Geophysical Research Abstracts
Vol. 17, EGU2015-8309, 2015
EGU General Assembly 2015

Old water contributions to a granitic watershed, Dorim-cheon, Seoul

Hyerin Kim (1), Sung-Hyun Cho (2), Dongguen Lee (2), Youn-Young Jung (3), Young-Hee Kim (1), Dong-Chan Koh (3), and Jeonghoon Lee (1)

(1) Dept. of Science Education, Ewha Womans University, Seoul, Korea (jeonghoon.d.lee@gmail.com), (2) National Instrumentation Center for Environmental Management (NICEM), Seoul National University, Seoul, Korea, (3) Groundwater department, Korea Institute of Geoscience and Mineral Resources (KIGAM), Daejeon, Korea (chankoh@kigam.re.kr)

It is reported that the intensity of rainfall will likely increase on average over the world. For water resources security, many studies for flow paths from rainfall or snowmelt to subsurface have been conducted. In Korea, few isotopic studies for characterizations of flow path have been undertaken. For a better understanding of how water derived from atmosphere moves to subsurface and from subsurface to stream, an analysis of precipitation and stream water using oxygen-18 and deuterium isotopes in a small watershed, Dorim-cheon, was carried out with high resolution data. Variations of oxygen-18 in precipitation greater than 10‰ (δ18Omax=-1.21‰ δ18Omin=-11.23‰) were observed. Isotopic compositions of groundwater assumed as the stream water collected in advance were -8.98‰ and -61.85‰ for oxygen and hydrogen, respectively. Using a two-component mixing model, hydrograph separation of the stream water in Dorim-cheon was conducted based on weighted mean value of δ18O. As a result, except of instant dominance of rainfall, contribution of groundwater was dominant during the study period. On average, 68.8% of the groundwater and 31.2% of rainfall contributed to the runoff. The results show that even in the small watershed, which is covered with thin soil layer in granite mountain region, the stream water is considerably influenced by groundwater inflow rather than rainfall.