

## Temporal changes of petrological characteristics of volcanic products between pre-caldera and post-caldera stages in Aso volcano

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In order to clarify the long-term magmatic evolution in Aso volcano, we investigated petrographic characteristics and bulk-rock chemical compositions of the pre-caldera volcanic rocks.

Pre-caldera volcanic rocks are divided into the following eight groups on the basis of their phenocryst assemblages and bulk-rock compositions: (A) cpx olivine basalt-basaltic andesite (SiO<sub>2</sub>: 49-55 wt. %), (B) olivine opx cpx andesite (54-57 wt. %), (C) olivine hornblende opx cpx andesite (56-59 wt. %), (D) opx cpx andesite (55-62 wt. %), (E) hornblende opx cpx andesite (55-59 wt. %), (F) hornblende andesite (53-57 wt. %), (G) opx cpx hornblende dacite(64-65 wt. %), (H) biotite hornblende rhyolite (72-73 wt. %). The basaltic group A includes Picritic basalt (olivine: 20 vol. %, MgO: 15 wt. %), high-Mg andesite (MgO: 6-9 wt. %) and high-Al basalt (olivine: 5 vol. %, MgO: 6 wt. %). The Picritic basalt and high-Mg andesite are distributed in patches in the southwestward of caldera. The high-Al basalt is distributed in southeastern caldera wall.

Reported eruption ages of these eight groups are as follows: (A) Picritic basalt (2.9 Ma), high-Mg andesite (3.9 Ma) and high-Al basalt (2.2 Ma), (B) 0.5 Ma, (D) 0.8-0.5 Ma, (E) 0.6-0.4 Ma, (F) 0.5 Ma and (H) 0.4 Ma. These eruption ages indicate that the magma composition drastically changed from Picritic basalt and high-Mg andesite to high-Al basalt and the other andesite-dacite-rhyolite (ADR) between 3.9 and 0.4 Ma in the pre-caldera stage. The peak of pre-caldera volcanism was between 0.8 and 0.4 Ma. Several groups probably erupted almost simultaneously during the mature stage.

The petrological characteristics of pre-caldera high-Al basalts are similar to those of the post-caldera basalts. On the other hand, the petrological features of ADR are quite difference between pre and post-caldera stages. The major phenocryst phases of caldera-forming and post-caldera ADR are plagioclase (5-40 vol. %), cpx (5 vol. %) and opx (10 vol. %). In contrast, the most of pre-caldera ADR include hornblende phenocrysts (1-3 vol. %). On the Harker diagrams of SiO<sub>2</sub> versus trace elements, the concentrations of incompatible trace elements (K<sub>2</sub>O, Ba, Rb, Zr, Nb and Y) of pre-caldera ADR are significantly lower than those of the caldera-forming and post-caldera ADR.

These observations indicate that the petrological features of volcanic products from Aso area changed between pre and post-caldera stages as follows: 1) 3.9-2.9 Ma: Picritic basalt and high-Mg andesite, 2) 2.2 Ma: high-Al basalt, 3) 0.8-0.4 Ma: high-Al basalt and incompatible element-depleted hornblende baring ADR and 4) after 0.3 Ma: high-Al basalt and incompatible element-enriched two pyroxene ADR. This temporal variation of rock type observed in Aso area probably indicates the change of composition of magma source.