Petrology of the Muro Pyroclastic Flow Deposit: similarity to the Middle Miocene Acid Rocks in the Outer Zone of southwest Japan

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Muro Pyroclasitc Flow Deposit is usually included into the Middle Miocene Setouchi Volcanic Rocks, though its source is still uncertain. Investigation of whole rock compositions and phenocrysts of the Muro Pyroclasitc Flow Deposit shows that it has similar character to those of 'S-type' Acid Rocks in the Outer Zone of southwest Japan. Biotite K-Ar age of the Muro Pyroclasitc Flow Deposit is well in accord with those of the Acid Rocks of the Outer Zone of the southwest Japan. We suggest that the Muro Pyroclasitc Flow Deposit were supplyed from one of a felsic igneous complex of the Acid Rocks of the Outer Zone of the southwest Japan.

Muro Pyroclastic Flow Deposit is usually included into the Middle Miocene Setouchi Volcanic Rocks which are distributed ca. 1000km along southwest Japan Arc. Muro Pyroclasitc Flow Deposit is distributed in 30x15km2 area with 400m maximum thickness. So its present volume exceeds 100km3. However no feeder is found within and near the deposit, and the source of the Muro Pyroclasitc Flow Deposit is still uncertain (Nishioka et al., 1998).

We investigated the whole rock compositions and phenocrysts of the Muro Pyroclasitc Flow Deposit, and found that it has similar character to those of so-called 'S-type' Acid Rocks in the Outer Zone of southwest Japan.

Biotite, hypersthene, sanidine, quartz, and minor garnet and augite were previously reported phenocryst minerals. We newly found cordierite. Though garnet is not often observed in thin sections due to its low mode, euhedral garnet crystals are contained in most of samples. Garnet and cordierite are the minerals usually contained in peraluminous felsic igneous rocks. Most of hypersthene phenocrysts are rich in Al and poor in Ca which is characteristic of the orthopyroxene in peraluminous felsic igneous rocks, as suggested by Maeda et al. (1991).

Whole rock SiO2 content ranges 73.0-75.5 Though the samples came from various localities, scattering of the whole rock compositions is small. Al2O3/(CaO+Na2O+K2O) molecular ratio is usually 1.1-1.2, and all of the samples is peraluminous. We compared whole rock compositions of the Muro Pyroclasitc Flow Deposit with those of Acid Rocks in the Outer Zone of southwest Japan of the Kii Peninsula (Ohmine Acid Rocks, and Kumano Acid Rocks), and rhyolitic rocks of the Setouchi Volcanic Rocks (Nijyo and Shodoshima district). The major element compositions of the Muro Pyroclastic Flow Deposit are in the range of those of the felsic member of the Acid Rocks in the Outer Zone of southwest Japan. However rhyolitic rocks of the Setouchi Volcanic Rocks have lower K2O content than Muro Pyroclasitc Flow Deposit comparing for the samples with the same range of the SiO2 content.

Uto et al. (1997) reported high precision K-Ar biotite age of the Muro Pyroclasitc Flow Deposit (14.44+/-0.16Ma). We determined K-Ar ages of the Setouchi Volcanic Rocks and the Acid Rocks in the Outer Zone of southwest Japan for many samples and confirmed the concentration of K-Ar ages of the Acid Rocks in the Outer Zone of southwest Japan to 14+/-1Ma. Furthermore, we reveled that felsic igneous activities of the Outer Zone of southwest Japan coincide well with those of the Setouchi region (Sumii, submitted; Sumii and Shinjoe,2000). So the radiometric age of the Muro Pyroclastic Flow Deposit is well in accord with those of Acid Rocks in the Outer Zone of the Kii Peninsula (Kumano Acid Rocks: Sumii et al., 1988; Ohmine Acid Rocks: Sumii and Shinjoe, 1999). Considering coincidence of petrological characteristics and radiometric ages, the Muro Pyroclastic Flow Deposit were supplyed from one of a so-called 'S-type' felsic igneous complex of the the Outer Zone of southwest Japan.