

# Assignment on geology



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Your Geology 203 – Assignment Natural Hazards – Volcanoes PART A few general questions Currently, approximately how many islands are part of the Caribbean Island Arc system? How many existed in the Eocene? Explain and list.

Forty-one islands are currently part of the Caribbean Island Arc system.

There were no islands in this region during the Eocene period because the Caribbean plate had not yet been formed.

2. How likely will eruptions occur on these islands? Are there any where it is more likely in the near future? Explain.

There are three active volcanoes in the Caribbean: the Soufriere Hills Volcano on Montserrat Island in the Lesser Antilles, Mount Pelee in Dominica, and Mount Scenery on Saba. The more active a volcano is, the more likely it is that it will erupt again, and that is the case for all three volcanoes. The Soufriere is the most active of the three and therefore more likely to erupt again because its current pattern of activity includes periods of dome growth followed by brief episodes of dome collapse, resulting in lava flows, ash venting, and eruptions (Young et al. 349).

3. What is a supervolcano?

A supervolcano is a volcano capable of producing an eruption thousands of times larger than most volcanic eruptions in history, with ejecta greater than 240 cubic miles.

4. What would happen if a supervolcano eruption occurred?

If a supervolcano erupted, the effects would be catastrophic. The Lake Toba eruption, which occurred in what is now Sumatra and Indonesia approximately 74, 000 years ago, plunged the earth into a volcanic winter and killed approximately 60% of the human population at the time.

## PART 2: Cross Sections

### 5. Cross section of the Caribbean Island Arc area (“ Soufriere Hills”)

Map from the Smithsonian: <http://www.volcano.si.edu/world/volcano.cfm?vnum=1600-05=&volpage=maps>

### 6. Cross section of the Yellowstone caldera (“ Steam Explosions”)

From the U. S. Geological Survey: [http://pubs.usgs.gov/fs/2005/3024/press-images/fig\\_03\\_yellowstone\\_map.jpg](http://pubs.usgs.gov/fs/2005/3024/press-images/fig_03_yellowstone_map.jpg)

## PART 3: Environmental Impacts, risk, and hazard assessment

There are all kinds of reasons people live near a volcano. The reasons are similar to why people live near other hazards. People tend to live where they have roots, regardless of the potential risks. Fortunately, scientists have set up risk assessments.

For example, scientists have developed an extensive series of protocols for the residents living near the Soufriere Hills Volcano on the Caribbean island of Montserrat. This volcano was dormant for almost one hundred years before becoming active again in 1995, and has continued to erupt ever since. Its eruptions have resulted in over half of Montserrat becoming uninhabitable.

There are those who have remained, though. In response to the few that have stubbornly refused to leave their home, scientists founded what eventually became the Montserrat Volcano Observatory (MVO) immediately after the first phreatic explosions on July 18, 1995 (MVO. ms n. p.). As a result of the MVO's research, the Soufriere Hills Volcano has become one of the most closely monitored volcanoes in the world. Monitoring of this volcano is done by measuring the deformation of its flanks and dome, by measuring the ambient sulphur dioxide concentrations at ground level, by recording and

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analyzing volcanic earthquakes, and by visual observations (“ Monitoring n. p.). The MVO publishes their regular reports and risk assessments on their website, and prints leaflets and posters to disseminate throughout the island.

The Montserrat government and the MVO have adopted risks assessments since the 1995 eruption, the most recent version being the “ Hazard Level System,” which has been used since August 2008. It divides the southern two-thirds of Montserrat into seven zones (“ Hazard Level System” n. p.). According to the MVO, the northern part of Montserrat is safe for humans to reside because the overall trend of seismic activity is downward. The exact angle of the activity is unknown, however, so there are regular periods of frequent mild eruptions, as there was during the early part of 2010 as described by Pulsipher (10-13). Her article gives some insight as to the reason people have continued to live under the shadow of an active volcano. The first thing the Federal Emergency Monitoring Administration (FEMA) advises people to do if a near-by volcano erupts is to follow all evacuation orders, and to avoid mudflows, river valleys, and low-lying areas while leaving. FEMA also advises residents to protect themselves from falling ash (“ What To Do” n. p.).

By comparison, the Yellowstone Caldera, which is monitored by the Yellowstone Volcanic Observatory, causes a 0.6 cm rise and fall of the Yellowstone Plateau. There has been more activity in recent years, but scientists monitoring it have found little evidence of the prospect of a cataclysmic eruption happening in the near future. The Yellowstone Caldera is monitored by measuring volcanic and seismic activity in Yellowstone National Park, by measuring deformations and hydrologic data, and through

data gathered during regular field studies. The Yellowstone Volcanic Observatory publishes monthly reports of the volcano's activities (" Volcano Monitoring" n. d.).

Pulsipher is not even a Montserrat resident, but she expresses her fond memories of what it was like on the island before the 1995 eruption. She describes the beauty of the place, including the spectacular sunsets caused by the ever-present ash from the volcano and the stubborn vegetation that survives in spite of the volcano's activity. The reader is able to understand why Montserrat's residents are just as stubborn and why they chose to live in such a place, even with the MVO's constant monitoring of volcanic activity. Its residents, like Pulsipher, have a connection to the island so strong, not even living in the shadow of an active volcano makes them leave it, and risk assessments like the one the MVO provides makes it possible.

#### Works Cited

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