Parsons et al., 2018, Structural evolution of a crustal-scale shear zone through a decreasing temperature regime: The Yukon River shear zone, Yukon-Tanana terrane, Northern Cordillera: Lithosphere, https://doi.org/10.1130/L724.1.

GSA Data Repository Item 2018357

Data Repository File DR1:

**U-Pb zircon geochronology - analytical procedures & zircon images**

*The Yukon River shear zone*

AJ Parsons, MJ Coleman, JJ Ryan, A. Zagorevski, NL Joyce, HD Gibson, KP Larson

1) **U/Pb isotopic system analytical procedures**

Samples 10RAYMC023A02, 10RAYMC005A02 and 16RAY-JR140A01 were pulverized using a standard jaw crusher and disk mill and then washed using a Wilfley table at GSC Ottawa. Samples 11RAYAZ297A and 11RAYJR238A were pulverized using an electric pulse disaggregator at Overburden Drilling Management in Ottawa, ON. Subsequent micropanning of the <850µm fraction was done at GSC Ottawa. Heavy liquid and Frantz magnetic separation of all three samples was carried out at GSC Ottawa. Analytical procedures and calibration details followed those described by Stern (1997) and Stern and Amelin (2003). Briefly, zircons were cast in 2.5 cm diameter epoxy mounts along with the Temora2 zircon primary standard, the accepted $^{206}\text{Pb}/^{238}\text{U}$ age of which is 416.8 ± 0.33 Ma (Black et al., 2004). Fragments of the GSC laboratory zircon standard (z6266, with $^{206}\text{Pb}/^{238}\text{U}$ age = 559 Ma) were also included on the mount as a secondary standard, analyses of which were interspersed among the sample analyses throughout the data session to verify the accuracy of the U-Pb calibration. For the mount including sample 16RAYJR140A01, only the z6266 standard was viable and, therefore, z6266 in this case was used as the primary standard. The mid-sections of the zircons were exposed using 9, 6, and 1 µm diamond compound, and the internal features of the zircons (such as zoning, structures, alteration, etc.) were characterized in both back-scattered electron mode (BSE) and cathodoluminescence mode (CL) utilizing a Zeiss Evo 50 scanning electron microscope. The mount surfaces were evaporatively coated with 10 nm of high purity Au. Analyses were conducted using an $^{16}\text{O}^+$ primary beam, projected onto the zircons at 10 kV. Prior to analysis, the ion beam was rastered over the area of interest for 2 minutes in order to locally remove the Au coating and eliminate effects of surface common lead. The sputtered area used for analysis was ca. 13-23 µm in diameter with beam currents ranging between 3.5 and 14.5 nA.
U-Pb isotopic data was acquired using the Sensitive High Resolution Ion Micro Probe (SHRIMP II). The count rates at ten masses including background were sequentially measured over 6 scans with a single electron multiplier and a pulse counting system. The 1σ external errors of $^{206}$Pb/$^{238}$U ratios reported in the data table incorporate the error in calibrating the standard Temora2 zircon. The data presented here was analyzed on three different epoxy mounts; details of each analytical session are provided in the footnotes of Table DR1. Off-line data processing was accomplished using customized in-house software. Isoplot v. 4.15 (Ludwig, 2008) was used to generate concordia plots and to calculate weighted means. Errors for isotopic ratios in Table DR1 are given at 1σ uncertainty, as are the apparent SHRIMP ages. Age errors reported in the text are at the 2σ uncertainty level, and encompass the combined statistical uncertainty of the weighted mean age for the population and the 2σ error of the mean of the Temora2 zircon calibration standard (except in the case of sample 16RAY-JR140A01). No fractionation correction was applied to the Pb-isotope data; common Pb correction utilized the Pb composition of the surface blank (Stern, 1997). All ages are reported as the $^{207}$Pb-corrected weighted mean $^{206}$Pb/$^{238}$U age. The error ellipses on the concordia diagrams and the weighted mean errors are reported at 2σ. Reasons for excluding single-spot analyses from the weighted mean age are outlined in Table DR1. In Figure 4, MSWD is defined as the mean square of weighted deviates, and POF is defined as the probability of fit.
2) **Back-scattered electron (BSE) and cathodoluminescence (CL) zircon grain images**

Images of representative zircon grains from all samples with spot analysis locations and spot ages are presented below.