Overarching goals

• move the students from textbooks -> primary literature
• relate class material with current research within geology to give them a context for why this course is relevant
• move away from purely lecture-based classes to more discussion-based settings

Reading the literature

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Sequence of classes

• Mineralogy:
  – one paper a week from Geology
  – each paper deals with a different mineral
  – papers come from a variety of subdisciplines from within geology
  – all papers from within last 10 years
• Petrology:
  – one paper a week; most from Geology but not all
  – each paper relates to at least one topic from that week’s lecture topics
  – emphasis on current methods to address questions
  – all papers from within last 10 years (most within 1 year)

Sequence of classes cont.

• Structure:
  – one paper a week; from GSA Bulletin or Lithos
  – each paper relates to at least one topic from week’s lecture
  – trying to highlight methods from geophysics / remote sensing / GIS to solve structure problems
  – all papers from within last 5 years

Format

• discussion occurs at end of the week
• pdf’s posted on class site on Monday along with reflection questions
• reflection responses due back to instructor via class site at least 30 minutes before discussion starts
  – students can’t see other responses
  – grading based on did do / sort of did / didn’t do basis
  – worth 5% of overall grade

evolving reflection questions

• mineralogy:
  – very leading questions
  – asked students to focus on specific terms / concepts / diagrams in papers
  – always ended with:
    • terms you didn’t understand?
    • concepts that were hard to grasp?
  – move towards broader questions in 2nd half of course, but still explicitly asked
• petrology:
  – questions more open and focused on whether or not data / interpretations matched lecture topics
evolving reflection questions cont.
- always asked about diagrams
- asked “how / where would you use this method elsewhere?”
  - structure
    - very open questions
    - focus more on methods -> interpretations as tools to be used elsewhere

discussion format
- responses used to start discussion about papers, but then open to further questions / topics of interest brought up by students
- all students encouraged to participate in discussion
- discussions varied from 15 – 50 minutes depending on topic
- food to aid discussion provided by instructor
  - mineralogy:
    - more instructor answering questions / leading discussion
    - questions varied quite a bit into “how does that type of analysis work?” or “what exactly is a ________?”
  - petrology:
    - more student discussion with less instructor input

discussion format
- focus more on differences between lecture material & paper read
- fewer “how does that type of analysis work?” or “what exactly is a ________?” but still occurred
- structure
  - beginning of semester, instructor still lead – by end, one student chosen each week to facilitate discussion & keep it rolling
  - students answered other student’s questions first before instructor spoke up (if needed)

Successes
- mineralogy:
  - our second paper resulted in an NSF-worthy research proposal!
  - students moved away from “what does this word mean?” to “could this method be applied to _______?” type responses
- petrology:
  - brought current avenues of research into discussion
  - gave context to why the class had a large “how you use ______ to determine ______” focus

Successes
- structure:
  - curriculum lacking GIS / remote sensing / geophysics class, so brought topics up without being “how does ___ work” heavy
  - students became more & more able to answer each others questions

Pitfalls
- mineralogy:
  - some minerals are difficult to find papers about
  - some topics just had no student interest
  - takes time to find papers & write intelligent response prompts
  - papers get retracted
- petrology:
  - metamorphic petrology poorly represented in <5 yrs of Geology
  - questions at beginning were too vague
  - could use a few more weeks for a few more topics...
- structure:
  - long papers were a struggle for some students