

Physical Geography of Southeast Asia

Case Study

Mount Merapi Eruption

By Michelle Crane

Teacher Consultant for the Texas Alliance for Geographic Education





Introduction

- Asia has 1/3 of the world's active volcanoes
- Indonesia has 76 historically active volcanoes – more than any other country
- The majority of Indonesia's volcanoes have erupted within the last 100 years.



Map





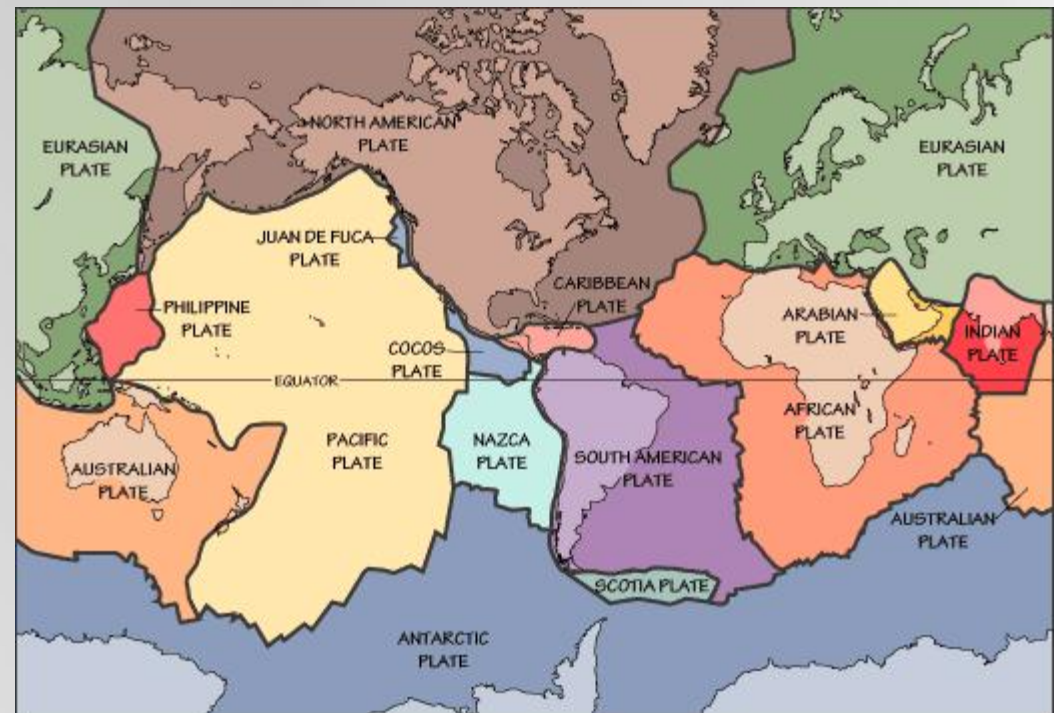
Famous Historical Eruptions

- The eruption of Mount Tambora in 1815 may be partly responsible for “the year without a summer” – summer frosts throughout North America and Europe.
- The eruption of Krakatau (or Krakatoa) in 1883 was so loud, it was heard as far away as Australia.



Causes

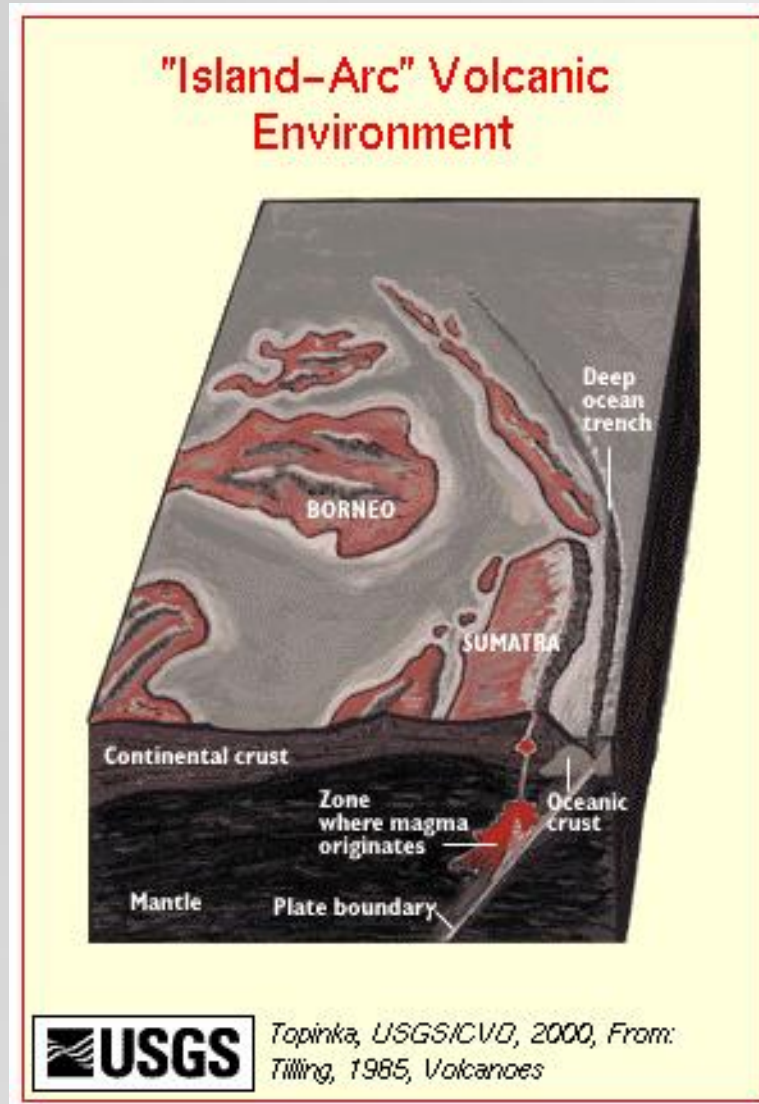
- Convergent boundary
- Oceanic Australian plate is colliding with Continental Eurasian plate
- Oceanic plate is subducting under the continental plate





Causes

- As oceanic plate subducts, the leading edge begins to melt
- Magma flows to the surface and creates a volcanic arc
- Java and Sumatra lie along the Sunda Arc





Mount Merapi

- Mount Merapi is located near the center of the island of Java
- Historically one of the most active volcanoes in the region
- Lies just north of Yogyakarta – a metropolitan area with over 2 million people





2010 Eruption

- Eruption began on Oct 26.
- Most people had been evacuated – about 250,000 people were displaced.
- At the time of the eruption, about 15,000 people had not evacuated.
- About 300 people had been reported killed



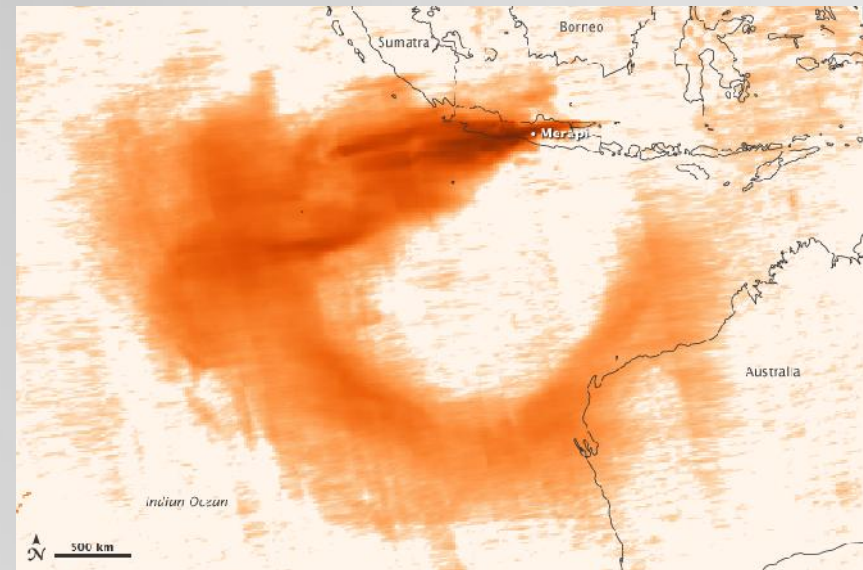
Local/National Scale

- Mount Merapi's Eruptions – The Big Picture
 - http://www.boston.com/bigpicture/2010/11/mount_merapis_eruptions.html
 - A photo essay by the Boston Globe



Regional Scale

- High levels of sulfur dioxide were released by the eruption
- Air currents spread them as far away as Australia
- Sulfur dioxide is harmful to humans and can cause cooling in the Earth's atmosphere





Google Earth Layers

- Various satellite images of Mount Merapi area by NASA Earth Observatory
- Including Thermal and Sulfur Dioxide emissions
- KML file for viewing in Google Earth is located at:
 - http://eoimages.gsfc.nasa.gov/images/imagerecords/46000/46881/ge_46881.kml



Documentation

- NASA. (2013, June 4). NASA Earth Observatory. Retrieved from <http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=46881>
- Smithsonian Institution. (2013, June 4). Global Volcanism Program: . Retrieved from <http://www.volcano.si.edu/index.cfm>
- US Geological Survey. (2013, June 4). Volcano Hazards Program. Retrieved from USGS: <http://vulcan.wr.usgs.gov/Volcanoes/Indonesia/>



Notes & Credits

- Slide 1
 - Photo credit: Smithsonian Institution, 2013
- Slide 3
 - Map used courtesy of US Geological Survey
- Slide 5
 - Illustration courtesy of the USGS
- Slide 6
 - Illustration courtesy of the US Geological Survey
- Slide 8
 - (Smithsonian Institution, 2013)
- Slide 9
 - Note – in order to access the entire photo essay, you will have to answer a short 2 question survey. It is recommended you complete this before showing the photo essay to your students. In addition, some of the images may be disturbing. It is recommended you preview the pictures before sharing with students.
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 - NASA Earth Observatory image created by Jesse Allen, using OMI data provided courtesy of Simon Carn, [Department of Geological and Mining Engineering and Sciences](#), Michigan Technical University. Caption by Michon Scott.
- Slide 11
 - Mount Merapi Eruptions.kml file accompanies this file on the website. Be sure to download and install before presenting to students.