

# Radon Concentration Anomalies at Nakaizu Observation Station and Current Situation of Geochemical Monitoring for Seismic Activity

Fumiaki TSUNOMORI

Graduate School of Science, The University of Tokyo

7-3-1 Hongo, Bunkyo, Tokyo 113-0033, Japan

fumi@eqchem.s.u-tokyo.ac.jp

[Abstract]

I'm going to introduce radon concentration behaviors before big earthquakes of the 1978 Izu-Oshima-Kinkai earthquake and the 2011 Tohoku earthquake. In addition, we would like to discuss on the geochemical monitoring of not only radon but also geofluid dissolved in groundwater.

An anomalous increase in radon concentration was measured at the Nakaizu observation station located at Izu Peninsula prior to the 2011 Tohoku earthquake by a custom-made radon counter. Since the increase was more than three times the standard deviation of radon concentration variations over 35 years of recorded data, it is considered likely that it is a precursor to the earthquake. Following the earthquake, the radon concentration decreased exponentially to the background level. The anomalous increase can be explained by a modified volatilization model containing three important aquifer parameters.

The relative composition of He-N<sub>2</sub>-Ar in groundwater was analyzed at Atotsugawa observation station for two years. The tri-component diagram indicated the composition distributed on a mixing line between air (or air-saturated water) and radiogenic origin gas. This method has a potential to extrapolate the tectonic activity including seismic activity from a porosity evaluation by the mixing analysis.

[Acknowledgements]

The author express deep gratitude to Professor Tom Kuo of National Cheng Kung University, Taiwan for his fruitful discussions on radon monitoring and his encouraging comments. The author give many thanks to Professor Naoji Koizumi of The University of Shiga Prefecture and Group Leader Norio Matsumoto of Advanced Industrial Science and Technology for their kind assistances on groundwater sampling form hydrological aspects.