**Topic:** Igneous Zircon geochronology

**Data Sources and Publications:**

*Premo, W. R. and Fanning, C. M., 2000, SHRIMP U-Pb zircon ages for Big Creek gneiss, Wyoming and*

*Boulder Creek batholith, Colorado: Implications for timing of Paleoproterozoic accretion of the northern Colorado Province, Rocky Mountain Geology, v. 35, p. 31-50.*

*Premo and Fanning 2000 data.xlsx - Excel file with Premo and Fanning U-Pb data*

**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)*

**Goals:**

1) To understand the general utility and approach of igneous zircon geochronology analysis

2) To understand the basic approach of U-Pb isotope geochronology (in this case by SHRIMP) and the pros and cons of various techniques used to acquire U-Pb data

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

**Figures to create:**

Summary diagram showing relevant components of the Premo and Fanning study, including 1) map of Boulder Creek batholith with sample locations and location of our mapping area, 2) a simple concordia diagram created by you with data from this study plotted (use the provided spreadsheet called “Concordiadiagram.xlsx”), and 3) optional, some other relevant components of Fig. 9, 10, and 11 from the Premo and Fanning paper.

**Questions to Answer:**

1. What exactly do these U-Pb dates mean?
2. Why is there a variety of dates for the same sample or unit, apparently calculated in different ways?
3. What does a concordia diagram show?
4. What is the difference between crystallization ages and pluton emplacement age?
5. What are the relative ages of the pluton’s emplacement, quartzite sediment deposition, and their deformation?
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 the detrital zircon data from the Coal Creek Quartzite.
7. How would this additional data and your interpretations of them affect your original map and cross-section interpretation?
8. Identify some of the main sources of uncertainty in these data and interpretations and discuss some ways that they are addressed.