The Hermit’s Peak batholith, a Proterozoic metamorphic-plutonic massif in the southern Santa Fe Range of the southern Sangre de Cristo Mountains, is located in the tectonic transition zone between the Yavapai and Mazatzal Precambrian provinces. We conducted U-Pb zircon geochronology on five previously undated Hermit’s Peak batholith intrusions to establish the timing of magmatism relative to Proterozoic deformation events. The Gallinas Canyon felsite is a fine- to medium-grained quartzofeldspathic gneiss that yielded a date of 1.705±0.017 Ga (n=24). The felsite displays a strong penetrative steeply dipping east-northeast trending schistocity and gneissic layering that is parallel to the axial surface of tight to isoclinal folds. The felsite is frequently interlayered with fine- to medium-grained amphibolite and commonly intruded by K-feldspar megacrystic alaskite pegmatites. The approximately 30 km² Hermit’s Peak granite is a coarse equigranular and variably foliated granite. At some locations the granite displays a strong solid-state foliation, in others a modest submagmatic to magmatic foliation, and a lack of a foliation in others. A weakly foliated sample of the Hermit’s Peak granite from Porvenir Canyon yielded a date of 1.700±12.1 Ga (n=24). The Evergreen Valley tonalite is a coarse equigranular strongly foliated garnet-bearing hornblende-biotite tonalite that crystallized at 1.736±0.014 Ga (n=24). The tonalite was intruded by the Evergreen Valley granite-gabbro complex which yielded ages of 1.448±0.012 Ga (n=43) and 1.450±11.9 Ga (n=32), respectively. The granite-gabbro complex is layered on the macroscale but lacks an internal fabric. Both the gabbro and granite are coarse equigranular and display isotropic petrofabrics. Our results illustrate the episodic nature of magmatism in the Hermit’s Peak batholith at circa 1.7 Ga and 1.4 Ga as well as the prevalence of pre-1.45 Ga deformation. Our ongoing studies are addressing the structural relationship between the Hermit’s Peak granite and its host rocks as well as the petrogenesis of the Evergreen Valley gabbro-granite complex to further understand the tectonic setting of 1.7 Ga and 1.4 Ga magmatism in the Santa Fe Range.

Keywords:

Proterozoic, granite, Hermit’s Peak, Sangre de Cristo Mountains, geochronology