**Topic:** Detrital Zircon geochronology

**Data Sources and Publications:**

*Jones, J.V., III and Thrane, K., 2012, Correlating Proterozoic synorogenic metasedimentary successions*

*in southwestern Laurentia: New insights from detrital zircon U-Pb geochronology of Paleoproterozoic quartzite and metaconglomerate in central and northern Colorado, U.S.A., Rocky Mountain Geology, v. 47, p. 1-35.*

*Excel spreadsheet with zircon U-Pb data from Jones and Thrane study*

**Additional resources:**

*U-Th-Pb basics.pdf - A short crash course document in U-Pb geochronology created by Ellen Alexander*

*(CU postdoc)*

*Concordia Diagram.xlsx - Excel file for plotting data on concordia diagrams (created by Ellen Alexander)*

**Goal:** 1) To understand the general utility and approach of detrital zircon analysis

2) To understand the basic approach of U-Pb isotope geochronology (in this case by LA-ICPMS), and pros and cons of collecting U-Pb data with different techniques

3) To understand the constraints that these data place on the geologic history of the rocks in the map area.

**Figures to create:**

1. Summary diagram showing relevant components of the Jones and Thrane (2012) study, including 1) map of Idaho Springs-Ralston shear zone segment closest to our map area with sample locations and location of our mapping area, 2) most relevant components of Fig. 5 and Fig. 7E through J.
2. Histogram. Create a new histogram plot from data on the sample that was collected nearest to your mapping area in Jones and Thrane (2012) and plot its location on a version of your field map. This is J08-CC-QBC1.
3. Plot these data on a concordia diagram using the “Concordiadiagram.xlsx” spreadsheet.

**Questions to Answer:**

1. Give some options for the sources of clasts (provenance) for the metasedimentary rocks.
2. Are they related to any of the other geologic units in this mapping area?
3. Be prepared to explain Fig. 7 E through J (histograms and concordia plots for each of 3 samples from Jones and Thrane, (2012)).
4. What does this data tell you about relative ages of crystallization, deposition, and metamorphism of these rocks and minerals?
5. How would this additional data and your interpretations of them subsequently affect your original map and cross-section interpretation?
6. How do these data and interpretations relate to other field and analytical datasets that other students groups are working with? In your case, pay close attention to igneous zircon geochronology data from the Boulder Creek Granodiorite.
7. Identify some of the main sources of uncertainty in these data and interpretations and discuss some ways that they are addressed.