

## Contributions of crust-derived mafic/intermediate and felsic magmas to the Aira catastrophic caldera-forming eruption inferred from geochemical characteristics of essential clasts

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In order to understand the origin of voluminous felsic magmas causing catastrophic caldera-forming (CCF) eruptions, we examined geochemical and petrographical characteristics of essential clasts with variable compositions contained in the Ito ignimbrite erupted at ~30 ka from Aira CCF eruption. The composition of the cores of plagioclase phenocrysts in both white and dark-colored rhyolitic pumice clasts showed a bimodal distribution with peaks at ~An<sub>85</sub> and ~An<sub>40</sub>, while those within andesitic scoria clasts exhibited a unimodal distribution peaked at ~An<sub>80</sub>. Strontium isotopic composition of the high-An<sub>70-90</sub> and low-An<sub>30-50</sub> plagioclase cores were  $^{87}\text{Sr}/^{86}\text{Sr} = 0.7068 \pm 0.0008$  and  $0.7059 \pm 0.0002$ , respectively. These observations may lead to a conclusion that the voluminous rhyolitic magma that caused Aira CCF eruption formed by mixing of the andesite and the felsic magmas which crystallized high- and low-An plagioclase phenocrysts, respectively. The andesite magma that may be derived from a less differentiated, possibly mafic magma shows lines of evidence for assimilation of the upper crustal basement rocks such as the Miocene granitic intrusions ( $^{87}\text{Sr}/^{86}\text{Sr} = 0.7119-0.7245$ ) and/or sedimentary rocks of the Shimanto Group ( $^{87}\text{Sr}/^{86}\text{Sr} = \sim 0.7145$ ). This suggests mixing of the andesite and the felsic magmas occurred at a shallow upper crustal level. The rhyolite magma has far low  $^{87}\text{Sr}/^{86}\text{Sr} = \sim 0.7059$  than that of the basement rocks whereas has a similar Sr isotope composition with the least assimilated andesite magma. Both the felsic and mafic magmas could have been derived from a same source rock, possibly the lower crust material beneath Aira caldera.

Keywords: Aira caldera, caldera-forming eruption, Sr isotope ratio, magma mixing