Spatiotemporal variations in oxygen-hydrogen and strontium isotopic and trace elemental compositions of precipitation, Saijo, Ehime

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We collected monthly precipitation at 6 sites with different altitudes in Saijo city of Ehime prefecture over 9 years from 2007 to 2015, and determined their $\delta^{18}O$, δD and Sr isotopic and elemental compositions and to elucidate the precipitation process.
The values of deuterium excess (d-excess) ranged from 20 to 30‰ during winter and from 3 to 10‰ during summer in precipitations. The values of d-excess at the location “Jojusha (1,280 m above sea level)” were 3~10‰ higher than those of another sites during summer from 2009 to 2012. On the other hand, the values of d-excess at Jojusha had same as those of another sites during summer from 2013 to 2014. These results indicate heterogeneity of the isotope ratio within the investigation area and were ascribed to the origins of clouds, process of condensation from clouds and massive heavy rain.
The enrichment of As, Cu, Pb, Sb and Zn concentrations in the precipitation at lowest altitude site (20 m on the roof of city office) suggests the input of industrial anthropogenic activities from the urban area in the Saijo city and/or surrounding Setouchi region.
The concentrations of Al, Mn, Fe, Zn, V, Cu, As, Rb, Sr, Mo, Cd, Sb, Cs and Ba were high at city office site, Fujinoishi (700 m) and Jojusha from winter to spring. The Sr isotope ratio of precipitation at Jojusha also showed a seasonal variation with high in spring, indicating the contribution of the eolian dust from the Asian continent.

Keywords: precipitation, oxygen-hydrogen isotpe, Sr isotope, trace element

