New U-Pb Zircon Geochronology Data Supporting 1.7 Ga Crystallization Age for the Hermit’s Peak Granite, Las Vegas Range, New Mexico

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Numerous Proterozoic granitoid plutons are exposed in the Las Vegas Range, the most prominent of which is the Hermit’s Peak granite (HPG). The HPG is a tabular body that intrudes basement quartzofeldspathic gneisses and amphibolites >1.70 Ga. The body is truncated on the east by the Laramide-age Hermit’s Peak thrust fault, which juxtaposes Proterozoic basement against Paleozoic strata to the east. The HPG has often been categorized as a 1.4 Ga pluton and considered part of the enigmatic trans-Laurentian Mesoproterozoic rhyolite-granite magmatic event. The HPG displays a fairly regular steeply dipping N-NW trending biotite foliation and abundant synplutonic pegmatite sills. In thin section, the biotite occurs as euhedral plates, quartz shows straight to undulose extinction, quartz-feldspar boundaries range from curviplanar to moderately interdigitate, and feldspars show recrystallized margins. The HPG foliation is strongly developed and parallel to that of the amphibolitic country rock at its western and southwestern contacts. While no contact relationship was observed to the east, the fabric intensifies to an ultramylonite defined by a very fine grain size, ribboned feldspar and quartz, and gneissic banding before being truncated by the Hermit’s Peak thrust fault. The elongate pluton shape, the parallelism between granite and amphibolite foliations, and the continuum between magmatic and high-temperature solid-state processes during the development of the granite foliation are strong evidence for the syntectonic emplacement of the Hermit’s Peak granite. Four samples from the Hermit’s Peak batholith showing variable degrees of fabric development yielded U-Pb zircon crystallization ages of 1.714±0.017 Ga (n=19), 1.705±0.017 Ga (n=24), 1.700±0.012 Ga (n=25), and 1681±0.023 Ga (n=22). Thus, the HPG belongs to the suite of ca. 1.7 Ga plutons intruded during Proterozoic province assembly.

View of northwestern face of Hermit's Peak from Johnson Mesa.