Hydraulic properties, water chemistry and gas composition at Hongu observatory, Wakayama Prefecture

*Norio Matsumoto[1], Tsutomu Sato[1], Akinobu Miyakoshi[1], Noritoshi Morikawa[1], Masaaki Takahashi[1], Hitoshi Tsukamoto[1], Kohei Kazahaya[1]

1.Institute of Earthquake and Volcano Geology, National Institute of Advanced Industrial Science and Technology (AIST)

In order to explore potential sites for in-situ continuous $^{3}He/^{4}He$ gas mass spectrometer which is under development, we performed temperature and electric conductivity logging and hydraulic tests at a 1000 m well at the Hongu observatory. We also collected groundwater and gas samples from the well after the hydraulic tests. There are several reasons why we selected the Hongu observatory as the potential site: (i) High $^{3}He/^{4}He$ ratio were observed in the hot springs near the Hongu observatory; (ii) Several ancient texts reported that discharge of hot spring at the Hongu area were stopped in response to past Tonankai or Nankai earthquakes, and (iii) we have been observing groundwater, crustal deformation and seismic data near the Hongu observatory to detect non-volucanic tremors and short-term slow slip events occurring at plate boundary directly underneath the Hongu area. As a result, we obtain medium transmissivity of the aquifer (2.0 - 2.8 x 10^{-5} m^{2}/s), high $^{3}He/^{4}He$ ratio (4.69 Ra) in the gas sample and similar chemical composition of the sampled water to the surrounding hot springs.

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