

Time series of gas composition in groundwater monitored at Atotsugawa Well

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We discuss on time variation of gas composition dissolved in groundwater of Atotsugawa observatory from October 2010 to February 2013. An observation well of Atotsugawa observatory was drilled in southern-west part of Atotsugawa fault located in Gifu Prefecture. Groundwater is sampled directly from an aquifer with a TEFLON pipe by 1 L/min. Dissolved gas makes many bubbles in the TEFLON pipe because the pumping reduces the pressure of groundwater. All bubbles are collected in a gas-water separator on the ground, and are introduced into a quadrupole mass spectrometer in the observatory. A gas composition is analyzed by the mass spectrometer equipped with a gas dryer every 1 hour. Results are transported to our server computer, and all spectra are automatically analyzed. A gas ratio of He-N₂-Ar tri-component is calculated from a mass spectrum. This ratio is corrected by oxygen component in order to subtract air contamination. Tri-component ratio scatters on a mixing line of the air and the crust. Some data point on a line between the air and the mantle. Time series of the tri-component plot might have a potential to monitor gas migrated from a deep part to the ground surface.

Keywords: Groundwater, Dissolved gas, Time variation