

Geological and petrological study of the Miocene Muro pyroclastic flow deposit in the Kii peninsula

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The Muro pyroclastic flow (MPF) deposit, distributed in the northern part of the Kii peninsula is one of the largest Miocene ignimbrites in Japan. Geological and petrological characterization of the MPF deposits has an importance to understand flow and emplacement mechanisms of large-scale pyroclastic flows. Previous studies reported that the MPF deposits had been formed by a large-scale felsic magmatic activity (e.g. Shiida et al., 1960). The close relationship in geochemistry, petrography and chronology among MPF and some other igneous rocks distributed in the Kii peninsula has been pointed out, although the source of the MPF was not well clarified. Recent studies reported K-Ar ages of the MPF deposit (14.31Ma: e.g. Uto et al., 1997).

The purpose of this study is to reveal the petrological and geochemical features of the MPF deposits. In this study, I discuss the flow direction and source of the MPF. The MPF deposit consists of welded tuff (e.g. Shiida et al., 1960), and the facies can be roughly divided into the black glassy upper part and the light-gray lower part. Because of the lack of remarkable difference in the mineral assemblages and mode of phenocryst minerals between these parts, their difference can be explained by the degree of the devitrification of matrix.

The size of phenocryst minerals included in the welded tuff was measured. All the phenocryst phases have similar grain size distribution, probably because the fragmentation process during transportation in the pyroclastic flow determined the crystal sizes rather than original phenocryst size distribution. Decreasing grain size from east to west suggests the flow direction. The bulk chemical composition of the Muro pyroclastic flow deposit is comparable with the biotite granite porphyry of the northern body of Kumano felsic rocks (KFR) located about 50Km south of the MPF deposits, suggesting that KFR may be the source of MPF. The E-W flow direction of the Muro pyroclastic flow must have been controlled by paleogeography of the Kii peninsula in the Middle Miocene.