

Age and petrological complexities of young alkalic magmas at Changbaishan/Mt. Baekdu Volcano

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Magmatic products erupted at Changbaishan/Mt Baekdu volcano located along the N. Korean/China border are highly complex and incorporate a range of crystals formed at variable times from compositionally variable magmas. $^{40}\text{Ar}/^{39}\text{Ar}$ ages of crystals from eruptions <20 ka reflect highly complex relationships. Selected feldspars retain near eruption ages while others retain ages that are much older, either reflecting previous crystallization events or the effects of excess argon. Additional U-series age constraints confirm the youthful nature of most crystals in young eruptions. When corrected for age using these dates, or those obtained from zircon or chevkinite, initial amounts of radium disequilibria in some feldspar populations exceed 50,000%, far surpassing the most enriched signatures measured to date (e.g., at Mt Erebus). Older crystals, those reflecting Ra equilibrium in young eruptions (<8 ka), have isotopic signatures that cannot originate from the magmas in which they are hosted. Rather, these crystals likely result from remobilization from cumulates underlying the edifice that are related to previous, but compositionally similar, magmatism. As such, we try to connect the same minerals that yield relevant ages (either from mineral remnants or from taking minerals from the same separates) to the petrogenetic history of specific magmas and other accompanying crystals types using Sr, Nd, and Pb isotopes. In so doing, a broad petrogenetic history is reconstructed that includes ages that are directly connected to individual phenocryst populations yielding a detailed understanding of petrogenesis that may be critical in making future eruption assessments at the volcano.