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# Volcanism-induced generation of high-silica granite: A snapshot from Yandangshan caldera, southeastern China

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Silicic magmatism was ubiquitous in the coastal areas of southeastern China. Today, the numerous volcanic fields and granitic plutons provide excellent locations to advance our understanding of upper crustal magmatic processes. We examine the petrogenetic links between alkali feldspar granites, porphyritic monzonites and syenites and coeval silicic volcanic rocks (e.g. rhyolite) from the Yandangshan caldera and surrounding area using zircon U-Pb ages, trace elements, and Hf isotopic ratios, and bulk-rock geochemistry. Our results strongly suggest that lithological differences within the Yandangshan caldera are the result of silicic melt segregation. The porphyritic monzonites and syenites are enriched in Sr and Ba with high Zr/Hf and positive to weak negative Eu anomaly and interpreted to represent cumulate residues of crystal-melt segregation. The alkali feldspar granites and rhyolites are enriched in Rb and depleted in Sr, Ba, and Eu and display low Zr/Hf and Eu/Eu* and high Rb/Sr ratios. Both units are interpreted to represent the evolved silicic melts that were extracted from a crystal-rich mush. Compared with the erupted rhyolites, the alkali feldspar granites have a higher silica content and Rb/Sr ratio and lower Sr and Ba contents and Eu/Eu* ratios. Furthermore, zircons of the alkali feldspar granites have the most evolved trace element signatures (high Hf, Nb, Y, U; low Zr/Hf and Eu/Eu*) of the entire suite. These features together with zircon U-Pb age indicate that the granites formed after the eruption of the rhyolitic melts. We propose that, following the eruption of the rhyolitic melts, more-evolved granitic melts were generated and successively extracted from the underlying, complementary feldspar-rich mush. By comparing the geochemical characteristics of simultaneous silicic plutonic and volcanic rocks in the coastal area of southeastern China, we demonstrate that large volumes of high-silica granitic magma were accumulated in succession to silicic eruptions.