into different types and indicated that the origin might be due to deep circulating groundwater.

The present study attempts to establish the origin and mode of recharge to these springs based on naturally occurring isotopes Deuterium (D), Oxygen -18 (O18) and Tritium present in water along with chemical analysis. The meteoric origin of all spring waters was conclusively established from the Deuterium and Oxygen-18 results. There is a straight line relationship between δ O-18 and δ D for monthly rain water known as the meteoric water line for Sri Lanka. All spring samples fell on this line, as any groundwater originating from rain should fall on it. The isotopic composition of shallow groundwater at any location is close to the long-term average of monthly rain water composition, weighted for monthly rainfall amounts. By comparing such data for Batticaloa, Tanamalwila and groundwater data for Monaragala, the mode of recharge is deep percolation of local rain water through soil layers. Recharge coming from altitude higher than 300m above the general elevation of any spring is not shown.

Excepting Kanniyai and Rankiriyaya, all other springs contained low levels of Tritium, ranging from 0 TU to 4.7 TU. Rankiriyaya and Kanniyai contained groundwater recharged over the last few years. In the case where there is a possibility of mixing with shallow near surface cold groundwater, the spring waters might be older than 40 years. In the absence of appreciable mixing with young groundwater, the waters of the springs should be about 20-40 years of age. At Kanniyai and Rankiriyaya it is possible that the deep groundwater is mixed with a large proportion of young water.

Based on a piper diagram, the spring waters were classified as follows: (a) Rankiriyaya and Kanniyai: Bicarbonate type; (b) Maha Oya, Wahawa, Kapurella and Galewewa: Chloride-sulphate type; (c) Mahapelessa: Chloride type. Appreciable mixing with cold near surface water is not shown for types b and c.

The isotopic results indicate the meteoric origin of Thermal springs of Sri Lanka. The mode of recharge is deep percolation of local rain water upto an altitude of 300m above the general elevation of any spring. This can take place through deep fractures, faults and joints in the parent rocks.

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