Oxygen isotope trends of granitic magmatism in the Great Basin: Location of the Precambrian craton boundary as reflected in zircons

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ABSTRACT

The δ18O values of magmas in the Great Basin help to decipher the tectonic assembly of North America and to determine the magmatic source and potentially the composition of the crust at depth. Igneous zircons from Precambrian, Jurassic, Cretaceous, and Tertiary intrusive bodies of the northern Great Basin best preserve the record of magmatic oxygen isotope ratios. The variation of δ18O values in zircon with age reconciles previous differences in interpretation based on δ18Osys and radiogenic isotope data. The new δ18Ozr, data support the results of previous radiogenic isotope studies documenting the increased availability of crustal and sedimentary components to magmas in the Cretaceous during the Sevier orogeny and a return to a larger proportion of mantle-derived components in the Tertiary during Basin and Range extension.

In the Great Basin, δ18Ozr values also vary systematically with crustal structure as determined by radiogenic isotope systematics. Plutons emplaced east of the 86Sr/88Sr = 0.706 isopleth have higher δ18Ozr values than plutons intruded west of the 0.706 line. However, analyses of δ18O values in quartz do not show the bimodal distinction across the 0.706 line owing to subsolidus alteration. On the basis of δ18Ozr, plu-

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