

Chemical compositions and Sr-Pb isotope ratios of precipitation of Saijo city in Ehime prefecture

YOKOO, Yoriko^{1*} ; KAMEYAMA, Takuya¹ ; SHIN, Kicheol² ; KATO, Shota³ ; TOKUMASU, Minoru⁴ ;
NAKANO, Takanori²

¹Faculty of Science and Engineering, Doshisha University, ²Research Institute for Humanity and Nature, ³Kanazawa University,
⁴Saijo City

We collected monthly precipitation at 2 sites with different altitudes (20 m on the roof of city office and 1280 m in Jojusha) in Saijo city of Ehime prefecture over 5 years from 2008 to 2012, and determined their chemical compositions and Sr-Pb isotope ratios. The concentrations of Al, Mn, Fe, Zn, V, Cu, Ga, As, Rb, Sr, Mo, Cd, Sb, Cs, Ba, and P were high at both sites from winter to spring. The concentration and isotope ratio (⁸⁷Sr/⁸⁶Sr) of precipitation also showed a seasonal variation with high in spring, indicating the contribution of salinization minerals mainly of Ca-carbonate in Asian dust.

Throughout a year, the concentrations of Ni, U, Pb, Cs, Sr, Li, Rb, V, Sb, Al, Mn, and Co in the precipitation of the city office site were 1.3 to 3.0 times higher than those in the precipitation at the Jojusha site. For Ga, As, W, Cd, Zn, Ba, Si, and Mo, the enrichment in the city office precipitation were 3.7 to 6.5 times and the enrichment in the city office precipitation were 17 times for Cu. The increase of dissolved elements in the winter precipitation is likely ascribed to the long-range transport from the Asian continent. However, the enrichment of elements in the precipitation at the city office suggests their major source to be the urban area in the Saijo city and/or surrounding Setouchi region. This contention is consistent with the Pb isotope ratios of precipitation at Jojusha, which are indistinguishable from those in aerosols in Japan.

Keywords: precipitation, trace element, Sr isotope, Pb isotope