Comparing detrital zircon U-Pb age data to determine provenance relationships of Upper Cretaceous strata southwest New Mexico and southeast Arizona

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Analysis of detrital zircon U-Pb age data of the Early Cretaceous Hell-to-Finish Formation of the Little Hatchet Mountains in New Mexico and the Late Jurassic Glance Conglomerate and Early Cretaceous Morita Formation of the Huachuca Mountains in Arizona indicates different provenance histories. Formerly, the Hell-to-Finish Formation has been considered genetically similar and correlative with the redbeds of the Glance Conglomerate and Morita Formation based on outcrop appearance and stratigraphic position. In the SW Huachuca Mountains, a detrital zircon sample from a volcanic litharenite high in the Glance Conglomerate contains dominantly Early to Middle Jurassic grains (81 of 96 grains) derived from underlying volcanic rocks. Unconformably overlying the Glance Conglomerate, the lower Morita Formation transitions from nearshore facies rocks at the base to fluvial facies rocks. A detrital zircon sample of 90 grains from a nearshore subarkose contains mostly Triassic (n=12) and Proterozoic grains (n=60) but only a few Early Jurassic grains (n=6), reflecting burial or late stage erosion of Jurassic rocks. Higher in the section, a fluvial volcanic litharenite contains abundant Cretaceous grains (ca. 145 – 120 Ma) from the arrival of volcanic material to the west. In the Little Hatchet Mountains, the lower Hell-to-Finish Formation is fluvial, and the sandstones are litharenites that contain abundant chert and carbonate clasts and no volcanic fragments. A detrital zircon sample of the Hell-to-Finish Formation is composed almost exclusively of pre-Triassic grains (78 of 79 grains) and was sourced from the Burro uplift to the north. In contrast, the Morita Formation received a significant component of material from a western source that is not reflected in the Hell-to-Finish Formation, suggesting the basins were isolated. Material for the Glance Conglomerate was locally derived and is not an input for the Hell-to-Finish Formation.

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