Re-examining Teaching Strategies for Foundational Earth Science Topics
Jonathan Lambert's Fall 2020 LTF Event
October 19th, 2020

See PPT for for a general flow of the workshop

What are some difficult earth science topics to teach/learn?
- Answers that came up in pre-workshop questionnaire
  - CORIOLIS
  - MILANKOVITCH
  - MINERAL/ROCK ID
  - FLUID DYNAMICS
  - Isotope systematics
  - Atmospheric Circulation
  - Tectonics
  - Climate teleconnections (NAO, PDO, ENSO)
  - Vorticity
  - Gravity (Geoid?)
  - Stereonets
  - Principal Component Analysis
- Answers that came up in the workshop
  - Thermal wind
  - Intersections between earth science topics
  - Carbon cycle
  - Mohr circles
  - Stress types at different geologic zones
  - Secular equilibrium
  - Heat flow (latent, radiative, sensible)
  - Force balance
  - Mantle convection
  - Radiogenic dating
  - Geologic time periods

Why are these difficult?
- Jargon
- Interdisciplinarity
- Assumptions of knowledge

Some pedagogical aids for these topics:
- https://www.youtube.com/watch?v=HIyBpi7B-dE&ab_channel=AtlasPro
- https://app.visiblegeology.com/
- https://rockd.org/
- https://vrglaciers.wp.worc.ac.uk/wordpress/
- https://www.youtube.com/watch?v=1Y1Qi821n-s

- https://earth.nullschool.net/
- https://www.youtube.com/channel/UCnUHxOSVY4G4OFbF8XL1qUg
- https://svs.gsfc.nasa.gov/forEducators/Start_Here.html
- https://earth.nullschool.net/#current/wind/surface/level/orthographic=-35.55,24.54,192/loc=-50.112,37.962
- https://www.youtube.com/watch?v=uLxpCrYdc00&list=PLDrzzwhdpdSBiMLT5TZkySriC4QUhG4Wo&index=23&ab_channel=NickHall
- https://climate.nasa.gov/climate_resources/146/video-simulated-clouds-and-aerosols/

What makes a good pedagogical aid/resource?

- Rich with detail
- Accessible
- Expands your field of knowledge
- Zoom friendly (during COVID-19)
- Clearly stating goals

What are the weaknesses of a resource?

- Difficult to follow/self-direct through it
- Low level of Bloom's Taxonomy
- Not sufficiently annotated (if it is a diagram)
- Limited explanations
- Jargon/assumptions
- Too much information