Late Cretaceous porphyry copper mineralization in Sonora, Mexico and the implications for the evolution of the SW North America porphyry copper deposit Province.

VICTOR A VALENCIA[1], JOAQUIN RUIZ[1], GEORGE GEHRELS[1],FERNANDO BARRA[1], AND BENITO NOGUEZ-ALCANTARA[2]

[1]Department of Geosciences, University of Arizona, 85721-0077 Tucson, AZ (victorv@geo.arizona.edu)

[2] Servicios Industriales Penoles, blvd. Navarrete 2778, 83200, Hermosillo, Sonora,

The Southwest North America and northern Mexico province (SNANMP) represents the 2nd largest porphyry copper deposit **(**PCD) province worldwide. Most of the PCDs in this region are associated with the Laramide Orogeny. High convergence rates between the Farallon and North American plates coupled with shallow subduction are often cited to explain the considerable occurrence and distribution of PCDs throughout the states of Arizona, New Mexico and Texas in USA and Sonora and Sinaloa in Mexico. Previous work using K-Ar dating suggested that the SNANMP is composed of a series of NW-SE trending PCDs belts. These belts trend toward younger ages to the S-SW and are interpreted to follow the inferred NE subduction of the Farallon plate during the Laramide Orogeny [1]. Titley's model has several testable predications: one being that the age of mineralization should migrate outboard and another being that PCDs younger than 55 Ma should be restricted to Mexico whereas older PCDs (~65-75 Ma) should be restricted to Arizona and New Mexico. Preliminary analysis of the spatial versus temporal distribution of PCD in Northern Mexico using U-Pb and Re-Os geochronology indicate for the first time the presence of two late Cretaceous (~70-74 Ma) PCD in Sonora, Mexico, furthermore, U-Pb dating ages show overlapping magmatic events in the areas of Cananea and La Caridad in Sonora.

These new data suggest an alternative model where: 1) the late Cretaceous mineralization is not restricted to Arizona, 2) magmatism overlaps in space and time, 3) the age of the productive intrusives and mineralization are younger to the east, and therefore the mineralization follows the inland migration pattern of the magmatic arc.

References

[1] Titley, S.R., 1993, GAC **40**,.433–464.