

## Hydrogeochemical changes induced by 2016 Gyeongju earthquakes using groundwater level, radon-222, and strontium isotopes

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The Gyeongju earthquakes (M5.1 and M5.8) took place along the Yangsan fault (YSF) composed of NNE-trending right-lateral strike-slip faults on 12th September, 2016. Hydrogeochemical changes related to the earthquakes was expected to be important because no surface ruptures have been reported. To figure out pre-, co-, and post-seismic changes, the continuous monitoring data of groundwater level, temperature, and EC was used. In addition, 22 water samples were collected for hydrogeochemical parameters including isotopes (radon and strontium) after earthquake (Jan., 2017). The detected groundwater level anomalies could be attributed to the other source of groundwater by the movement of strike-slip fault. Radon concentrations provided the potential of mixing processes between deep and shallow groundwater. Strontium isotopes showed the anomalies with regard to the water-rock interactions. By combining these results, some conceptual models, which explain the mechanisms related to the earthquakes, were suggested with groups by lithostratigraphic units as water-rock interactions, mixing of shallow and deep aquifers, and bedrock fracture opening. This study is important in interpreting the hydrogeologic responses to the earthquakes by combined approaches, which are hydrogeochemistry and lithostratigraphic data.

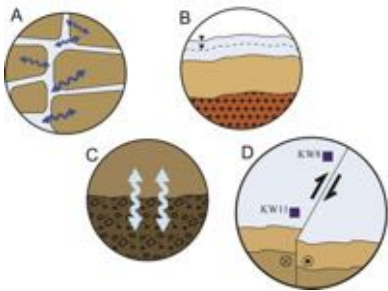


Figure. The conceptual models for the mechanisms related to the earthquakes using hydrogeochemical data; (A)

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water-rock interactions, (B) water level anomaly, (C) mixing  
between two aquifers, and (D) bedrock fracture opening.