Designing and Implementing Field Experiences through Distance Learning

Saturday Seminar
May 30, 2020

News & Announcements

- Master Spreadsheet: https://docs.google.com/spreadsheets/d/1LomGkHOIp1TfsTZNRZFNR6vpoTcTcABNmWM9_OGULD8/edit#gid=0
  - Currently about 39 activities
  - Very interested in feedback from those using these (or any other) activities that might help future instructors
- ACUE's toolkit for effective online instruction (contributed by Karen Gran)
  - https://acue.org/online-teaching-toolkit/
- Next Saturday Webinar 6/13
- GSA/NAGT Tech Webinar series coming soon!

First Reflections on Delivering a Virtual Field Camp

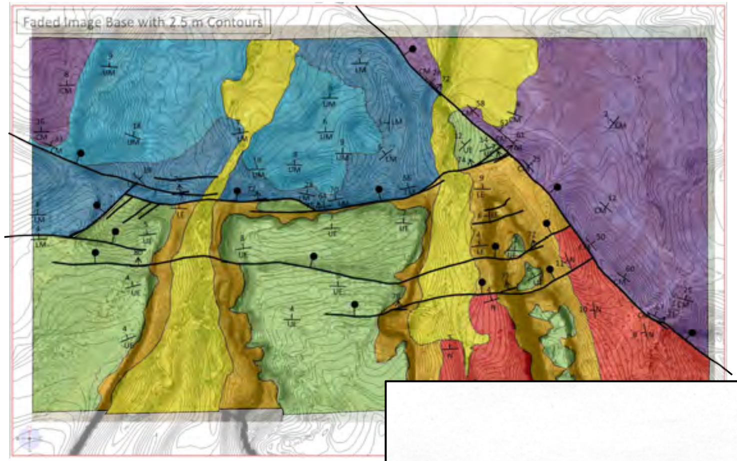
Bob Krantz

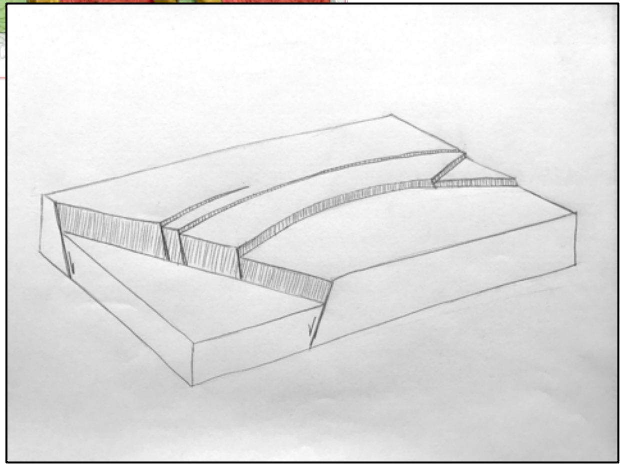
Fort Lewis College, Durango, Colorado

May 2020

Module Focus: Mapping and 3D Fault Analysis

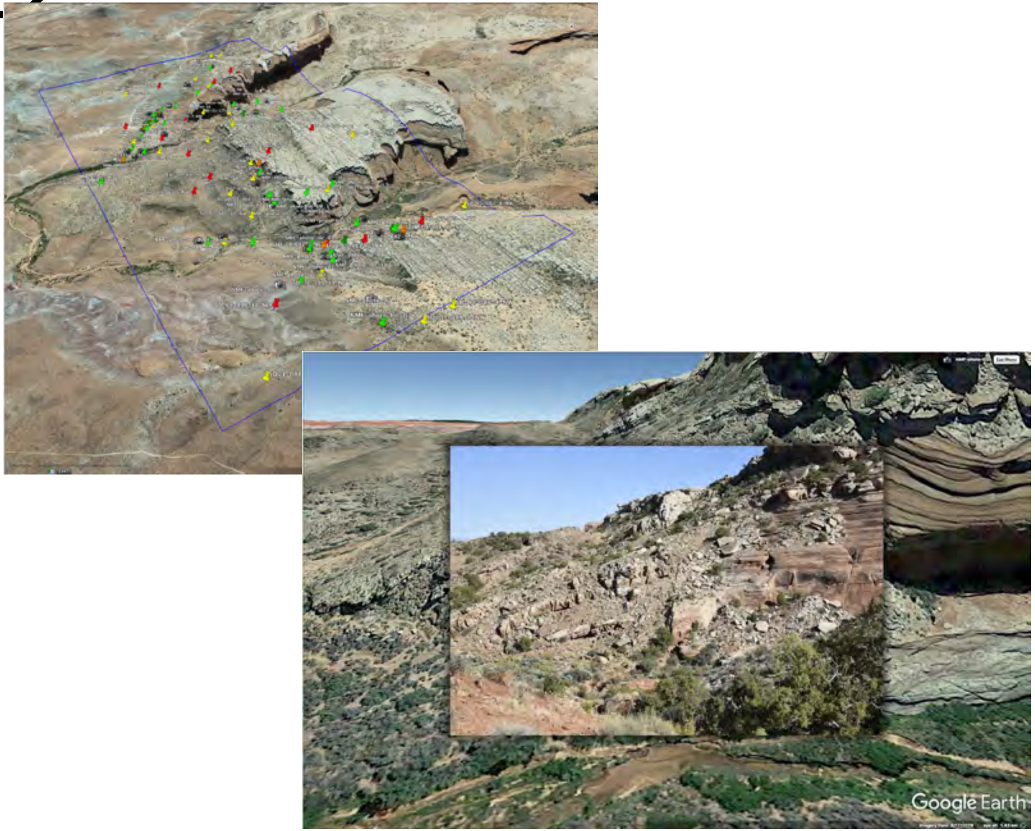
- North Moab Fault System
- ~4 square km area with excellent exposure
- Basic geologic mapping
- 5 geologic cross sections
- Stereonet analysis
- Fault geometry and displacement analysis
- 3D block diagram of faults





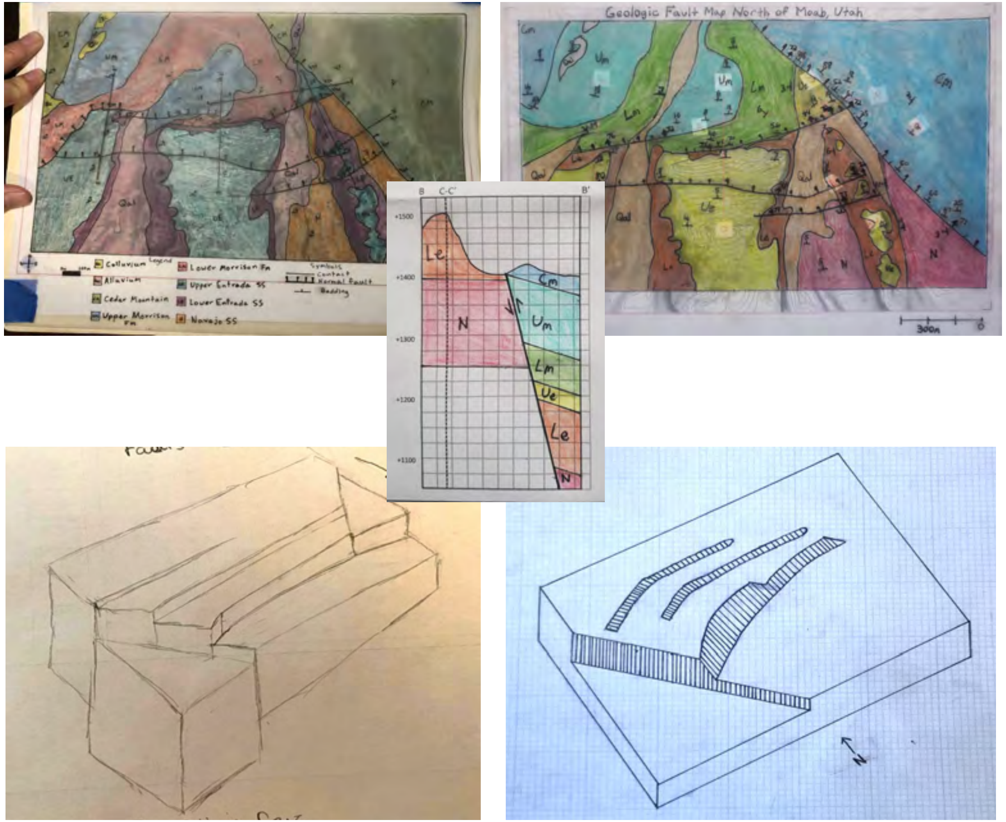
FLC Virtual Field Camp Delivery Methods, May 18-22

- All distance learning
- Google Earth platform
- Field photo album with locations
- Geologic station locations
- Station data lists
- Google Earth “project” with imbedded material
- Monday to Friday schedule with synchronous group sessions and independent work and communications
- Attempt to create game feel



Student Performance and Assessment

- All students delivered maps, sections, analyses, and block diagrams with essential content
- Performance varied by experience and background, grade range 75 to 90%
- Engagement varied by personality and situation
- Understanding and application of geologic reasoning most uncertain



Evaluating the Virtual Experience

- Only a few students embraced the virtual field geology as a game
- Some students struggled with 3D relations, perhaps not putting themselves into the map area context
- Most students attempted to “solve” for map making via naïve interpretation of information provided, especially station data
- This mapping approach avoids thinking like a geologist, using geologic reasoning to relate observations and concepts, and translate the rock expression into a mental model (and a map)
- The approach perhaps also presumed (and made it more difficult to model) expert methods for novices
- As delivered, this module did not directly encourage geologic thinking

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)

Joe Meert

Mapping exercise at Ghost Ranch, NM, with GoogleEarth Pro

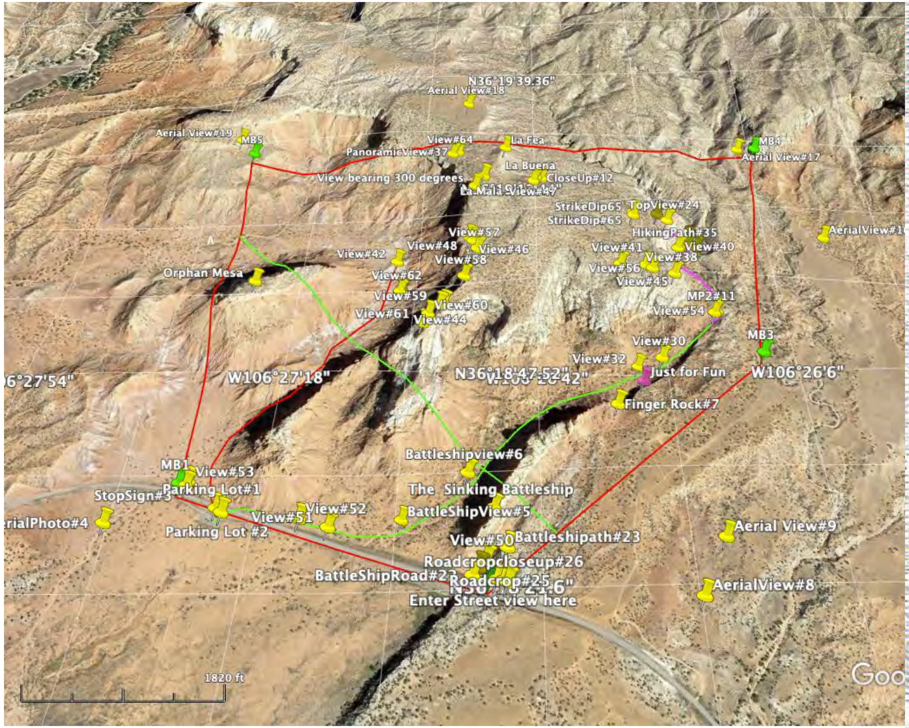
Ghost Ranch Mapping Project

Flexible: UF Students will complete map, cross-section and stratigraphic column using Illustrator/Corel. Can be split up and completed on paper or other method

Files: Many, included are high-res photos keyed to .kml files, 4 kml files, video explaining appearance of each unit/erosional profile, UF instruction sheets (docx), ai, cdr files of topo sheet, NGS topo overlay, Learning outcomes, photo keys

Brief Geology: Mesozoic, flat-lying strata Chinle, Entrada, Todilto and Summerville. Numerous faults, 2 big faults easy to see on google earth/air photos Smaller faults hinted at in photos and are easy to map.

Software: GoogleEarth, Drawing Package, Stereoplot Software, Excel


N36°19'39.36"
Aerial View#18
Aerial View#19
MB5
View#64
La Fea
PanoramicView#37
MB4
Aerial View#17
La Buena
View bearing 300 degrees
CloseUp#12
La Mala View#47
StrikeDip65
TopView#24
StrikeDip#65
AerialView#1
View#57
HikingPath#35
View#42
View#48
View#46
View#41
View#40
View#58
View#38
View#56
Orphan Mesa
View#62
View#45
MP2#11
View#59
View#60
View#54
View#61
View#44
View#30
MB3
View#32
Just for Fun
W106°27'18"
N36°18'47.52"
W106°26'6"
Finger Rock#7
Battleshipview#6
MB1
View#53
Parking Lot#1
The Sinking Battleship
StopSign#3
View#52
BattleShipView#5
View#51
Aerial View#9
Parking Lot #2
View#50
Battleshipath#23
Roadcropcloseup#26
BattleShipRoad#2
Roadcrop#25
AerialView#8
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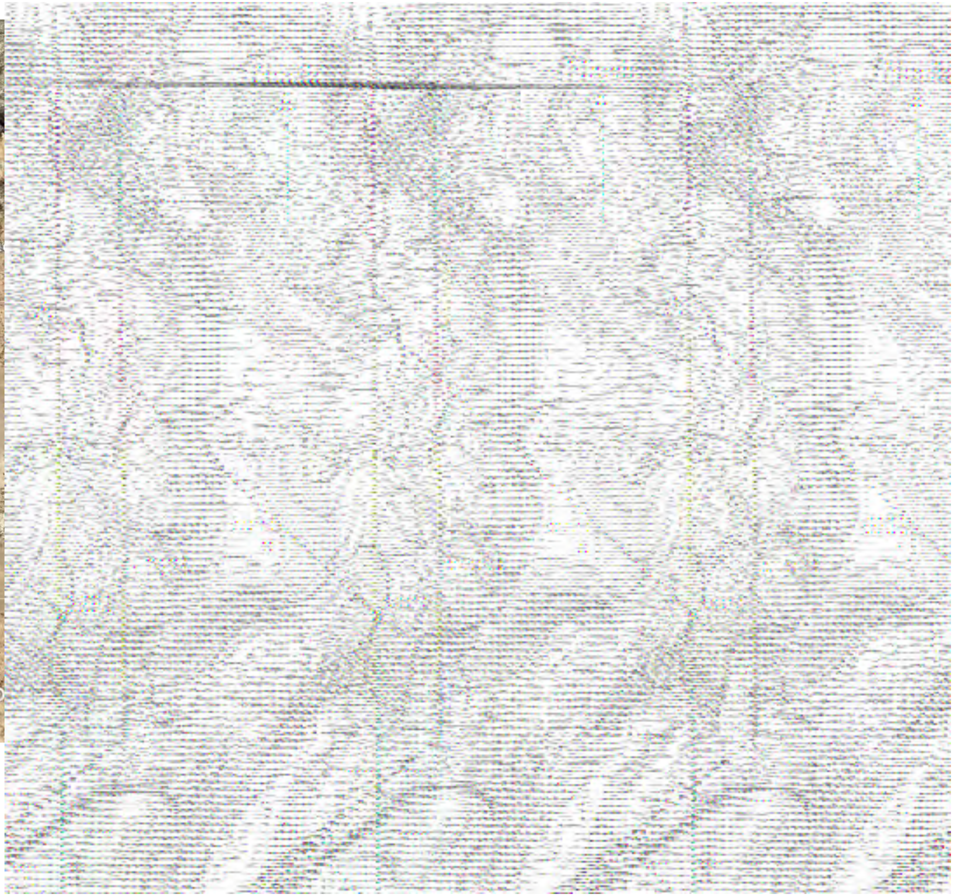
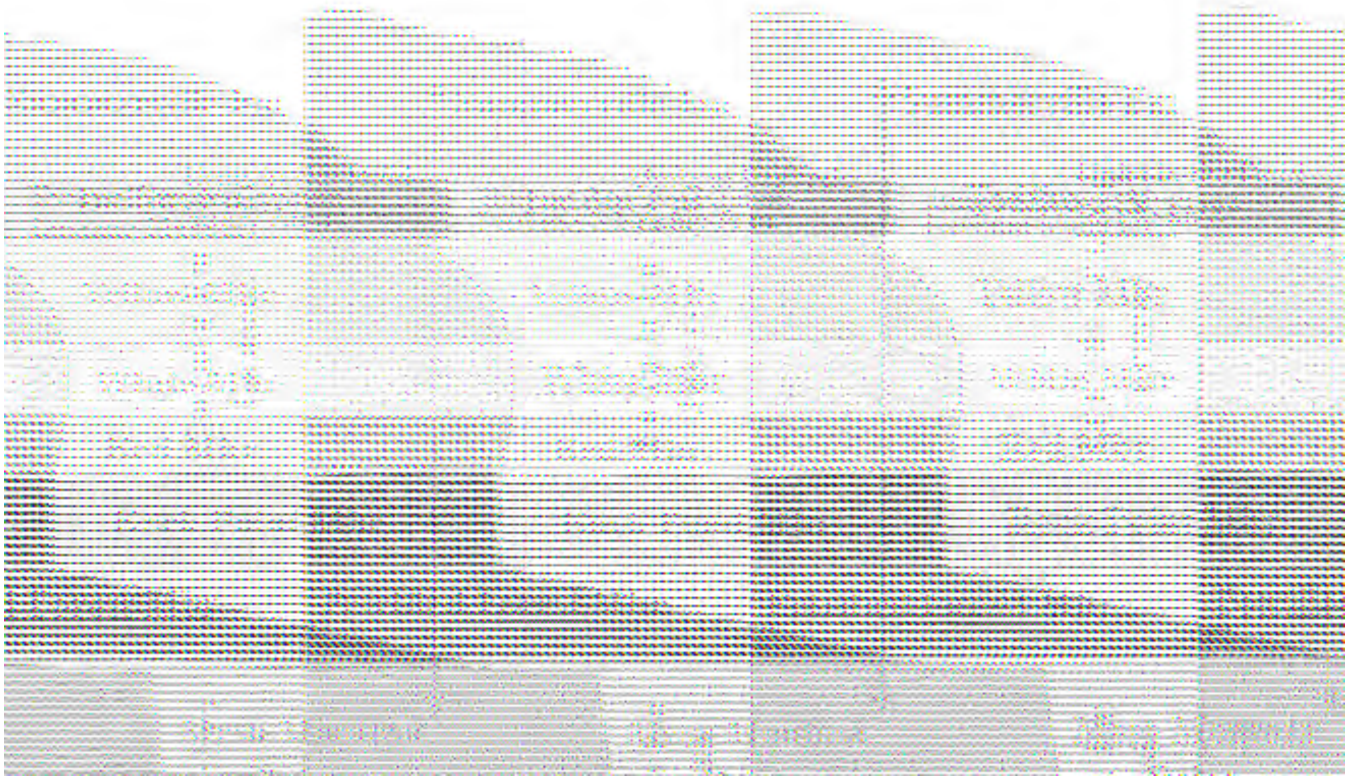
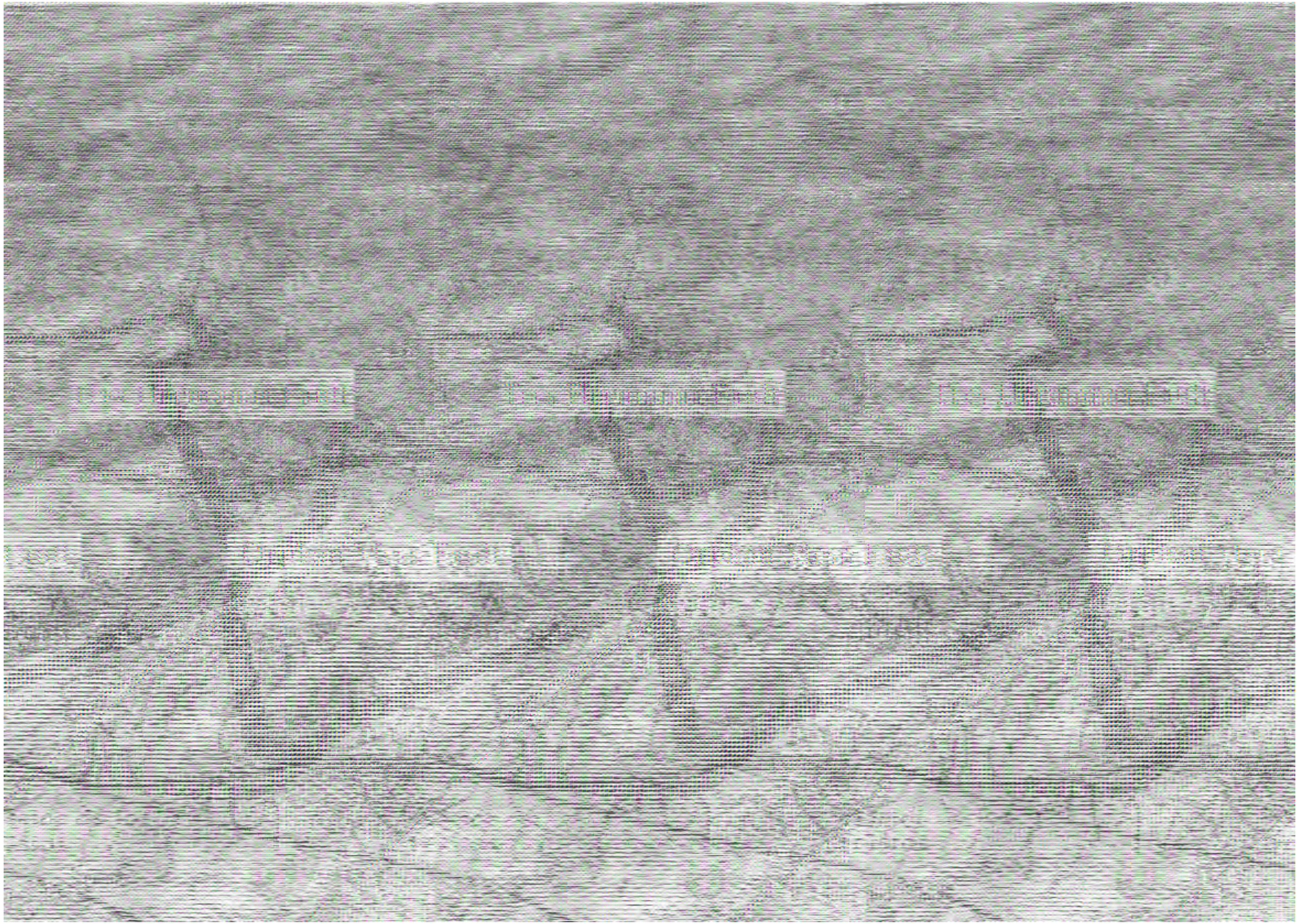





Petrified Forest
Down
Mesa Montosa
UP
© 2020 Google
Google Earth


Lower
Summerville
Upper
Summerville

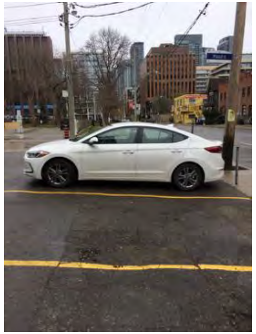


Charly Bank

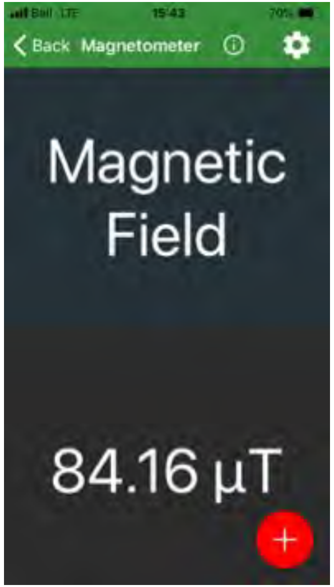
Magnetometry at Home

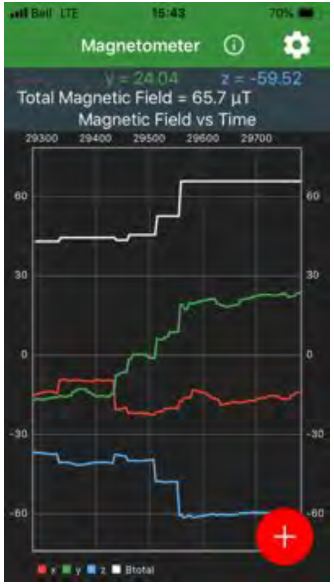
Magnetometry at home:
a hands-on survey with your smartphone

Charly Bank, University of Toronto, Canada



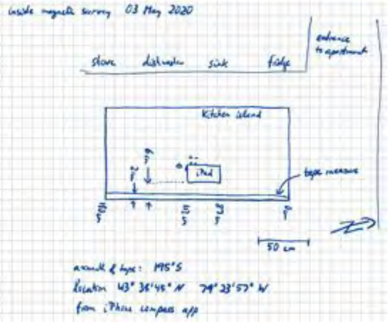
- introductory activity
- discussion with NAGT Virtual geophysical field experiences Working Group
  (Beth, Ian, Cynthia, Robert, Chris, Mike,...)
- students need
  smartphone with free magnetometer app
  (for iOS or Android, https://www.vieyrasoftware.net/)
  a magnetic object (fridge magnet, car)
  tape measure is optional
- students can run activity inside home, in driveway,
  on a parking lot, a park,...

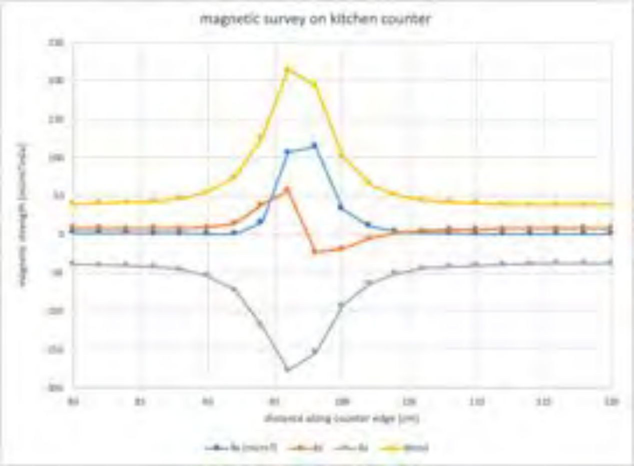




example: decay of magnetic field from a fridge magnet

1. your objective
2. considerations
   (date?, conditions?, working alone or in team?)
3. location (GPS, description, map)
4. survey setup
   length of profile, how many data to measure
5. measurements
   record over time or screenshots at distances
6. description of data:
   total field maximum and background
   where is total field above background?
   error

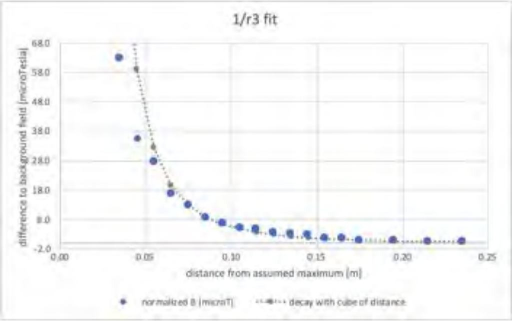




7. preliminary interpretation (decay with r^{-3})
8. archiving data

spreadsheet with data, directory with screenshots

short reflection



assessment using "single-point" rubric

- flexible to address range of possible surveys
- opportunity to discuss what may be excellent

component \ level	developing	competent	excellent
objective __ of 3	0-1 pt	2 pts - objective makes sense	3 pts
documentation __ of 6	0-2 pts	3-5 pts - fieldnotes reflect pertinent considerations - survey area seems clearly described (GPS, in point form, as map) - sketch map includes features, scale, N arrow	6 pts
survey __ of 4	0-1 pt	2-3 pts - survey is included in sketch map - survey parameters are obvious - instrument settings are noted - thoughts about accuracy of measurements are included	4 pts
results and interpretation __ of 3	0-1 pt	2 pts - it is clear where raw data can be found - data graph is shown and follows convention (units, labels) - preliminary interpretation is thoughtful	3 pts
archive __ of 4	0-1 pt	2-3 pts - directory contains all raw data with an explanatory file - scan of field notes is included, or clear where to find - image of quality control (and source file) may be included	4 pts
total: __ of 20			

activity may be used

- for a virtual geophysics field camp.
- as preparation before heading to field camp, and/or
- as hands-on exercise in an intro geophysics course

activity has been posted to SERC website

introduces several of the learning outcomes:

1. Design a field strategy to collect or select data in order to answer a geologic question.
2. Collect accurate and sufficient data on field relationships and record these using disciplinary conventions (field notes, map symbols, etc.).
3. Synthesize geologic data and integrate with core concepts and skills into a cohesive spatial and temporal scientific interpretation.
4. Interpret earth systems and past/current/future processes using multiple lines of spatially distributed evidence.
5. Develop an argument that is consistent with available evidence and uncertainty.
6. Communicate clearly using written, verbal, and/or visual media (e.g., maps, cross-sections, reports) with discipline-specific terminology appropriate to your audience.
7. Work effectively independently and collaboratively (e.g., commitment, reliability, leadership, open for advice, channels of communication, supportive, inclusive).
8. Reflect on personal strengths and challenges (e.g. in study design, safety, time management, independent and collaborative work).
9. Demonstrate behaviors expected of professional geoscientists (e.g., time management, work preparation, collegiality, health and safety, ethics).

Karst Hydrogeology: A virtual field introduction using Google Earth and GIS

Rachel Bosch
University of Cincinnati

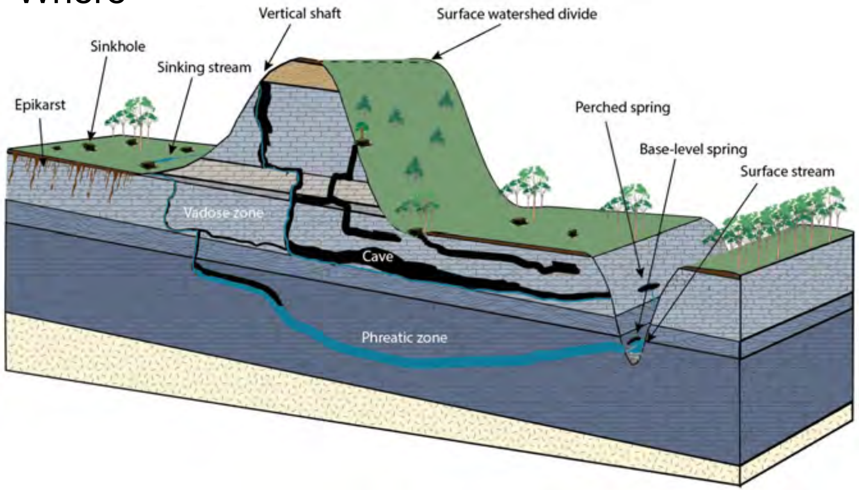
Who

What

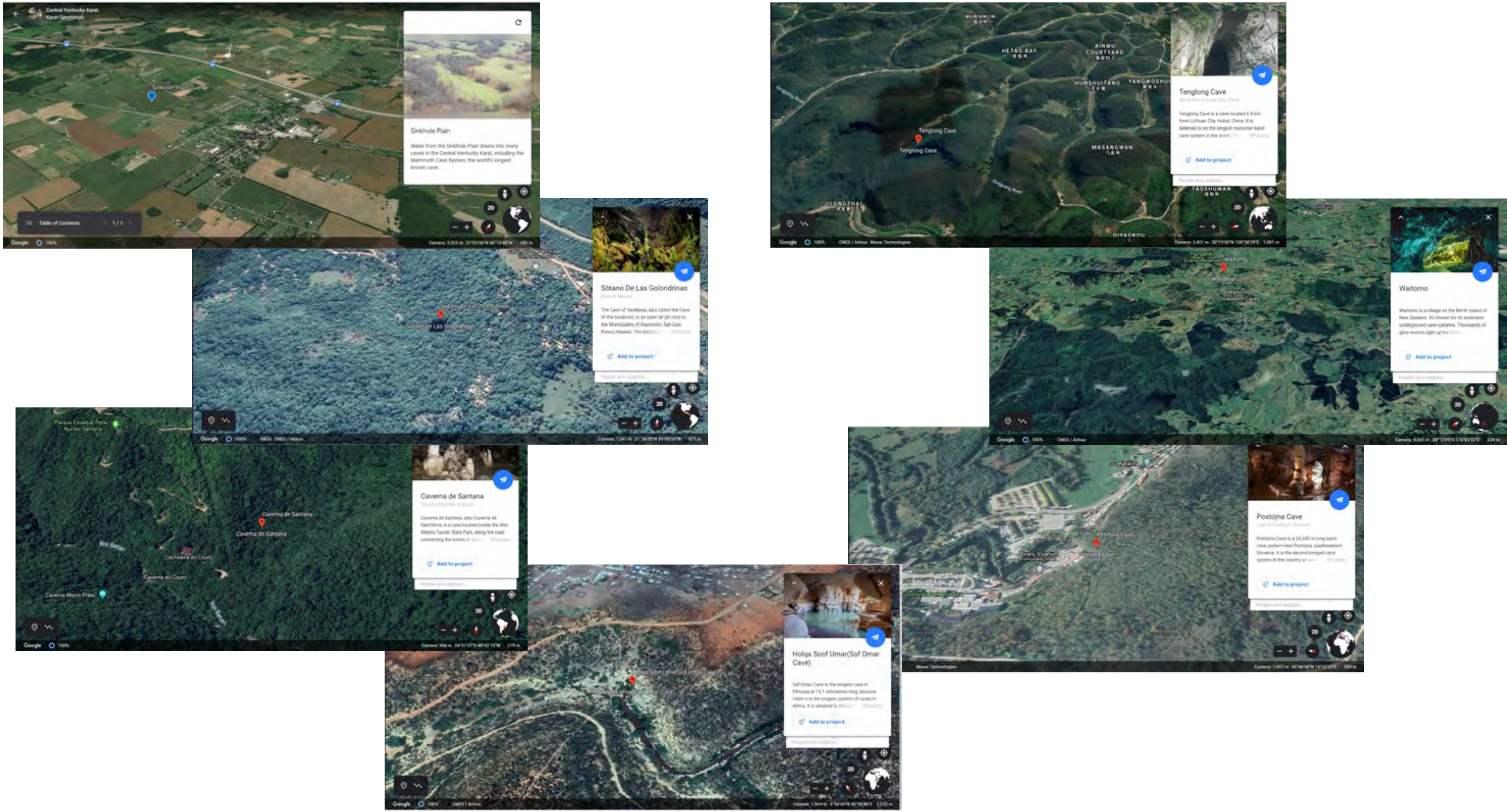
When

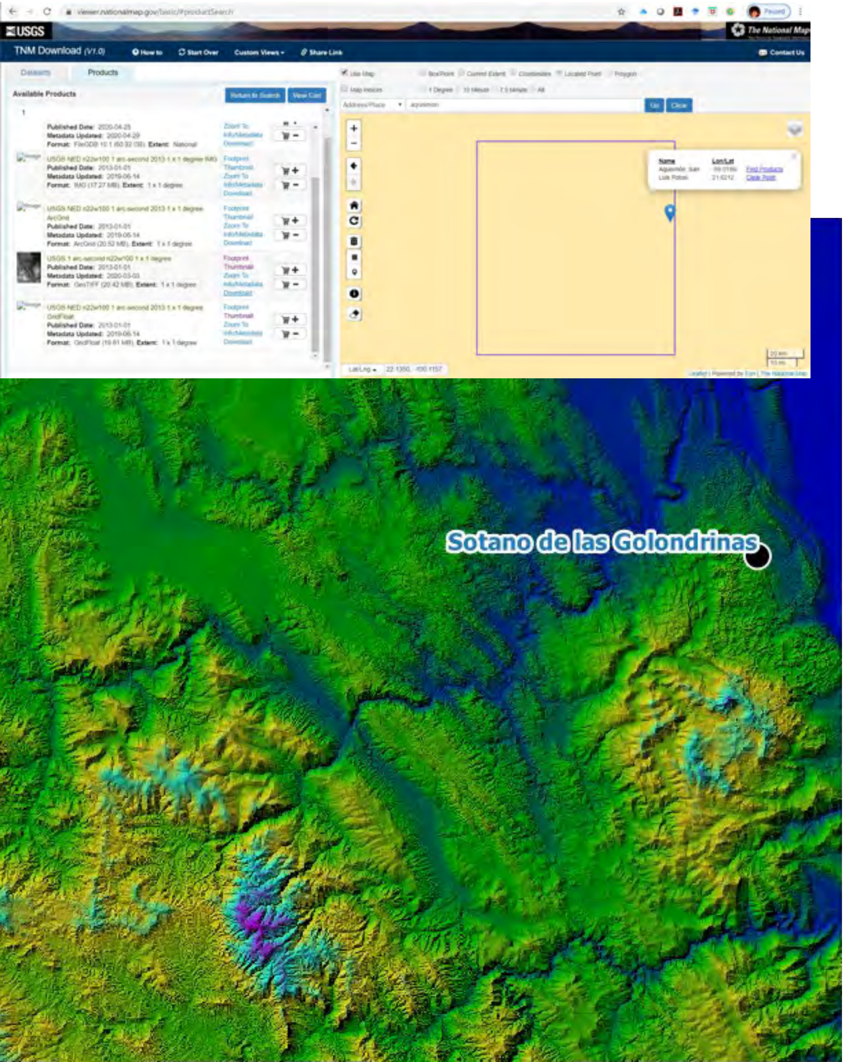
How

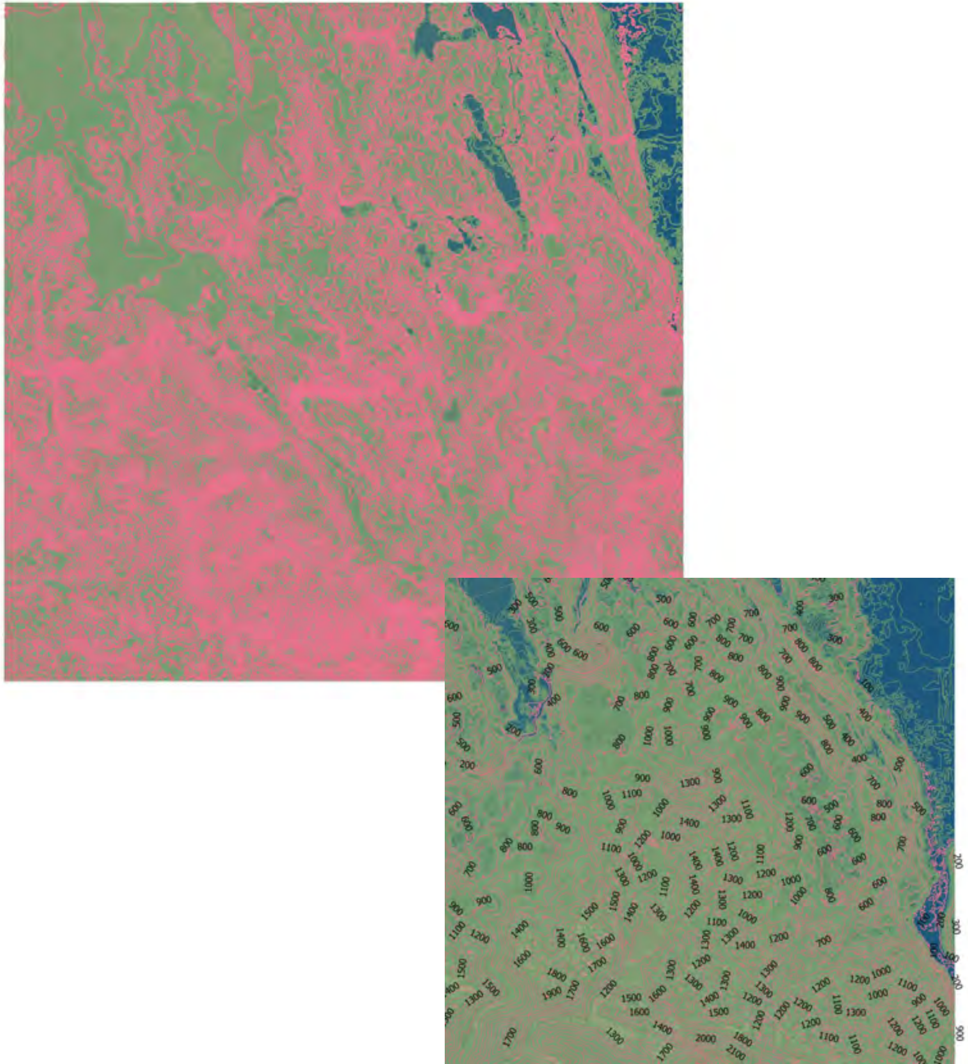
Where



Why


Central Kentucky Karst
Sinkhole Plain
Water from the Sinkhole Plain drains into many caves in the Central Kentucky Karst, including the Mammoth Cave System, the world's longest known cave.
Table of Contents
Tenglong Cave
Add to project
Sótano De Las Golondrinas
Waitomo
Caverna de Santana
Postojna Cave
Holqa Soof Umar(Sof Omar Cave)


USGS
The National Map
TNM Download (V1.0)
How to
Start Over
Custom Views
Share Link
Contact Us
Datasets
Products
Available Products
Return to Search
View Cart
Sotano de las Golondrinas

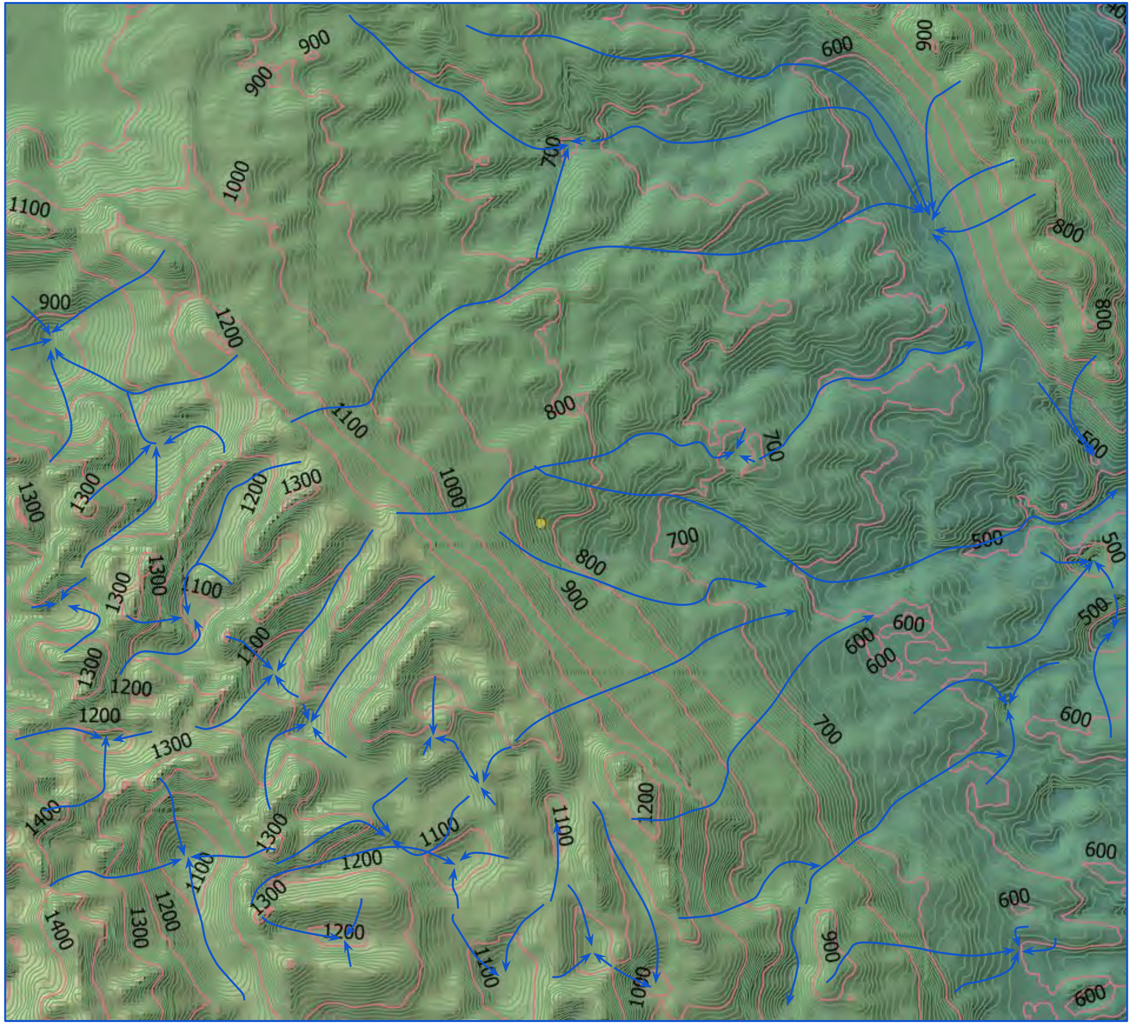


Water flow near Aquismón, San Luis Potosí, Mexico

- Rule of V’s
- Karst is complex!

Sharing science

- Group presentation
- Individual written report



Ben van der Pluijm

Google Earth Web-based Maryland Appalachians Geology field trip