Schedule for today

• 12:00 - Kurt Burmeister & Chris Atchison: News & announcements

• 12:10 - Alison Duval: Landslide mapping & analysis module

• 12:20 - Shannon Dulin: Combined stratigraphy/mapping exercise

• 12:30 - John Geissman: Geology of White Mesa area, Ojito Wilderness, San Ysidro, north-central NM; A splendid introductory field geology mapping exercise

• 12:40 - John Geissman & Bob Krantz: 20 min discussion on challenges & best practices w/ online instruction
Announcements

Teach the Earth - list of activities growing!!

https://serc.carleton.edu/NAGTWorkshops/online_field/activities.html

Confronting racism in the field -- open forum

Tomorrow (6/28), 1-2 PM PDT

Zoom invite in email, or contact me

Please invite whomever you think might benefit/contribute
Mapping and Analyzing a Landslide Inventory with lidar data –
Alison Duvall (University of Washington) and Erich Herzig (University of Washington)

Landslides along Cedar River, King County, WA
Landslide in Mt. Rainier Natl. Park, WA

Images from Washington Geospatial Open Data Portal
This module will familiarize students with empirical methods of mass movement hazard analysis, will provide them with training in mapping and analyzing landslide inventories from lidar data, and practice synthesizing results and writing formal reports.

**Duration:**
5 full days (can be shortened)

**Part 1:** Examining the Distribution of Mass Wasting Events - Puerto Rico and Arizona

**Part 2:** Landslide Mapping from lidar & Susceptibility Analysis - Seattle, WA

3. Students will **analyze** and **compile** characteristics of mapped landslides for **comparison** across the mapping area.

4. Students will **synthesize** mapping and data analysis results into a comprehensive written report.

**Products for Assessment**

1. Part 1 culminates with a short group presentation

2. Part 2 culminates with a comprehensive written report that includes mapping products and tables.
Part 1: Examining the Distribution of Mass Wasting Events - Puerto Rico and Arizona

[Unit 2 of the 4 part GETSI module]

Calculating and Analyzing LSI Student Exercise –
Bobak Karimi (Wilkes University) and Stephen Hughes (University of Puerto Rico – Mayaguez)

- Use ArcGIS to explore factors that contribute to the distribution patterns of mass wasting events in Arizona and Puerto Rico using a frequency-ratio method
- Categorize geospatial factors (elevation, slope, aspect, mean annual precipitation and calculate landslide susceptibility index (LSI) values for each category
- The LSI is based on the frequency of landslides and areal extent of each category and can be used to quantitatively estimate the relationship between the spatial distribution of landslides and each geospatial factor explored.

1.2 Days - Group analysis & oral presentations of findings
Part 2: Landslide Mapping from lidar & Analysis of landslide inventory - Seattle, WA

- Use ArcGIS to map a landslide inventory on lidar for 14 separate mapping areas in city of Seattle

- Perform analysis of landslide inventory, including: LSI (based on Part 1), landslide area, roughness, runout length, and failure style

- Students share landslide inventories and write (individual) reports discussing spatial patterns in landslides around Seattle

3.8 Days - Group (or individual) mapping + Individual Student Written Reports
Cañon City, Colorado
Stratigraphic section and mapping exercise

Shannon Dulin, Steve Adams, Alicia Bonar
University of Oklahoma-Bartell Field Camp
sdulin@ou.edu
2 weeks of curriculum

- Stratigraphic Section
- Mapping Project

- Intro TourBuilder to stratigraphy of the area and to Google Earth web
Grape Creek Strat and Mapping Area

- Built mapping area in Google Earth Web and provided intro kml file with follow-along pdf
- Subset of mapping area provided as a kml file and was used for stratigraphy
- Students could choose digital or paper mapping and drafting
Strat and Mapping Symbol Key

- Information (place name to reference)
- Outcrop locations
- Outcrop scale zoomable links and oriented photos (ThingLink, EasyZoom)
- Zoomable panoramas
- 360° Kula panoramas
- Oriented along-strike images (measure dip here! Solocator app)

**ThingLink symbols**
- Zoomable high-resolution image
- Additional exploratory images
- Acid Test
Grape Creek Mapping
Lessons learned

- Specific Zoom times
- Slack as a method to discuss questions, check notebooks, etc.
- VERY organized LMS helped immensely
- Very hard to get student involvement
- Digital vs. hardcopy option worked well
- Importance of detailed instructions

See you next year!
Ojito Wilderness Mapping Project, San Ysidro, north-central New Mexico

Saturday, 27 June, 2020

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Dept. Head, UT Dallas
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looking SSE

Photo courtesy of Professor Grant Meyer, UNM
Acknowledgements:
Dr. Mortaza Pirouz
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Jonathan Stine
Jordan Newman
Ali Sealander
Samuel Johnson
Google Earth stations: (1) map unit and bedding orientation; (2) specific map unit contacts; (3) field images, including 360° photos
Image looking SSE from north-central map area

“Postage stamp” map effort, intended to provide quick feedback
Overall, very reasonable! Good try w/ faults! Still a few poles.
Good job labeling my points.

Evidence??

[Diagram with various geological layers and notes.
Scale: 80m = 1 tick]
Ojito Wilderness/San Ysidro, NM
Cross-Section

Data
- SS7-352/53
- SM2-352/54
- SM4-350/54
- SB4-348/69
- SB5-345/54
- S92-170/47
- S46-122/23
- S47-126/25
- S111-162/17

Legend
- Qa
- Km
- Js
- Kdp
- Jt
- Kmc
- Jn
- Kdc
- Jn
- Kdo
- Jn
- Kde
- Jn
- Jmb
- Jmb

1 tick = 80m

Still vert exc!!

18/20
The Virtual Experience Mission: Thinking Like a Geologist

Bob Krantz
Fort Lewis College, Durango, Colorado
June 2020
VFC Follow-up: Thinking Like a Geologist

• What is it?
• How do we teach it?
• How do we assess it?
How Does a Geologist Think?

• Uses geologic reasoning
  • Looks for (and expects) geologic meaning and significance
  • Relates form and process to bridge from observations to interpretations
  • Always checks for geologic “sensibility”

• Applies geologic concepts
  • Micro concepts (minerals, anticline, cross-bedding)
  • Macro concepts (mineral assemblage, fluvial dep systems, plate tectonics)

• Connects to geologic contexts
  • Works across spatial and temporal scales
  • Integrates across disciplines

• Expert vs. novice
  • More about strategies than knowledge?

• Examples
  • Classic cross-cutting relations cross sections
  • Determining type of fault from map patterns
Opportunities to Think Like a Geologist

Intro Level
Determine the order and history

“Field Camp” Level
Determine the type of fault
How Do We Teach Geologic Thinking?

• Be mindful!
• Be observant!
• Show how to seek meaning—promote inquiry
• Promote geologic fluency
• Avoid superficial recipes and black boxes
• Avoid activities where a non-geologist can follow instructions and complete the task
• Consider **ALL** geologic expression, but select the most significant (and useful)
• Relate goals to strategy (and available info and tools)
• Model expert (or apprentice) thinking (conduct pilot project?)
How Do We Assess Geologic Thinking?

• Look for logic (and logical consistency)

• “Dumb mistakes” might reveal lack of thinking

• Conversations (and assignments) that include explanations of reasoning

• Intentional queries:
  • Why some observations or data used (or not used)
  • Why some interpretation fits better (or not)
  • What a given interpretation implies
  • What geologic concepts proved useful
Making Virtual Field Camp Better

• A virtual field camp, especially as a capstone experience, must inspire geologic thinking and applications
• The virtual experience should also encourage some degree of immersion and personal engagement
• The experience should make the rocks, and first order interpretation, the primary focus
• Potential strategies:
  • Represent the rocks as realistically as possible and as the first source of information
  • Require student plans for geographic and geologic navigation and investigation
  • Provide field data and other information by request
  • Have more discussion (interrogation?) about what a student “sees”
  • Model expert thinking and methods more
  • Improve the game delivery and engagement (and rely less on a stand-alone resource)
Discussion

Challenges & best practices w/ online instruction