Volcanoes and Hazards

What are the characteristics of volcanoes and their hazards?
Volcanoes and Hazards

- Volcano - an opening in the planet’s crust which allows molten rock, ash and gases to escape
Volcanic Eruptions
Volcanic Eruptions
Volcanoes and Hazards

- Caldera - a large volcanic crater, formed by a major eruption, leading to the collapse of the mouth of the volcano
Caldera Formation

Magma chamber empties during the eruption

Volcano collapses into the empty magma chamber

Caldera forms in the newly sunken volcano
Aniakchak Caldera, Alaska
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• Volcanoes are generally found at hotspots or where tectonic plates are diverging or converging
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• Hotspots - thinner portions of the crust where rising convection currents deliver magma to the surface
  
  • Example: Hawaiian Islands
The Hawaiian Island Chain
The Hawaiian Island Formation
The Hawaiian Island Chain
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- Converging and diverging tectonic plates
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• Types of Volcanoes:
  • **Composite Volcano** [stratovolcano] - tall cone shaped volcano composed of lava flows and other ejecta in alternating layers
  • Most deadly with violent eruptions
Composite Volcano [stratovolcano]
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- **Pyroclastic Flow** - lateral flow of hot gases, volcanic fragments, ash, and glass shards that can move at speeds of 100 m.p.h. down the slopes of the volcano
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• Types of Volcanoes [continued]:
  • **Shield Volcano** - large volcano with broad sloping sides created from a low viscosity lava flow
    • Usually occur around hotspots with non-explosive eruptions
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• Types of Volcanoes [continued]:

  • Cinder Cones - a cone formed around a volcanic vent by fragments of lava thrown out during eruptions

    • Usually smaller with short lived eruptions
Cinder Volcano
Types of Volcanoes [continued]:

- **Extinct Volcano** - volcanoes that are unlikely to erupt again due to a lack in lava supply.
Extinct Volcano - Shiprock, New Mexico
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• Predicting eruptions have been sought after by volcanologists since volcanoes were studied

• In 1991, USGS was asked to monitor Mount Pinatubo and used the many signs volcanoes give off prior to an eruption in the hope of minimizing damage to lives and personal property
Mount Pinatubo, Philippines
Mount Pinatubo, Philippes
Mount Pinatubo, Philippines
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- Tools used in monitoring:
  - Seismometer measurements of earthquakes
  - Radiocarbon dating of past eruptions
  - Gas readings of sulfur dioxide
  - Tiltmeters and lasers to show inflating
Volcanoes and Hazards

• Emergency Preparedness:
  • What do you do if there is an impending volcanic eruption?

EVACUATE