

Gaining Perspective with Google Earth Virtual Reality in an Introduction-Level Physical Geology Course



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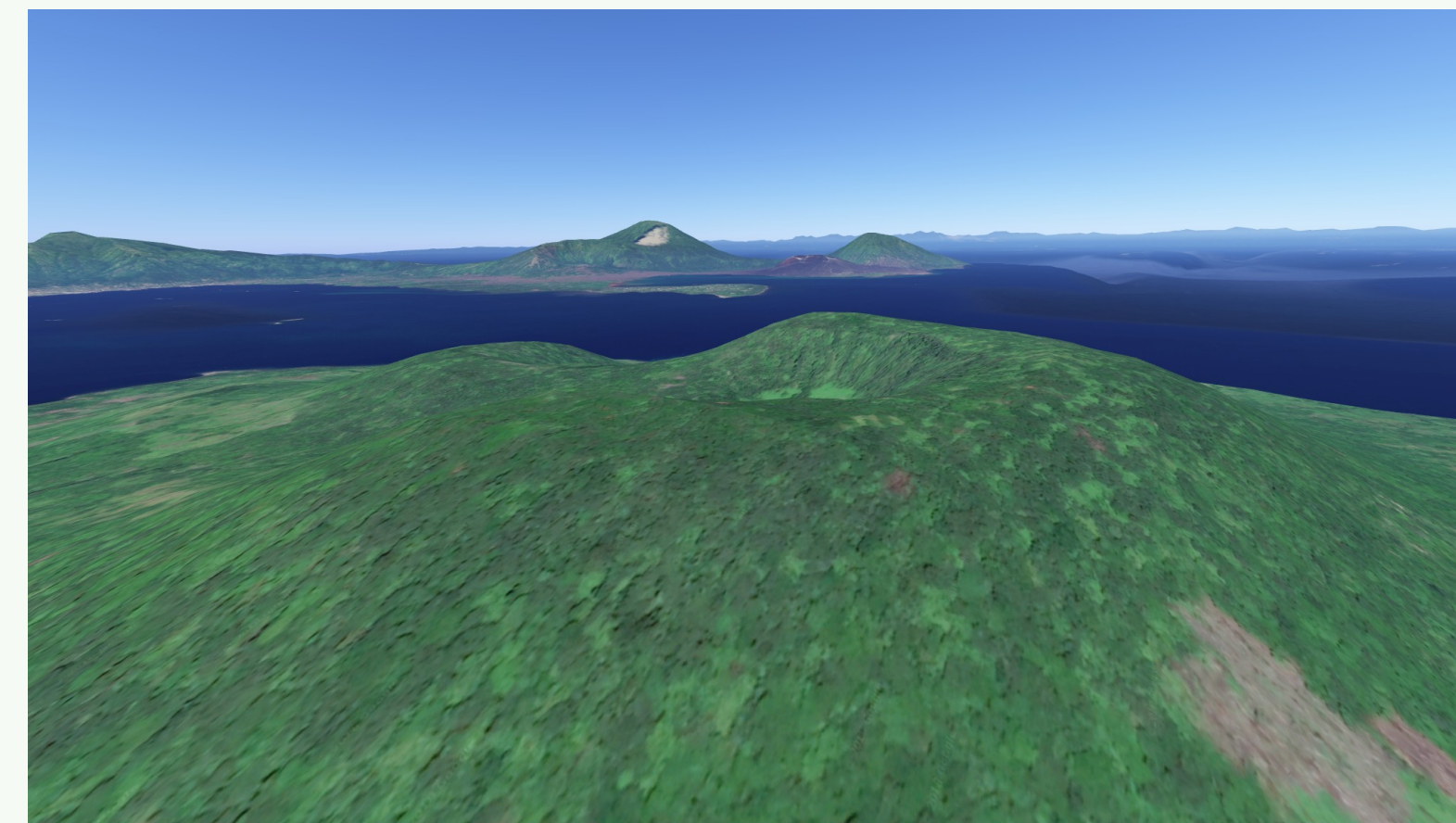
Introduction

Two of the main challenges in teaching geologic features and processes in an introduction-level Physical Geology course is describing their dimensions and scale. Near the end of the semester, students in the course were given three locations to “explore” in Google VR using the UNC Asheville’s Virtual Reality Laboratory, equipped with HTC Vives.

Locations were initially selected using the Google Earth desktop program and then exported to kmz2gevr (<https://github.com/kbogert/kmz2gevr>) and then loaded onto the VR stations as saved locations in the Google VR program. The goal of the exercise is to give them perspective of the dimensions and scale of the different geologic features and processes at each location. Students worked in pairs and took turns reading the assignment questions and writing responses of the one who was immersed in the virtual reality. A short series of questions following the activity asked students to reflect upon their favorite location, where they would like to explore, and what might be some other applications for the Google Earth VR program.

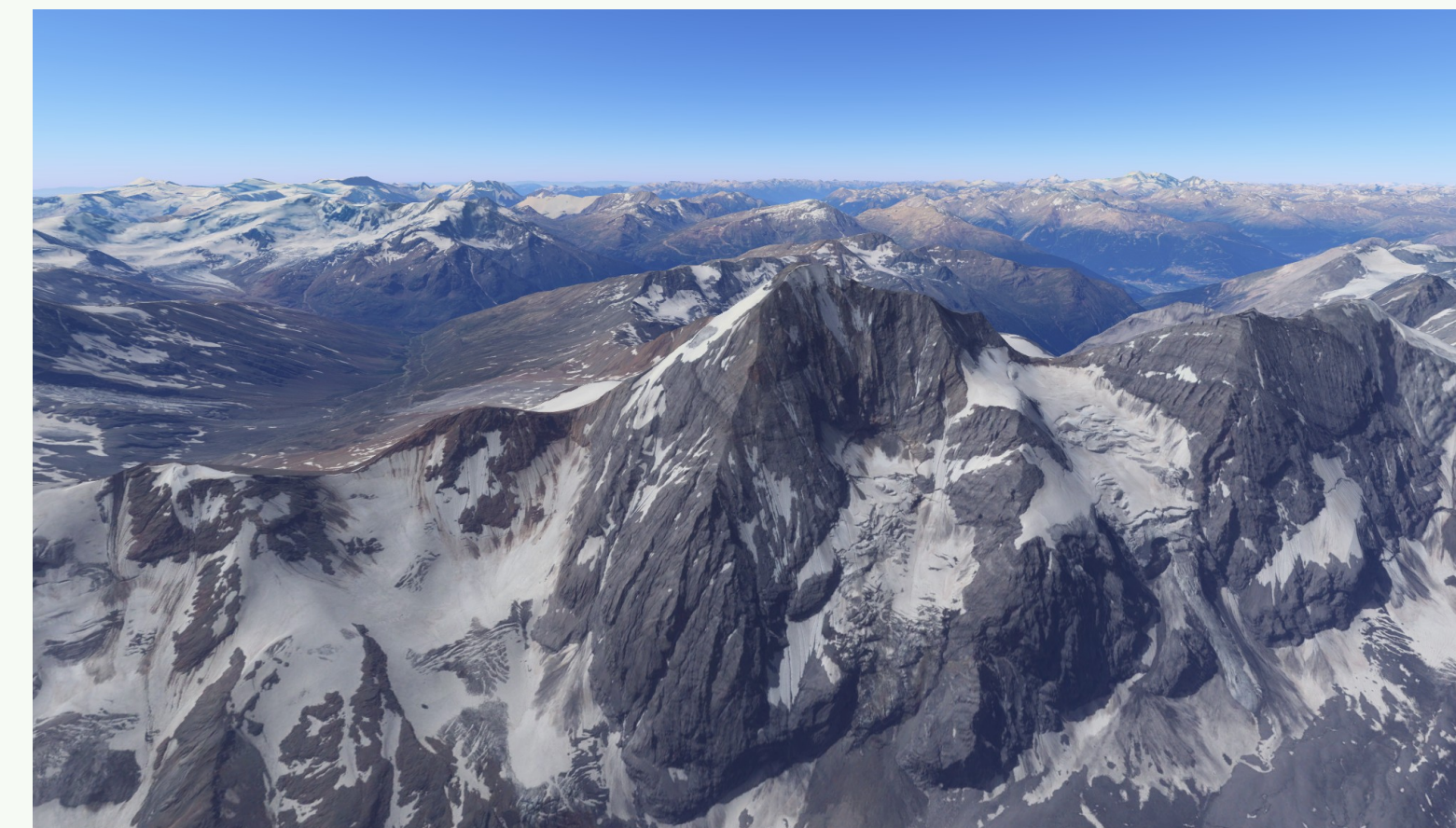
These locations are discussed in the lecture portion of the class and this VR assignment enables students to envision the scale and dimensions of the features shown prior in photographs. Within this sandbox setting, students can also explore “outside of the photograph”, enabling them to ask more questions and make more observations about the features and processes they are seeing. In the future, the following logistics will need more attention and planning: scheduling, students with disabilities, group sizes, pre-assessment of the geologic history of the features selected, and due dates for the assignments.

Locations



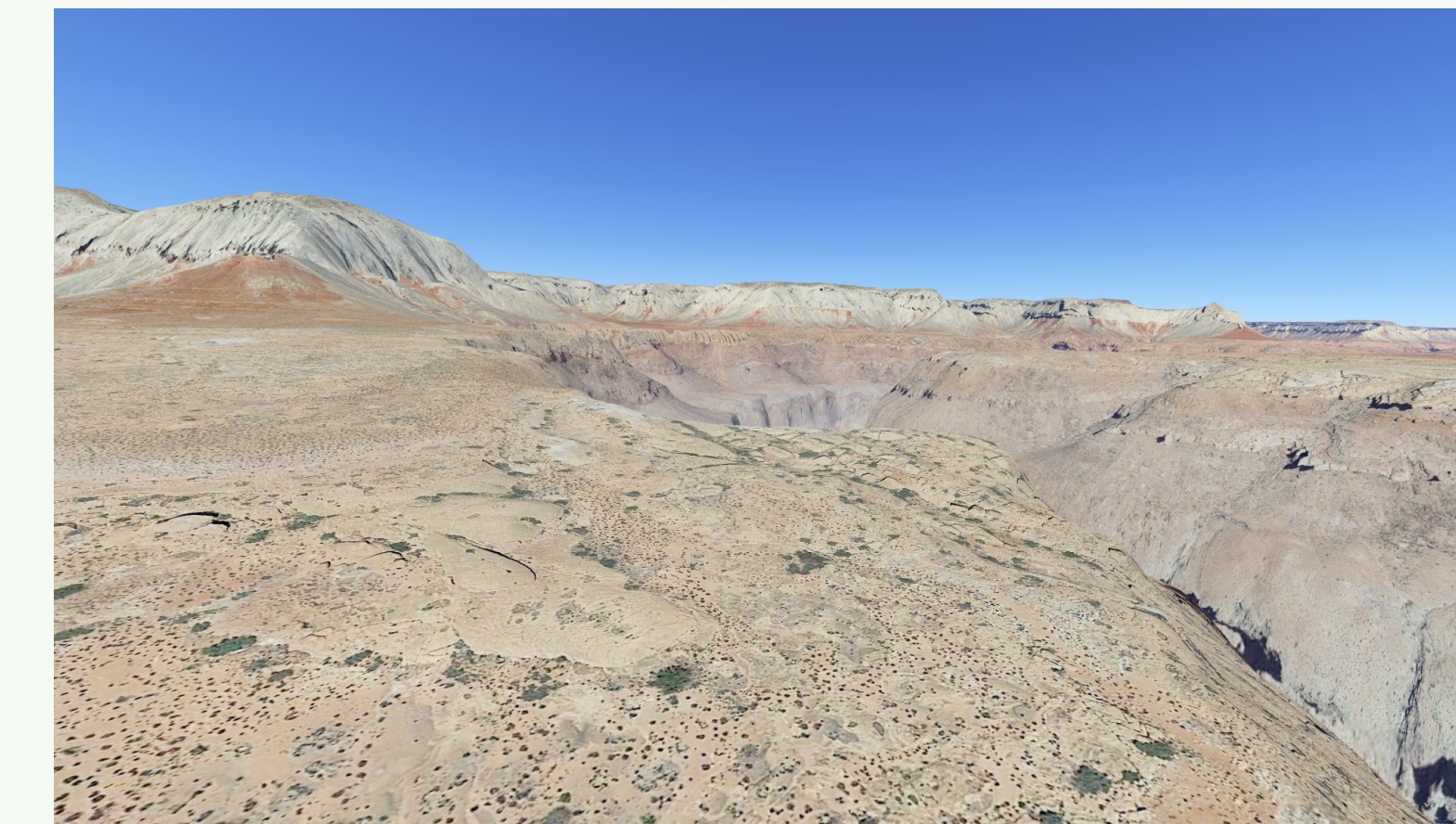
Vulcan and Tavorvur, New Britain, Papua New Guinea

Students were asked to compare and contrast the features they observed of the cinder cone Vulcan and the composite volcano Tavorvur.



Alps, Italy-Switzerland Border

Students were asked to explore the “ground” as well as “fly over” and write their observations of the mountains’ scale and features. They were also asked to determine what tectonic setting these mountains have formed in.



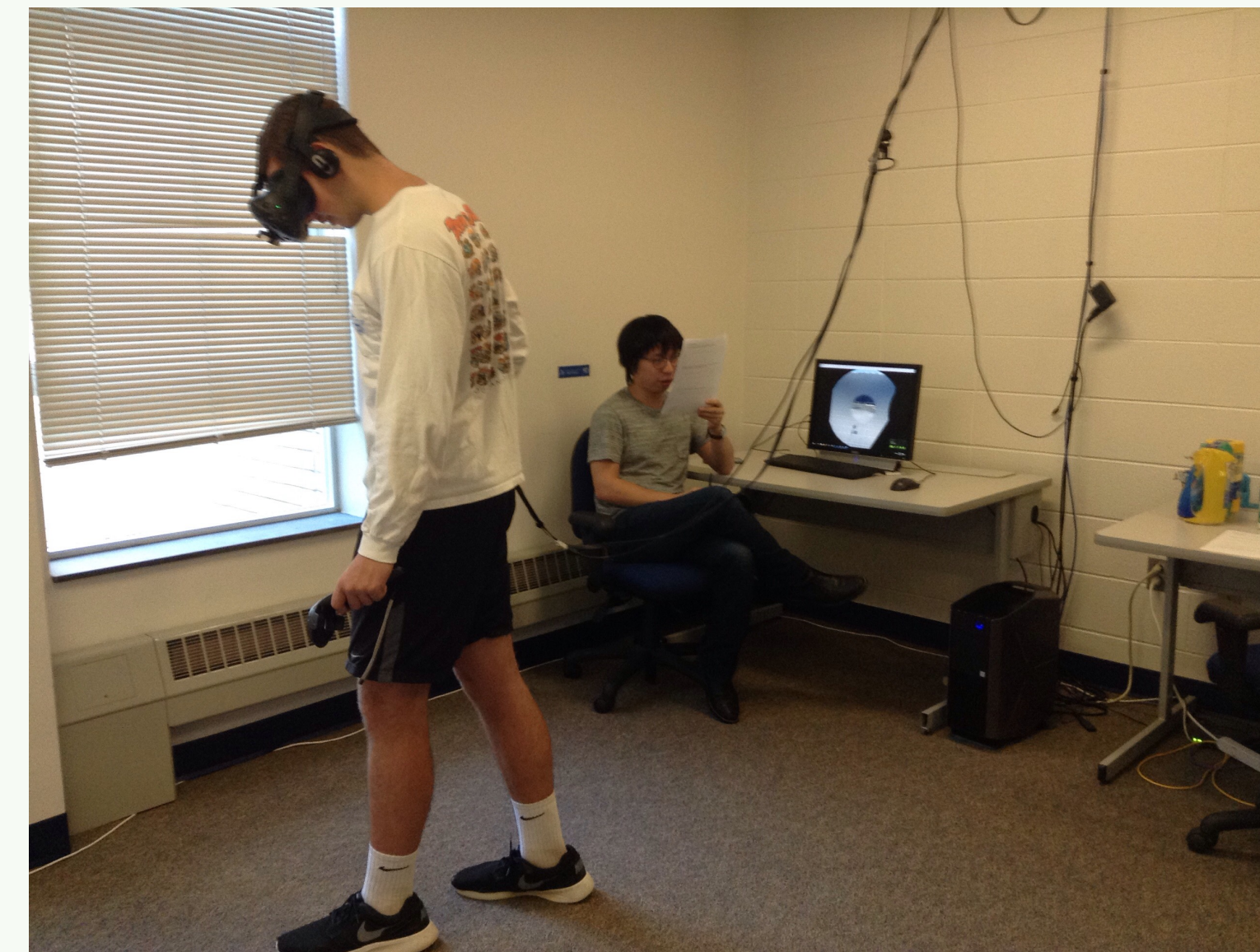
Grand Canyon, Arizona, USA

Students were asked to “fly over” and “raft” down the Colorado River in Google Street View to look for geologic features such as horizontal and inclined bedding, faults, joints, weathering patinas, and adjoining channels.



Students signed up in pairs so one could read the assignment while the other explored and then switch places.

Photographs by B. McNamee.



Promotional stock photographs of the HTC Vive headset and controllers.

Acknowledgments

We would like to thank the 2018 Spring and Summer ENVR105 Physical Geology students who participated in this assignment.

What exceeded expectations?

- Aside from the VR experience, level of enthusiasm and appreciation of the perspective gained of the geologic formations.
- The number of students who explored other locations or went well beyond the coordinates assigned.

What were some challenges?

- Accommodating student disabilities.
- Scheduling times for a large class and around other classes.
- Two groups working in the same room (talked over each other).
- Some warping of images, especially at the Grand Canyon.
- Time constraint to gain the full grasp of Google Earth VR controls and explore.

What could be done differently?

- For introduction-level courses, select locations based off of major formations discussed in lecture (e.g. The Grand Canyon and the Himalayas).
- Switch in and out of “human scale”.
- Preassessment of locations prior to VR use.

What other uses come to mind?

- Preliminary vetting of research sites.
- Virtual tours of surface mines for Environmental and Economic Geology courses.
- Comparison of formations for Petrology courses.
- Email your ideas to bmcnamee@unca.edu!