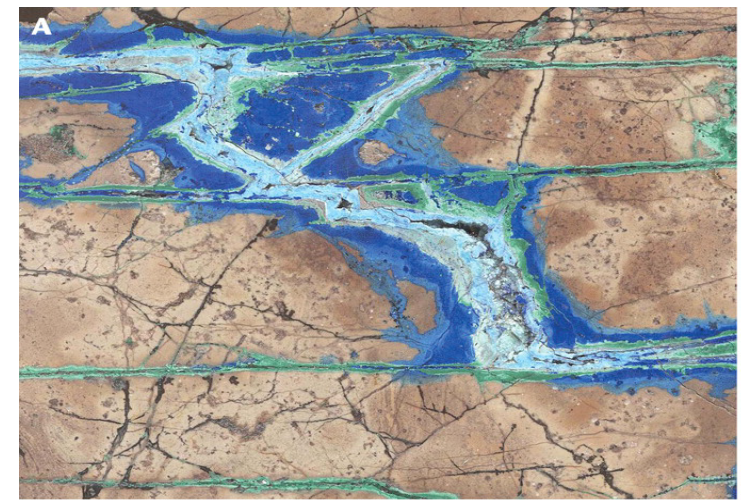
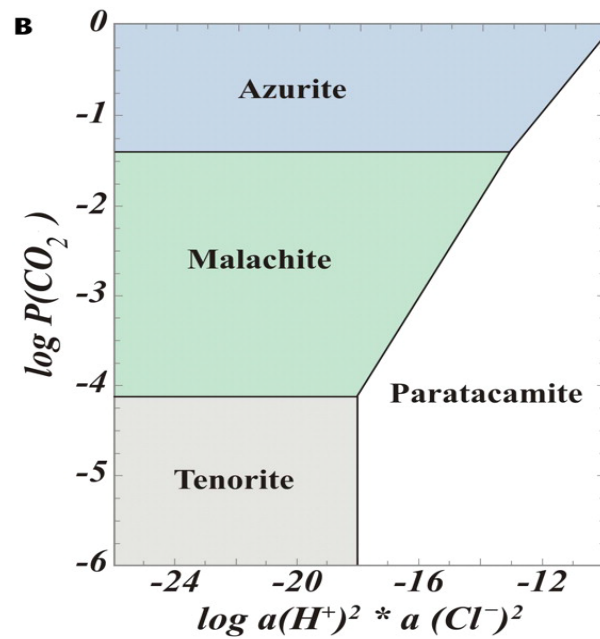


Introduction: The communicative power of visuals that are frequently used in Earth Sciences may be dramatically different to a student and to an expert because of differences in prior knowledge and inference during interpretation. Visual literacy is as fundamental to Earth Sciences as its vocabulary and the recognition of what one "sees" and interprets in a visual depiction are critical for enhancing student learning and for effective communication. We are developing a pre/post assessment in EOSC 322 Metamorphic Petrology, which will consist of a series of images and relational graphics. Students will be asked to interpret the visuals at both the beginning and end of the course, so we can assess learning and visual literacy.

Example 1: Write a paragraph describing the geological history of the sample.



(A) Thin section of a 10 cm polished slab of rhyolite.



(B) Phase diagram of rhyolite.

What do different students see?

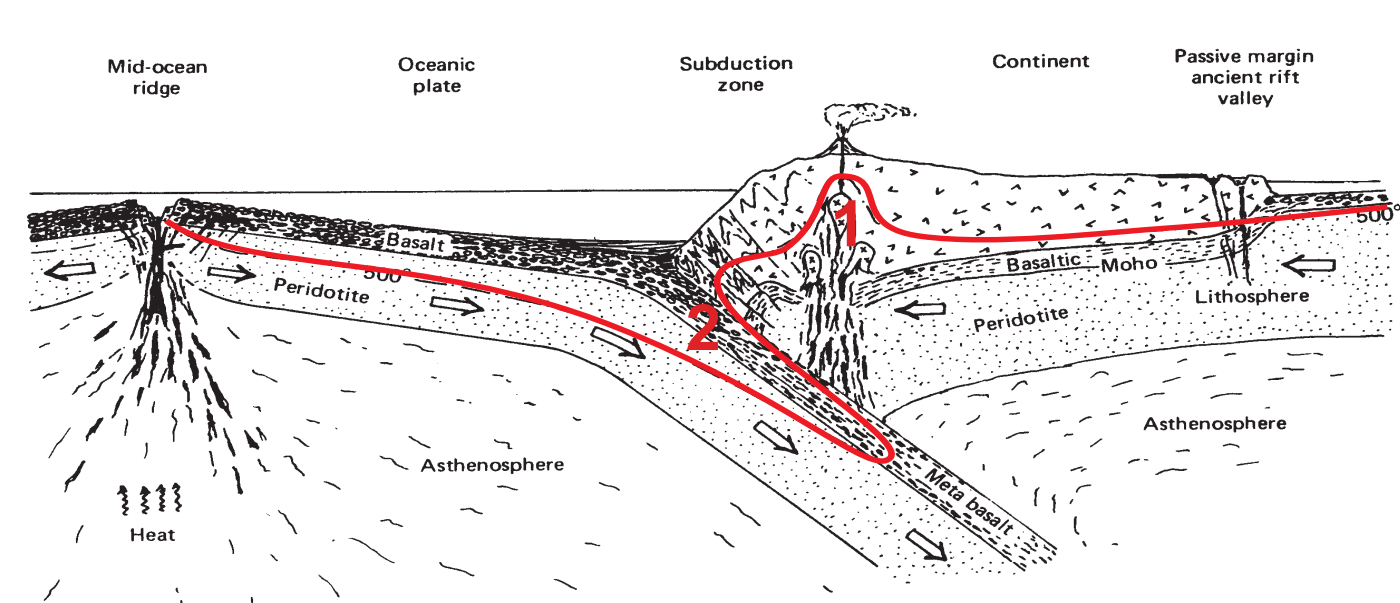
Example 1:

- 2nd year student: might "see" the crosscutting relationships and recognize that there are different minerals.
- 3rd year student: might recognize minerals by color and determine the sequence of formation.
- Expert: might infer the decrease in log P_{CO₂} of the fluid phase as required by the transition from azurite to malachite.

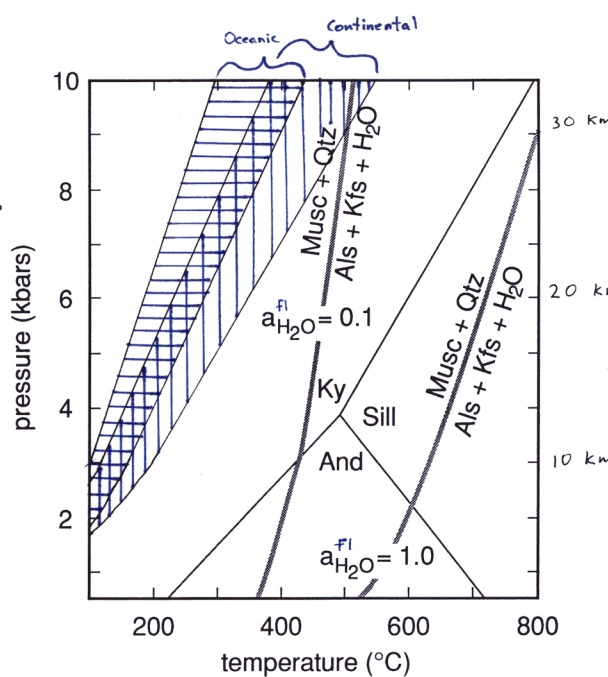
Example 2:

- 2nd year student: might map the pressure temperature conditions at points 1 and 2 in C to the correct regions in D.
- 3rd year student: might evaluate the implications for mineral content in rocks from regions 1 and 2.
- Expert: might relate the pressure temperature conditions of points 1 and 2 to stable oceanic and continental geotherms (shown by hatched lines in D).

Example 2: Locate points 1 and 2 from figure C onto figure D.



(C) Cross-section of a subduction zone



(D) P-T diagram

Summary

- Images can teach both spatial and temporal aspects of geology.
- Getting students to map qualitative data acquired from spatial and temporal sequences onto non-spatial domains, provides an additional method to measure students interpretation of images.
- In addition to the pre/post assessment, visual literacy will be incorporated into course level goals and assignments and exams will include specific questions requiring use of these visuals.
- By incorporating specific explanations as new visuals are introduced into our course, we hope visual literacy will be attained in parallel with conceptual material.