

Geologic characteristics for ground water in the Pliocene volcanic rock area in Uto Peninsula of Kumamoto Prefecture, Japan

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At the lower altitude of Uto Peninsula of Kumamoto Prefecture in the western part of central Kyushu, Japan, outcroppings of the Himenoura Group and Paleogene formation exist, and at the upper altitude Pliocene volcanic rocks stratify on the formations as an unconformity. The Himenoura Group in Cretaceous, while the Akasaki, Shiratake and Kyoragi Formations are composed of basal conglomerate, red bed, massive sandstone and black shale, respectively. Volcanic rocks are distributed on the Himenoura Group and Paleogene formation at the northern part of Uto Peninsula. Widely spread on the southern area exclusive of the Himenoura Group and Paleogene, these rocks are estimated to situate at 350-400m below sea-level.

The oldest volcanic rock of Uto Peninsula erupted at 8.5Ma by K-Ar age (at Kannon Cape). There are 2.9-2.2Ma ages of volcanic rocks distributed in the study area. They are briefly stratified in ascending order from hornblende andesite actively from Late Miocene to Early Pliocene, and pyroxene andesite in Late Pliocene. They are composed of hornblende andesite, hornblende pyroxene andesite, pyroxene andesite bearing hornblende andesite in the Late Pliocene at the Einoo area in ascending order. In this area SiO₂ contents are 53-61% and K₂O contents are 1.65-1.14wt%, and as such belong to low potassium andesite.

The flow systems of ground water in this area are flow near the original area, an intermediate flow and a wide and deep flow by Inoue et al.(2004). The intermediate flow pattern occurs as springs at Furuyashiki village which is situated at the middle part of the Nishiura River. Inoue et al.(2004) said the springs occur at the stratified

boundary of two formations, but joints and fractures of the lava in the formations has characteristics of andesite and differenced in occurrence of volcanic rocks, it is difficult to understand the ground water flow system. A layer of tuff 1m thick and tuff breccia compact and dense are not penetrated by water, but columnar and platy joints in massive lava flows should be penetrated easily by ground water. We tried to clarify the structure of joint systems in the volcanic rock taken by drilling cores in this area.