

Argon Isotopic Composition on Mauna Loa Historical Lavas

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K-Ar and Ar-Ar dating are widely adopted method to the reconstructions for the eruption history of the active volcanoes. Regardless of the wide use, there is a fatal problem of its basis that the initial argon isotope ratios are not fully reset, in other words, incompletely equilibrated with the atmospheric Ar. Although this phenomenon has been occasionally reported, the factors controlling have not intensively been investigated yet. Thus in this study, a set of lava systematically sampled from a historical lava flow was analyzed: sixteen samples from 1935 lava flow on Mt. Mauna Loa. Ar isotope measurement was performed with GVI-5400He as well as their major element compositions with XRF (Simultix12, Rigaku Co.) at JAMSTEC. Most of the samples showed smaller $^{38}\text{Ar}/^{36}\text{Ar}$ compared with the atmospheric isotope ratio. It may be a result of some magmatic processes at depth as well as shallower eruption related ones. Regardless of an anticipated enrichment of heavier isotopes that correlates with vesicularity for the residual argon in vesiculation, all the samples showed enrichment of lighter isotopes. Further, there is no clear correlation with vesicularity, lava type nor distances from the vent of the flow, etc.

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