VOLCANOES OF THE EASTERN SIERRA NEVADA
Geology and Natural History of the Long Valley Caldera

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THE INSTRUCTORS

John Rupp

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THE COURSE

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Geology and Natural History of the Long Valley Caldera

COURSE #: GI 88
THE COURSE

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Intro course - open to all majors

“Some decide to do a major in geology or environmental studies. But even if they don't, it still affects how they see the world.” - MH
• 14 - 18 students
• Half-semester-long seminar
• 15-day field trip
• SNARL (Sierra Nevada Aquatic Research Lab)
• Field books, no computers
COURSE CONTENT

volcanology  hydrogeology  ecology  economic geology
GEODETIC COMPONENT: RTK GPS

- 2-3 days
- 2-3 informal lectures
  - How GPS works
  - Applications of GPS
  - Career
- Field day
• Objective: Introduce students to multiple geophysical and geologic field methods

• Via: Study the active Hilton Creek fault where it crosses McGee Creek
FIELD METHODS

- GPS & leveling:
  - Survey leveling line of ~28 markers established by USGS? UCSB? in the 1980s

- Field observations:
  - Strike of fault trace
  - Offset of moraine
THE LARGE-GROUP CONUNDRUM
GROUP WORK

• THREE (FOUR) GROUPS:

• The group of students who self-identify as most interested in GPS start with me, help me set up the base and get the rover going - get the most in-depth intro

• Group of students leveling

• Group of students hike up a moraine to get an overview of the fault scarp and make observations with a Brunton

• Some students scout out leveling markers based on written instructions
• Real-time kinematic GPS
• base & rover w/radio contact
• real-time results
• Paper map vs. leveling vs. RTK GPS
TEACHING METHOD

• Explain the survey to the first student to take the controller

• That student explains it to the next, and so on, until all students have taken a turn

• Have one group explain the survey method to the next
CONCEPTS

- GPS as a scientific tool
- Deformation
- Mapping
- Precision
- Error sources
- Repeatability
- Indirect measurements
OUTCOMES
“For a lot of students, it's not their most pleasant day. For some they really love it and for some it's really rough.” - MH
CHALLENGES

“For a lot of students, it's not their most pleasant day. For some they really love it and for some it's really rough.” - MH

• Leveling is tedious
• Repetitive
• Difficult terrain
• Bad starting coordinates
• Lost radio lock
Where's the story?

- In GPS, errors are significant compared with the signal.

- In general, in introductory classes, you really want an experiment to go smoothly.

- Data in a format that's more accessible for introductory students.

- A clear pattern in the data.
WORTH IT? WE THINK SO.

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“One of my favorite days.”

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“GPS day was really cool to see what we could be doing as a geologist in the future.”

“The challenge of doing it at an appropriate level that's both comprehensive and gives them a window into the power and complexity of the methods.” - MH