Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

AHW24-03 Room:301A Time:May 25 10:00-10:15

Stable isotopes in precipitation all over Japan observed in 2013

ICHIYANAGI, Kimpei[1*] ; TANOUE, Masahiro[2] ; YOSHIKUNI, Tsukasa[1]

[1]Graduate School of Science and Technology, Kumamoto University, [2]School of Engineering, The University of Tokyo

Stable isotopes in precipitation (Oxygen-18 and Deuterium) are useful natural tracers for understanding the hydrological cycle and reconstructing paleo-climates. There are a lot of observational studies of stable isotopes in precipitation in Japan. However, most observations on the local scale were conducted only one point or less than several points. The Isotope Mapping Working Group of the Japanese Association of Hydrological Sciences (JAHS-IMWG) conducted the intensive observation of stable isotopes in precipitation across Japan throughout 2013 (IOP2013). In this study, seasonal variation and spatial distribution of Oxygen-18 and d-excess at 57 stations across Japan were shown from the preliminary result of the IOP2013. Annual mean values in Oxygen-18 show the strong altitude effect from -13permil in the north part to -6permil in the southwest part of Japan. The Oxygen-18 values along the Pacific coast and the Japan Sea coast of Japan are more and less than -8permil, respectively. Annual mean values in d-excess ranged from 7permil in the southwest part to 22permil in the northeast part of Japan. The d-excess values in the north part and along the Japan Sea coast are relatively higher than those along the Pacific coast of Japan. The differences in d-excess values between the Pacific coast and the Japan Sea coast are mentioned in the previous studies. Most of the monthly Oxygen-18 values ranged from -15permil to -5permil observed in the north part of Japan, and those values were relatively high in the spring months (March-June) and low in the winter months (December to February). Most of the monthly Oxygen-18 values ranged from -10permil to -5permil in the southwest part of Japan, the seasonal variation is small. On the other hand, the monthly d-excess values show strong seasonal variations observed both in the north and southwest parts of Japan. Those values ranged from 0permil to 40permil in the north part and from 0permil to 30permil in the southwest part of Japan. Especially in the north part of Japan, monthly d-excess values were extremely high in the winter month (December to February). The high d-excess values are caused by the strong evaporation from the Japan Sea in the winter months.

Keywords: stable isotope, precipitation, d-excess, all over Japan, Isotope Mapping Working Group