



Isotopic signatures in meteoric waters of Bangkok, Thailand

Boonsom Porntepkasemsan*, Wutthikrai Kulsawat, Phatchada Nochit

Thailand Institute of Nuclear Technology (Public Organization)

9/9 Moo7 Ongkharak, Nakhon-NaYok 26120 Thailand

*e-mail: boonsom@tint.or.th

This study investigated the stable isotope characteristics of precipitation during 2015 and 2016 in Bangkok, Thailand. On the basis of 180 rainfall events, stable isotopes data established the Local Meteoric Water Line (LMWL) as $\delta^2\text{H} = 7.32\delta^{18}\text{O} + 2.86$, $R^2 = 0.951$. The slope of less than 8 indicated isotopic equilibrium conditions during rain formation. It was revealed that most of the values for precipitation distributing below the LMWL observed on the days of high temperature which mainly ascribed to the first evaporation from falling raindrops due to the predominantly dry atmosphere. The values of $\delta^2\text{H}$ and $\delta^{18}\text{O}$ in rainwater ranged from -114.49 to 10.68‰ and -15.80 to 1.04‰, respectively. Enriched isotopic signatures were observed in dry season (pre- and post-monsoons) and depleted valued in rainy season (monsoon) which coincident with ambient temperature and relative humidity. The deuterium excess (d-excess) values were -11.93 to 19.89‰ (average 6.18‰), with most values less than 10‰. The low d-excess values of < 10‰ suggested the warm and humid air masses surrounding of the Gulf of Thailand causing no additionally source of moisture. The plot of d-excess with amount of rainfall (mm.) showed that low amount of rainfall have variable d-excess values. Results can be concluded that stable isotope signatures of meteoric waters of Bangkok were seasonal variations associated with the temperature, relative humidity, and rainfall intensity. Additional large-scale spatial and temporal investigations of the meteoric water isotope characteristics for Thailand are crucial in order to determine the sources and to enhance understanding of the regime of water cycle and controlling factors.

Keywords Isotopic signatures, Stable isotope, Bangkok meteoric water line, Precipitation, Deuterium-excess