

Mantle helium distribution in Kyushu district, Southwest Japan

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We carried out the sampling of deep groundwater and spring water and examined mantle helium concentration in deep groundwater in Kyushu district, southwest Japan. The Beppu-Shimabara graben is located in central area of Kyushu that is one of the unique tectonic settings in addition to the usual subduction of the Philippine Sea plate beneath the Eurasian plate. We estimated mantle ³He flux into groundwater aquifers by the method using helium isotopes (e.g. [1]). Combining the chemical data of groundwater and the mantle ³He flux is used for estimating the flux of upwelling volatile species in deep fluids. We compared the areal distribution of ³He flux with the geological structure, volcanoes and other chemical parameters, and found that high ³He fluxes are distributed along the Beppu-Shimabara graben, volcanic area (volcanic front and monogenetic volcanoes) and faults. We also compare with the geophysical data in this region such as seismic velocity perturbations at 20-30 km depth beneath the sampling area. The results indicate that the Beppu-Shimabara graben and volcanoes act as a channel of mantle helium upwelling.

[1] Ohwada et al. (2012) *J. Geophys. Res.*, **117**, B02204, doi:10.1029/2011JB008532.