# DETRITAL MONAZITE GEOCHRONOLOGY OF ORTEGA QUARTZITE CLASTS IN PENNSYLVANIAN STRATA OF THE NORTHERN TRUCHAS UPLIFT, NORTHERN NEW MEXICO: IMPLICATIONS FOR THE SLIP HISTORY OF THE PICURIS-PECOS FAULT

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Proterozoic Ortega quartzite clasts from the Middle Pennsylvanian Flechado Formation near the Rio Chiquito at the north end of the Truchas uplift were sampled to test hypotheses for the timing of slip on the Picuris-Pecos fault (PPf), a major strike-slip fault with 37 km of dextral separation. Quartzite clasts that occur in proximal alluvial deposits and sedimentary breccias directly east of the PPf were derived from the west side of the fault. Today, only granitic gneiss is exposed west of the study area, and the nearest Ortega Quartzite exposures are in the Picuris Mountains, dextrally separated from the study area by at least 20 km.

Detrital monazite ($(Ce,La,Th)PO_4$) grains were found in 8 Ortega Quartzite clasts were examined by electron microprobe. Monazite grains were identified by producing large-scale (2x2 cm) Ce chemical maps of polished sample surfaces. This process allowed the identification of a range of sizes of monazite grains, rather than preferentially focusing on large grains that are relatively easily detected using backscattered electron imaging or petrography. Monazite grains in most samples ranged between 5 and 50 microns in diameter. Widely variable chemical composition between grains supports a detrital origin. Age determinations of the monazite grains were carried out by analyzing their U, Th, and Pb concentrations, following the method of Jercinovic and Williams (2005) with technique modifications provided by M. Jercinovic (pers. comm., 2008). This technique assumes that monazite contains no common Pb at the time of crystallization, and that Pb is produced over time by radioactive decay of Th and U isotopes that are relatively abundant in this mineral phase. The age of individual 3-4 micron diameter spots on an individual monazite grain can be determined by the analyses of these, plus a range of other, elements. The technique also allows for multiple ages to be determined on a single grain, if the grain is large enough.

A compilation of the 134 ages determined for all samples shows a distinct peak in ages at around 1.42 Ga, with a second, slightly smaller peak at 1.68 Ga. Both age peaks are represented in 6 of the 8 samples analyzed, with two samples containing only ~1.4 Ga ages. Many monazite grains in samples are characterized by ~1.7 Ga cores with younger ~1.4 Ga rims. The Ortega Quartzite in the Picuris Mountains contains only ~1.4 Ga monazite. The presence of ~1.7 Ga monazite grains quartzite from the Flechado Formation implies derivation from north of the Picuris area, suggesting that at least 30 of the 37 km of dextral separation on the PPf accumulated since the Middle Pennsylvanian. Furthermore, no trends in monazite ages are observed with stratigraphic position in the 390 m thick Flechado Formation, suggesting that no systematic change in source terranes occurred during deposition of this unit as a result of syndepositional strike-slip.