ABSTRACT

TESTING THE LATE CRETACEOUS KAIPAROWITS-MESAVERDE FLUVIAL CONNECTION: A DETRITAL ZIRCON U-PB GEOCHRONOLOGIC AND PETROGRAPHIC PROVENANCE APPROACH

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Detrital-zircon analysis of Upper Cretaceous (Campanian) strata of southern and east-central Utah provides an opportunity to examine long-distance dispersal systems and test correlations of continental strata. Sandstone samples from fluvial strata of the Kaiparowits Formation (n=5) from the Kaiparowits Plateau of southern

Utah and Mesaverde Group (Neslen, Bluecastle Tongue of Castlegate, Farrer, and Tuscher formations; n=7) from the Book Cliffs north of Green River confirm correlations of the Kaiparowits Formation with post-Castlegate strata of the Mesaverde Group. Thrust-belt derived sublitharenite and quartzarenite of the Neslen and Bluecastle Tongue formations, respectively, lack Mesozoic grains and contain a broad spectrum of Archean (Neslen peak at 2700 Ma), Proterozoic (peaks at ~1700, 1400, 1100, 1000, and 580 Ma) and Paleozoic (peaks at 528 and 413 Ma) grains that record recycling of Proterozoic, Paleozoic and Jurassic sandstones exposed in uplifted thrust sheets. South-derived feldspathic litharenite of the Kaiparowits, Farrer and Tuscher formations contain Proterozoic grains (peaks at ~1700, 1400 and 1100 Ma) and a diverse population of Mesozoic grains (Triassic-Jurassic peaks at 200, 178, and 150 Ma; Cretaceous peaks at 98, 80, and 76 Ma). Archean grains are rare to absent. The Precambrian grain ages are consistent with ultimate derivation from basement sources in the SW US and the Mesozoic grains were derived from magmatic arc rocks of the southwestern US. TuffZirc ages for the six youngest grains from three Kaiparowits samples are statistically indistinguishable from $^{40}Ar/^{39}Ar$ ages on bentonitic tuffs at the same stratigraphic horizons (76-74 Ma) and TuffZirc ages from the Farrer Formation. TuffZirc data also indicate that the Tuscher Formation is older (74-72 Ma) than previously inferred. Statistical analyses, including Overlap-Similarity and Kolmogorov-Smirnoff Statistical tests, in conjunction with young grain ages and detrital age spectra, corroborate petrographic evidence that

Kaiparowits rivers connected northward with the river system that deposited the Farrer Formation.