



Spatial and temporal variability of stable isotopes in precipitation observed over the Indonesia Maritime Continent

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Stable isotope in precipitation has been widely used in climate science as proxy data for the temperature and amount of precipitation to reproduce the past climate. Various meteorological and climatological factors can combine to produce unique variability in precipitation isotope values. Considering the vast scale of Indonesia Maritime Continent (IMC), it was recognized that a greater number of observation points were needed for complete understanding of the spatial and seasonal variability of precipitation isotope values across the region. From October 2010 and March 2013, more than 2,000 precipitation samples were collected weekly at 33 stations over Indonesia. Both $\delta^{18}\text{O}$ and $\delta^2\text{H}$ in precipitation were measured by an Isotope Ratio Mass Spectrometer (Thermo-Fisher, Delta-V) at Kumamoto University, Japan. Isotopic compositions of $\delta^2\text{H}$, $\delta^{18}\text{O}$, and d-excess values were ranged from -119.3 to +36.7 permil, from -16.2 to +19.7 permil, and from -134.1 to 34.9 permil, respectively. The slope of the Local Meteoric Water Line (LMWL) was 7.7 obtained from samples which d-excess were -10 to 20 permil. However, the LMWL was 3.7 obtained from samples which d-excess were abnormally low (less than -30 permil). Of course, these samples were affected by evaporation during sampling and/or transportation to Japan. However, some samples might be affected by evaporation during raindrops were in the atmosphere because about 45% of these samples were collected in the rainy season (December to February).