

Figure S1. Results of $^{40}\text{Ar}/^{39}\text{Ar}$ dating analyses for volcanic units investigated in this work. (a) Single crystal fusion analyses for the Kingston Canyon Tuff. Bar heights represent the date $\pm 2\sigma$. The * symbol indicates analyses that were used in the calculations of ages and associated statistics. (b) Single crystal fusion analyses for the tuff of Tibadore. Bar heights represent the date $\pm 2\sigma$. The * symbol indicates analyses that were used in the calculations of ages and associated statistics. (c, d) Single crystal fusion analyses for the Antimony Tuff from two locations. Bar heights represent the date $\pm 2\sigma$.

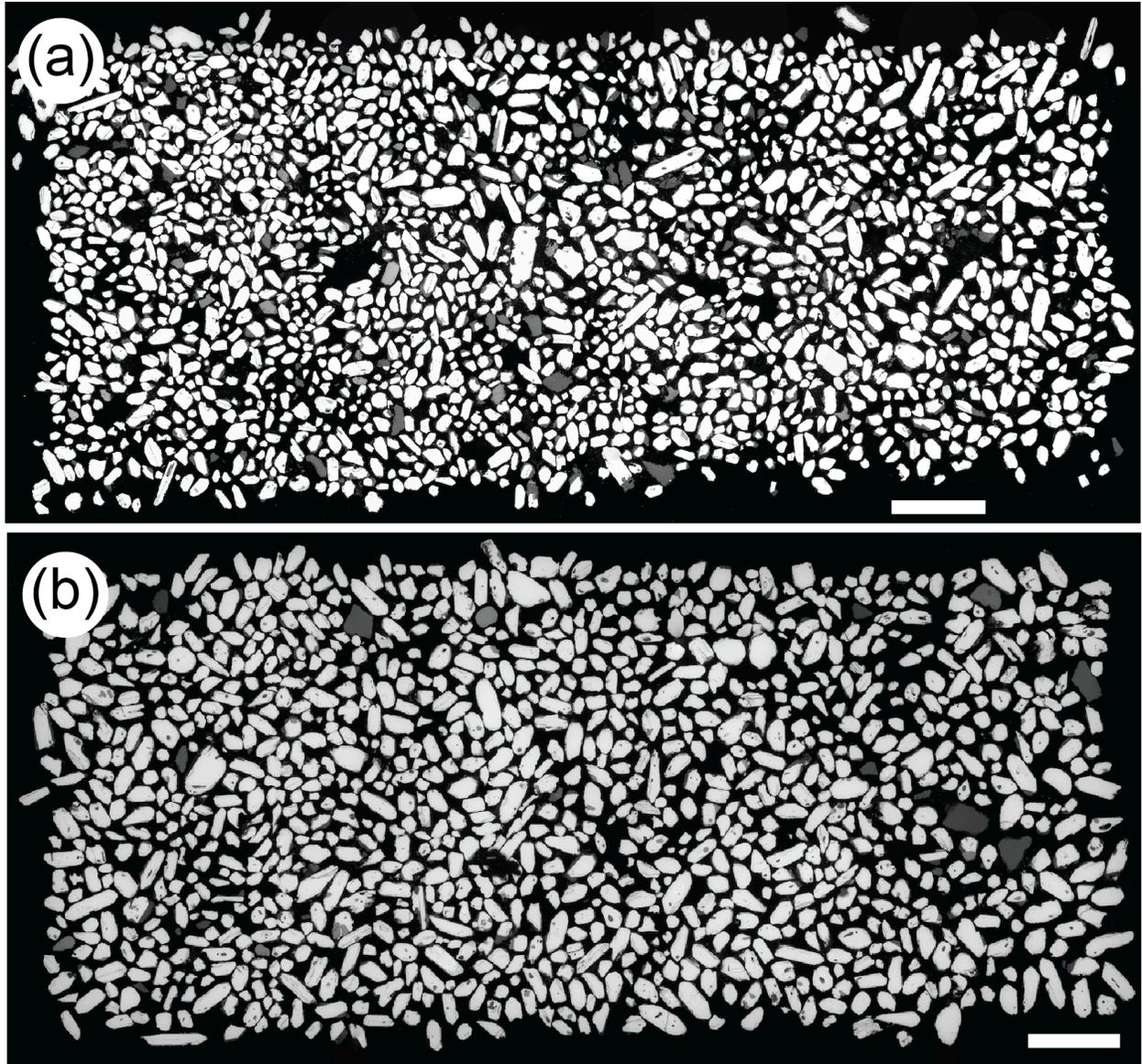


Figure S2. Backscattered electron images of zircon grain mounts. (a) Kingston Canyon Tuff; (b) alluvium of the Mount Dutton Formation. Scale bar measures 500 micrometers.

List of tables provided as a supplementary Microsoft Excel file (Rivera_supp_tables.xlsx).

- Table S1: Location data for samples of this study
- Table S2: Full analytical data for $^{40}\text{Ar}/^{39}\text{Ar}$ analyses of the Kingston Canyon Tuff and tuff of Tibadore
- Table S3: Full analytical data for $^{40}\text{Ar}/^{39}\text{Ar}$ analysis of the Sevier gravity slide pseudotachylyte
- Table S4: Full analytical data for $^{40}\text{Ar}/^{39}\text{Ar}$ analyses of the Antimony Tuff
- Table S5: Full analytical data for $^{40}\text{Ar}/^{39}\text{Ar}$ analyses of the Langdon Mountain lava flow
- Table S6: Full analytical data for zircon U/Pb analysis of the Kingston Canyon Tuff (sample ID KCT)
- Table S7: Full analytical data for zircon U/Pb analysis of the Mt. Dutton Formation breccia

References cited in the supplementary materials.

Min, K., Mundil, R., Renne, P. L., and Ludwig, K.R., 2000. A test for systematic errors in $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology through comparison with U/Pb analysis of a 1.1-Ga rhyolite. *Geochimica et Cosmochimica Acta* 64, 73-98.

Taylor, J. R., 1982. *An introduction to error analysis: the study of uncertainties in physical measurements*, University Science Books, Mills Valley, California, 270 p.