

Detrital Zircon Evidence for Local and Distal Provenance of a Regionally Integrated Drainage Network, Renova Formation, Southwest Montana

Jennifer L. Rothfuss and Amy L. Weislogel

Department of Geological Sciences, University of Alabama, Tuscaloosa, AL 35487

Detrital zircon U-Pb ages from granitic clasts and arkosic sandstones determined using Sensitive High Resolution Ion Microprobe-Reverse Geometry (SHRIMP-RG) and Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) combined with paleoflow and facies data indicate local and distal uplifts supplied sediment to the Paleogene Renova Formation.

West of the Boulder batholith, trunk fluvial facies in Divide basin yield 78.5 ± 0.5 Ma zircon locally sourced by Climax Gulch and/or Burton Park lobes of the Boulder batholith as well as locally and/or distally sourced 81.4 ± 2.0 Ma Elkhorn Mountain Volcanics zircon and 1732 ± 25 Ma Belt Supergroup zircon. Sands yield distally sourced 71-73 Ma Idaho batholith zircon and ~51 Ma zircon from plutonic rock in the Anaconda Range. Alluvial facies in the Divide-Melrose basin yield zircon sourced by Dillon Volcanics, Cretaceous plutonic and sedimentary rocks, and Archean metamorphic rocks reflecting radial dispersal from adjacent McCartney Mountain and the Highland Range.

East of the Boulder batholith, trunk fluvial sandstones and gravels in Jefferson, North Boulder, and Three Forks basins yield local 73-80 Ma Boulder batholith-Elkhorn Mountain Volcanics zircon. A granitic cobble and sandstones from Harrison basin yield 74-76 Ma and Archean zircon from plutonic and metamorphic rocks of the adjacent Tobacco Root uplift.

Data indicate interconnectivity of basins west of the Boulder batholith characterized by detrital mixing of zircon from local and distal plutons and uplifts. Due to absence of distally sourced zircon in eastern paleodrainages, it is inconclusive whether the regional fluvial system continued east of the Boulder batholith.