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Continental rift rhyolites of the Basin and Range, USA: timescales of activity from the zircon and feldspar record

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The Colorado Plateau, USA, is bordered by Pleistocene continental rift volcanism in New Mexico, Arizona, and Utah. While most of the eruptions have been basaltic, rhyolitic domes, tuffs, and lavas have been produced. On the western margin, where the Colorado Plateau meets the Basin and Range extensional province, the Black Rock Desert of central Utah hosts Pleistocene-Holocene bimodal basalt-rhyolite volcanic activity. The South Twin Complex consists of six rhyolites within a single basin erupted between 2.45 and 2.40 Ma, and they precede all Pleistocene basalts of the region. In this work, we share a new rhyolite eruptive stratigraphy based on high precision $^{40}\text{Ar}/^{39}\text{Ar}$ dates and examine the zircon crystal cargo from each eruptive center. The new eruption ages allow us to examine the spatial and temporal distribution of volcanism in the South Twin Complex, whereas the zircon crystal morphology, geochemistry, and U/Pb dating allow us to assess the conditions and timescales of silicic magma processes in the subvolcanic plumbing system. Our data suggest the plumbing system beneath the region experienced punctuated influxes of magma over a brief period of thousands to tens of thousands of years. Further, the timescales and patterns of silicic magma assembly and evolution of this small anorogenic region are similar to those observed within the voluminous Yellowstone province, suggesting that the volume of magmatic flux does not control magmatic evolution in intercontinental settings.