The source of Kamafusayama pyroclastic deposits and debris avalanche deposit, southern Fukushima prefecture, Japan

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1. Introduction
Kamafusayama pyroclastic deposits (KfPD, 0.59-0.41Ma)[2)3)4)] consist of dacitic to andesitic pyroclastic fall and flow deposits, distributed in the southern Fukushima. The main part of KfPD compose Kamafusayama (1510m.a.s.l). The KfPD has intermediate characteristics with respect to: 1) age, 2) distribution and 3) compositions between early Pleistocene felsic large-scale pyroclastic flow deposits (Shirakawa pyroclastic flow group, about1.51Ma-0.92Ma)[1)2)5)6)] and basaltic to andesitic Nasu stratovolcanic group (0.54Ma[7)] -present). Although clarifying the eruption history and magma processes of KfPD is essential for understanding the volcanism and magmatism in this area, detailed stratigraphy and source area have not been clearly revealed. We have carried out geological and petrological study of KfPD to reveal the stratigraphy and magmatic processes, and current results can be summarized as follows; 1) KfPD is divided into two eruption stages (Eruption stage 1 and 2) separated by a paleosol layer, 2) A debris avalanche (KfDa) deposit was found at the top of Eruption stage 1, 3) Compositional trends of Stage 1 and 2 are slightly different each other on K2O-SiO2 diagram, and 4) magma mixing was a common process in each stage.
In order to determine the source of KfPD, we investigated distributions and lateral change of thicknesses of the deposits. In addition, we compared the petrologic features (petrography and whole-rock chemistry) with adjacent volcanic rocks; Ksv (Kashi volcanic rocks (after 1.47~1.21Ma)[1)6)]) which is the older products of Kashiasahidake Volcano, Kav (Kashiasahidake Volcano(0.54Ma)[7)]) forming present edifice of Kashiasahidake Volcano, and Oshiromoriyama Lavas intruding in Ksv(Early Pleistocene)[1)]. In addition, petrologic characteristics of lava fragments in KfDa were also determined.
2. Field occurrences
Both of Eruption stage 1 and 2 of KfPD consist of alternative units of pyroclastic flow and fall deposits (Eruption stage 1 and 2 are composed of 7 and 13 units, respectively). There is no paleosol layer within the units in one stage. The thickness of KfPD air-fall units increase towards Kashiasahidake Volcano. KfDa is composed of tuffaceous matrix facies and block facies. The former contains white pumice, gray pumice, scoria, and lithic fragments of tuff and lava. The latter is materials incorporated from underlying layers and mega blocks (max 3.0m in diameter) of andesitic lava. KfDa is deposited in northeastern and southeastern sides of Kamafusayama. Maximum thickness is 7.0 m at the northeastern side of Kamafusayama.
3. Petrographic characteristics and discussion
Common phenocryst minerals of Ksv, Kav, KfDa and Osd are Pl, Opx, Cpx, Opq. Some samples of KfPD, Ksv and Osd include Qtz phenocryst. Ksv and Osd are low-K dacite to andesite (SiO2=55.6-64.8wt%, K2O=0.21-0.97wt%, and SiO2=60.7-66.2wt%, K2O=0.08-0.97wt%, respectively). Kav shows low-K andesitic compositions (57.4-57.6wt% in SiO2, 0.42-0.43wt% in K2O). SiO2 and K2O contents of lava fragments of KfDa are 59.8-63.7wt% and 0.75-1.15wt%, respectively, categorized in low-K~medium-K dacite to andesite. On plots of Harker diagrams in major elements, Ksv forms similar trends to Eruption stage 1 products of KfPD. Compositional field of lavas in KfDa overlaps with those of Eruption stage1 and 2 of KfPD.
As a result, the source of KfPD can be estimated to be the Kashiasahidake Volcano owing to its distribution, lateral thickness change of air fall units and petrological similarity. We could not identify the source edifice of KfDa because there is no amphitheater on the adjacent volcanoes and petrographic

characteristics of them (Ksv, Kav, Osd) are not similar to lava fragments of KfDa.

5. Reference

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