

Recycled zircon populations in Pleistocene Lake Thatcher and Lake Bonneville deposits, Portneuf and Bear River, SE Idaho

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Detrital zircon age-populations obtained at the Arizona LaserChron Lab from sand samples from SE Idaho trunk drainages (Bear River and Portneuf River) document an Idaho-Wyoming thrust-belt zircon “barcode”, and also contain specific local grain-populations. Zircons from the Bear River drainage, in Pleistocene deposits from the Lake Bonneville basin (Riverdale delta) and the Lake Thatcher basin (center of basin below Black Canyon Dam), have undergone at least three episodes of sediment recycling. Age-populations include Archean Wyoming Province (20%--peaks from 2.7 to 2.8 Ga), a small <5% group of Mojave Province? Paleoproterozoic 1950 Ma grains, 25% Paleoproterozoic Yavapai Province grains (with peaks around 1,680, 1,750, and 1,790 Ma), Mesoproterozoic A-type granites (15% of grains, with peaks at 1305, 1400 and 1490 Ma), a major (30%) recycled Grenville Province grouping with peaks around 1,050, 1,110, and 1,190 Ma, and a small <10% discordant population near 100 Ma, likely recycled through proximate sources in Mesozoic thrust belt sandstones from ultimate sources in the Idaho batholith or its volcanic cover. The Precambrian grains are recycled from Neoproterozoic Uinta Mountain Group and Brigham Group sandstones that crop out in the Bear River drainage, and from thrust belt sandstones that contain the same populations. We track a large proximal population of 510-490 Ma grains from the Upper Cambrian Worm Creek Quartzite Member of the St. Charles Formation from Williams Canyon into the Thatcher basin. Bonneville Flood deposits of the Portneuf River contain <10% 700 Ma grains from the Bannock Volcanic Member (Pocatello Formation) and 15% 20 to 5 Ma grains derived from Miocene basin-fill (Salt Lake Fm).