Assignment 3 – Volcanoes

Student Question Sheet

In this assignment, you will Google Earth, Excel, and Googling skills to investigate volcanoes. Remember to use the desktop version of Google Earth and Excel, don't use the website version.

Fill in your answers on the student answer sheet document. Only .pdf files will be accepted.

Due by 2/28, uploaded to Canvas via Turnitin

Assignment Rules:

- All answers must be in complete sentences and written in your own words to receive credit. Questions involving tables or screenshots do not need complete sentences.
- Screenshots/images need to be your own work.

Rules Acknowledgement:

1. Before beginning the assignment, acknowledge that you know the rules of the assignment as listed above. Type "I understand answers need to be written in my own words and in full sentences to receive credit, except for values in tables. I also know screenshots/images need to be my own" **(3 pts)**

Part 1: Mt. St. Helens *(53 pts)*

2. Over the past ~4,400 years, Mt. St. Helens has had 40 confirmed eruptions. Based on this information, what is the recurrence interval for eruptions of Mt. St. Helens? **(4 pts)**

3. Of these 40 eruptions, only 22 have a known VEI rating, and they are listed in the excel sheet. Let's work on creating a graph to visualize only these 22 eruptions. First, you need to figure out the number of eruptions per VEI rating. You could do this manually, but let's use the COUNTIF function in Excel. In cell E2, enter:

    =COUNTIF($B$2:$B$23, D2)

    COUNTIF is the function, $B$2:$B$23 is the range we want to count, and D2 is what we want to count in that range. When you enter this into cell E2, you are telling Excel to count how many times VEI 0 appears in column B. Copy that formula down for each VEI rating. **Create a clustered column graph of the data in columns D and E and paste it in your answer sheet. Make sure it's properly labeled. (6 pts)**

4. Describe what you see on your graph. What type of statistical distribution is your graph showing? Google the following choices to help you: Normal distribution, uniform distribution, bimodal distribution, and exponential distribution. **(5 pts)**

5. What is the recurrence interval of a VEI 5 eruption or larger at Mt. St. Helens? Assume the other 18 eruptions with no VEI rating were less than VEI 5. **(4 pts)**

6. The last volcanic activity of Mt. St. Helens was from October 2004 to early 2008, and it's detailed in the [Bulletin of the Global Volcanism Network](). Summarize this eruption event. **(5 pts)**

7. The last major eruption of Mt. St. Helens was in 1980. Look at Mt. St. Helens in Google Earth. How can you tell what areas were affected by the most recent eruption in 1980? Hint: look at the color differences **(4 pts)**

8. What is the area (in mi^2 and km^2) affected by this eruption? You can measure this in Google Earth using the ruler polygon tool. **(4 pts)** (be sure to select polygon from the ruler pop-up box, then outline the affected area, just like Texas in Assignment 1)

Area mi^2	
Area km^2	

9. Compare that to the area (in mi^2 and km^2) within the Houston highway 610 loop (Measure the area of the 610 loop in Google Earth). Are they different or similar? Discuss. **(5pts)**

10. Create an elevation profile of Mt. St. Helens that runs south to north (You did this from El Paso to Houston in Assignment 1). Paste the profile in the answer sheet. Start from a little south of the base of the volcano and end on the north side just west of that lake. **(4pts)**

11. Look at your profile. How can you tell that much of the north face of the volcano collapsed in a landslide? **(4pts)**

12. Create a second elevation profile of the crater that runs from west to east. Start at the top of the crater on the west side and go to the top of the crater on the east side. Paste it in the answer sheet. **(4pts)**

13. On your west-east profile, mark the location of lava dome that grew between 2004 and 2008. You can do this in Microsoft Paint, PowerPoint, or Apple Preview. Paste your annotated profile in the answer sheet. **(4pts)**

Part 2: Investigating a current eruption *(12 pts)*

Head to the [Smithsonian Volcano monitoring website](). Choose a volcano that is currently erupting and answer the following questions. You will be using your Google skills. **(4pts)**

14. Describe the current eruption of your volcano. Include things like the volcano's name, location, when it started erupting, the tectonic setting of the region, and anything else notable. **(5 pts)**

15. Before it's present eruption, when was the last time your volcano erupted? Describe the eruption and if it affected people, property, infrastructure, etc. **(4 pts)**

16. Find your volcano on Google Earth, take a snapshot of it, and paste it into your answer sheet. I've given you an example of Mt. St. Helens below. **(3 pts)**
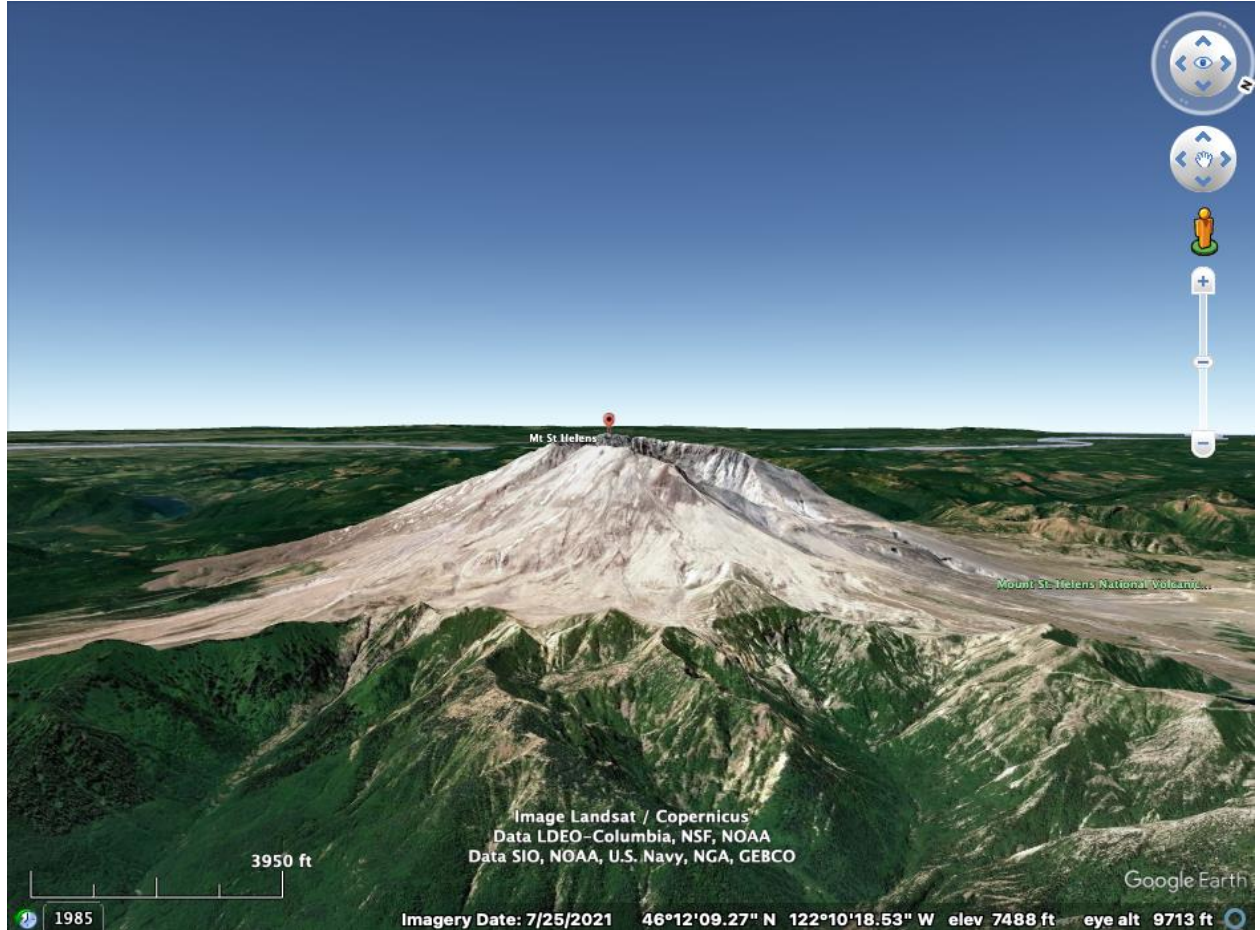
Part 3: Investigating volcanic hazards *(32 pts)*

17. Discuss the number of deaths and injuries that occurred due to the 2018 eruption of Kilauea in Hawaii and what caused them. Be sure to include your sources. *(4 pts)*

18. Do basaltic lava flows pose a greater risk to people or property? Why? *(3 pts)*

19. Head to the Pacific Northwest Seismic Network website and look at the recent seismicity for the volcanoes in this region (click the "Volcano Seismicity" dropdown and go through each of the volcanoes). What are the 2 most seismically active volcanoes in the Cascade Range? *(4 pts)*

Go to Mt. Rainier's volcanic seismicity page. Within this page, click on the "seismicity" tab at the top of the map to see the history of earthquakes since 2016. For the first graph, negative

numbers on the y-axis indicate elevation above sea level, and positive numbers indicate depth within the Earth (elevation below sea level).

20. Look at the first image, at what depth or range of depths do most of these earthquakes occur? *(3 pts)*

21. Look at the second image. Discuss the history of earthquakes for this volcano, including if the number of earthquakes per year has been increasing, decreasing, or about the same. (Look carefully at what the graph lines are showing, the red line is the cumulative number of earthquakes, the block lines are earthquakes per day.) *(4 pts)*

22. Look at the third image, where in the Mt. Rainier region have most of these earthquakes occurred? *(3 pts)* (Be very specific)

23. What do you think is responsible for these earthquakes? *(4 pts)* (Hint: These are not earthquakes from the subduction zone)

24. Let's say you were to live in Tacoma, Washington. Look at the USGS volcanic hazard map, and discuss the hazard that lava flows, pyroclastic flows, and lahars pose to Tacoma. *(3 pts)*

25. Summarize the Electron Mudflow and why this lahar was unique. *(4 pts)*