

Comparison of stable precipitation isotopes between regional isotope simulation and intensive observation around Japan

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Stable isotopes in precipitation have been used as tracer of hydrological cycle. However, there are few or no observation studies throughout Japan at the same time. Here, we organized Isotope Mapping Working Group (IMWG), and conducted the intensive observations for the period from January to December in 2013 at 124 sites. These observational data with high spatial resolution are vulnerable on a global scale. In this study, the observational data was compared with isotopic compositions derived from isotope regional circulation model. By comparing spatial distribution of isotopic compositions of precipitation, it was seen that the model captured not only the latitude effect (values decrease with increasing latitude), but also the intensity of the effect around Japan, except for June to September. The spatial distributions from June to September were uniform around Japan. Then, in order to compare seasonal variation of isotopic compositions of precipitation between simulation and observation, we calculated regional averaged seasonal variations according to regional partition of Japan Meteorological Agency. As a result, the model captured observed seasonal variation, such as high values from March to July in the northern part of Japan. However, model overestimated isotopic compositions in January in the western part and the eastern part of Japan. The overestimation was due to an intensity of the low pressure system in the south coast of Japan around 14 January 2013, because the simulated isotopic compositions by the low pressure system were higher compared with observed that. We will introduce the result of comparisons.

Keywords: stable isotopes in precipitation, isotope regional circulation model