Supplemental Item S13 – Examples of differences between DZ vs DARL populations

DARL ages <35 Ma (96%) dominate the Chetaslina River and correspond with <35 Ma volcanic bedrock exposed upstream (25% of the watershed) among extensive ice (16%) (Figs. 4, 9; DR5). In contrast, DZ ages <35 Ma represent only 1% of the Chetaslina sample; instead, a 150 Ma DZ age peak dominates the age spectra, reflecting contributions from Late Jurassic plutons and Quaternary sediments that comprise 4% and 53% of the watershed, respectively. The adjacent Dadina River exhibits similar DARL and DZ age discrepancies. Another example, the Nabesna River, yields 94% DARL ages <35 Ma that match <35 Ma volcanic-plutonic bedrock that makes up much of the watershed (22%) along with abundant ice (33%) (Figs. 4, 9, DR5). In contrast, DZ ages <35 Ma make up only 6% of the Nabesna sample; instead, Cretaceous DZ ages dominate the age spectra, reflecting contributions from Cretaceous plutons and Quaternary sediments that make up 4% and 27% of the watershed, respectively. Lastly, Rocker Creek shows 89% DARL ages <35 Ma that overlap <35 Ma volcanic-plutonic sources that comprise 65% of the watershed (Figs. 4, 5; DR5). In contrast, DZ age spectra lack ages <35 Ma and are exclusively Late Cretaceous–Paleocene ages that reflect recycling of Quaternary sediments that comprise 36% of the watershed, and perhaps unmapped Late Cretaceous–Paleocene igneous rocks.