



## **Stable isotopic variations of water vapor on the winter coastal area in Korea**

Jeonghoon Lee (1), Songyi Lee (1), Yeongcheol Han (2), and Soon Do Hur (2)

(1) Ewha Womans University, Science Education, South Korea (jeonghoon.d.lee@gmail.com), (2) Korea Polar Research Institute, South Korea

Studies of isotopic compositions of precipitation in Korea have been conducted for groundwater mixing and sources and residence time of water. Unravelling of water vapor isotopes will be very helpful in explaining the sources of moisture. In this work, we first present isotopic compositions of water vapor over western part of Korea in winter between December 2015 and February 2016. We collected the samples of water vapor isotopes by a cryogenic method with impingers and liquid nitrogen. We captured the water vapor for 4 to 6 hours, depending on humidity and collected 54 samples in total. The samples were analyzed by a Picarro L2130-i and the precisions were 0.06‰ and 0.7‰ for oxygen and hydrogen, respectively. The isotopic compositions of water vapor ranged from -34.04‰ to -15.27‰ for oxygen and from -221.9‰ to -100.2‰ for hydrogen. The deuterium excess ( $d = \delta D - 8 * \delta 18O$ ) was between 17.4 and 44.0 in permil. Both air temperature (T,  $\delta 18O = 0.57 * T - 25.5$ ,  $R^2 = 0.46$ ) and relative humidity (RH,  $\delta 18O = 0.18 * RH - 35.9$ ,  $R^2 = 0.38$ ) were positively correlated with the water vapor isotopes. This is not consistent with the fact that precipitation isotopes are correlated with only temperature in winter Eastern Asia. We expect that the water vapor isotopes will be an important role to understand the origin and pathway of moisture over the Eastern Asia.