

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

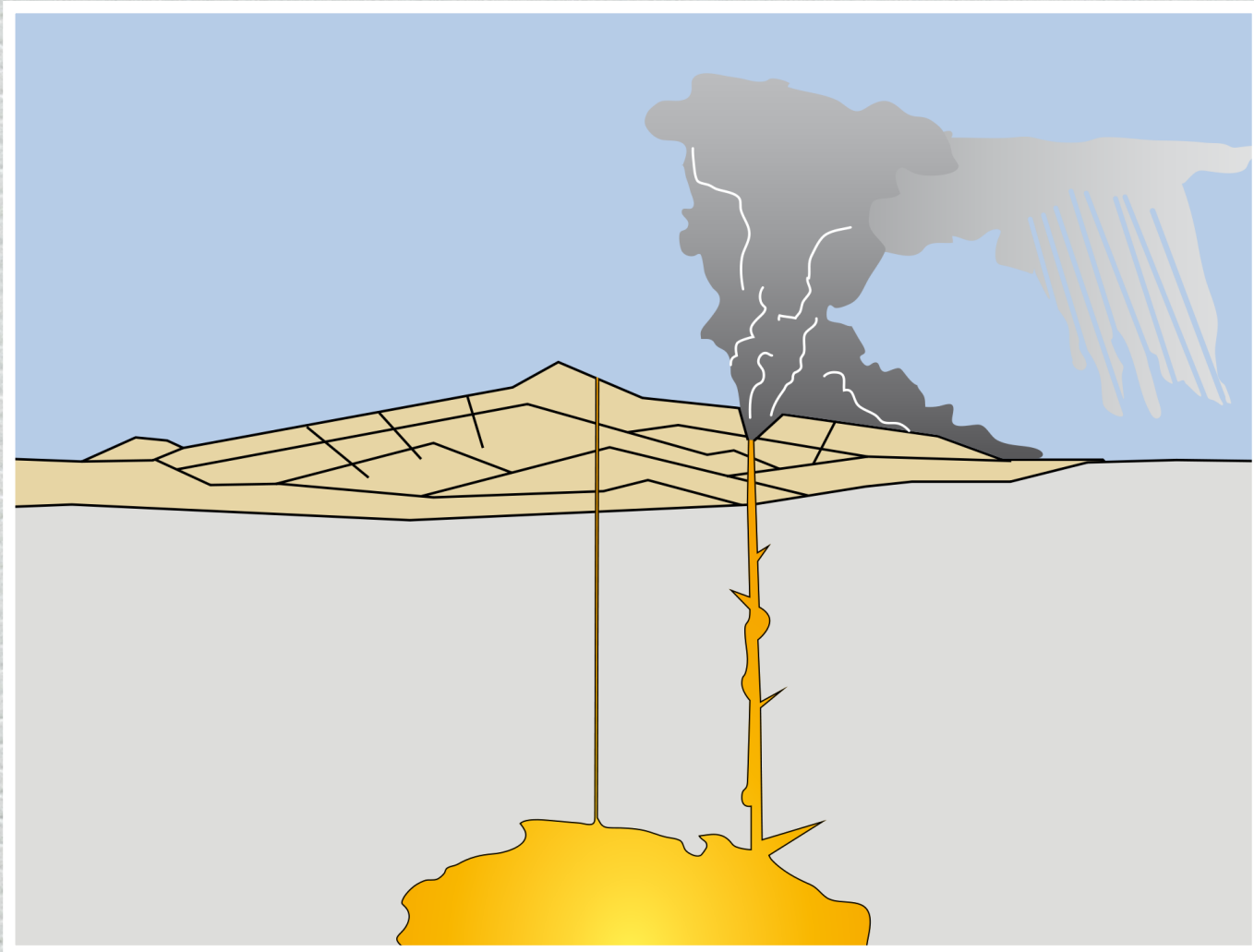


Volcanic Eruptions

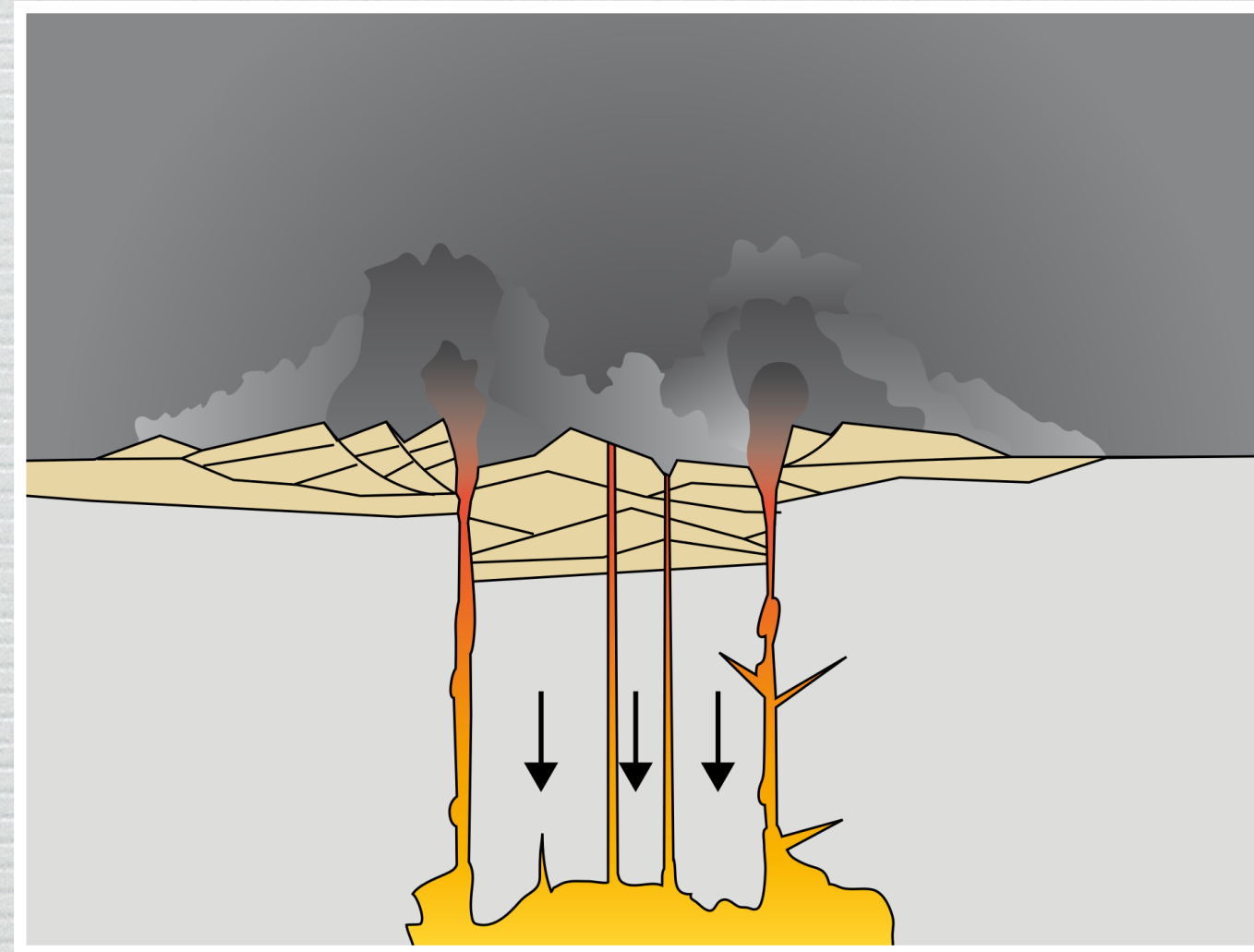
Volcanoes and Hazards

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

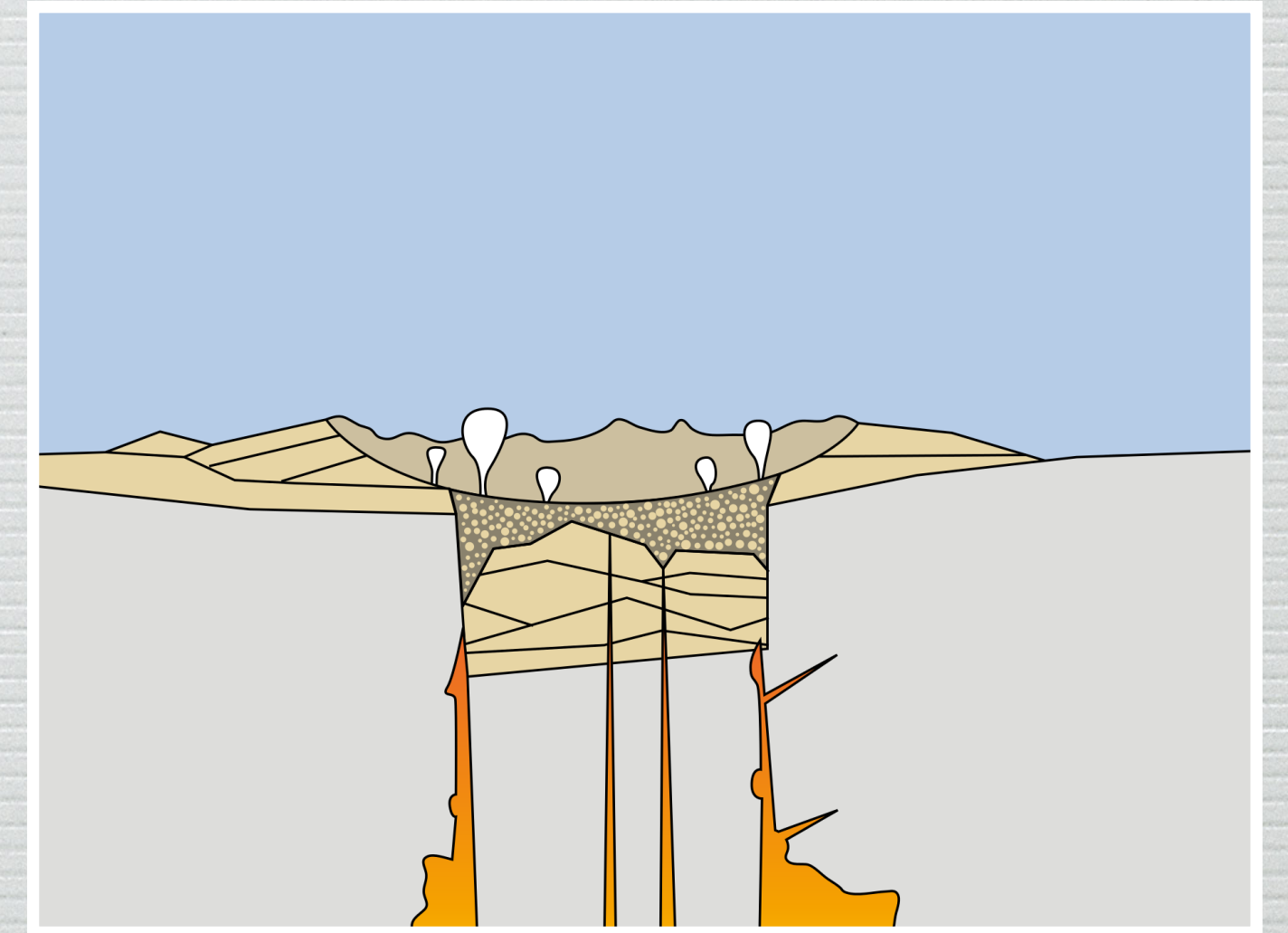




Magma chamber empties during the eruption



Volcano collapses into the empty magma chamber



Caldera forms in the newly sunken volcano

Caldera Formation



Aniakchak Caldera, Alaska



Mt. St. Helenes, Washington



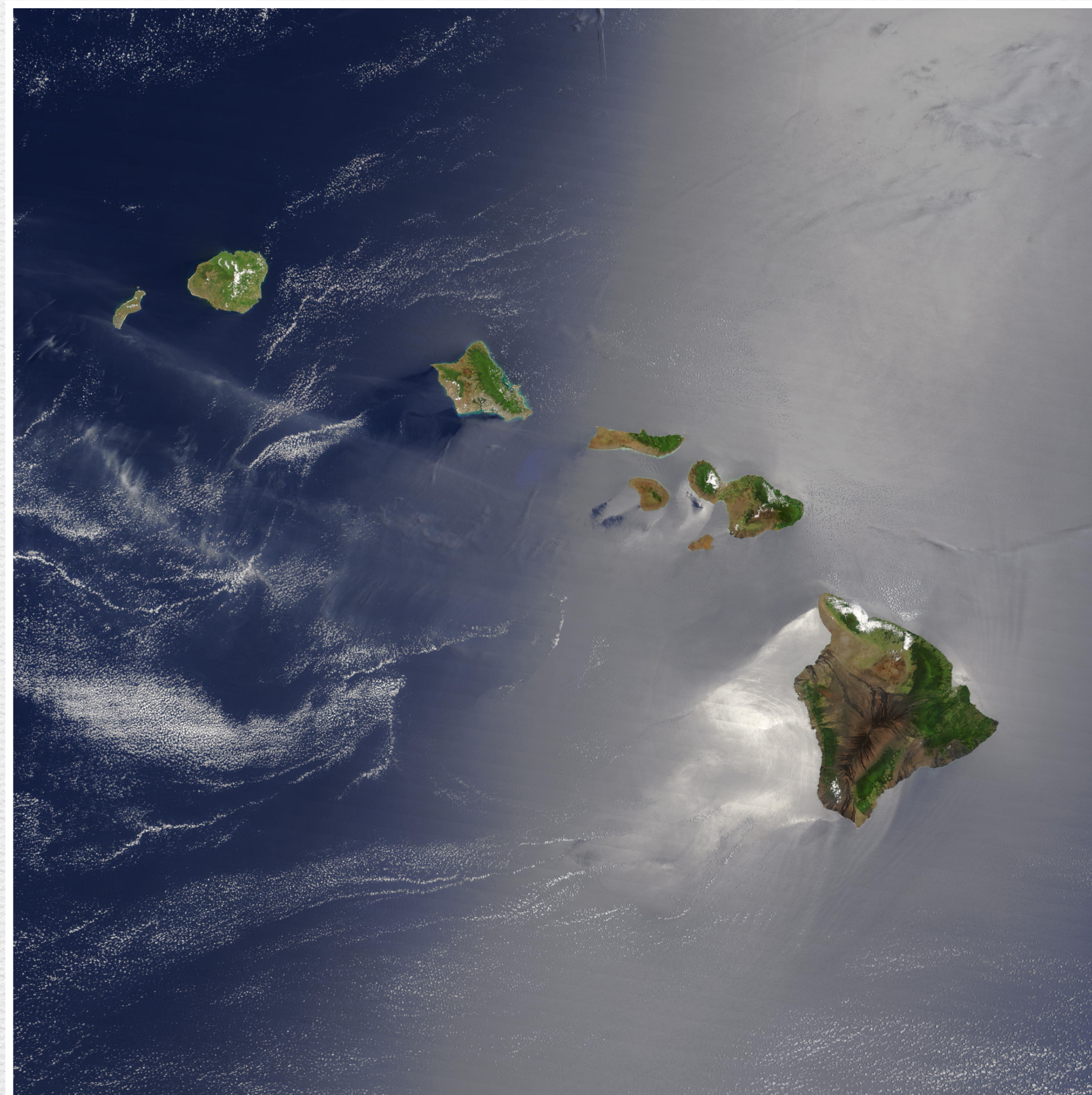
Volcanoes and Hazards

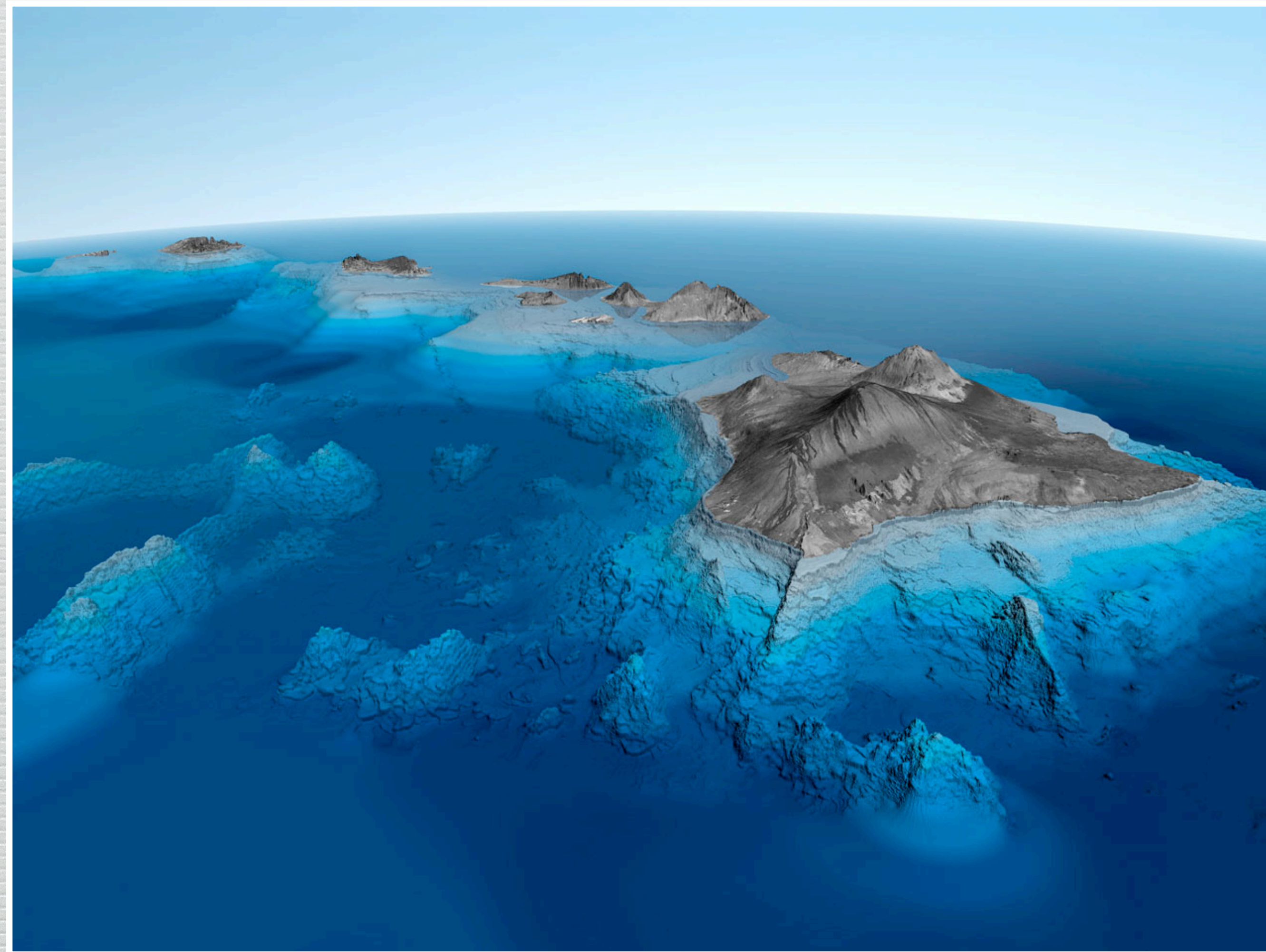
- Volcanoes are generally found at hotspots or where tectonic plates are diverging or converging



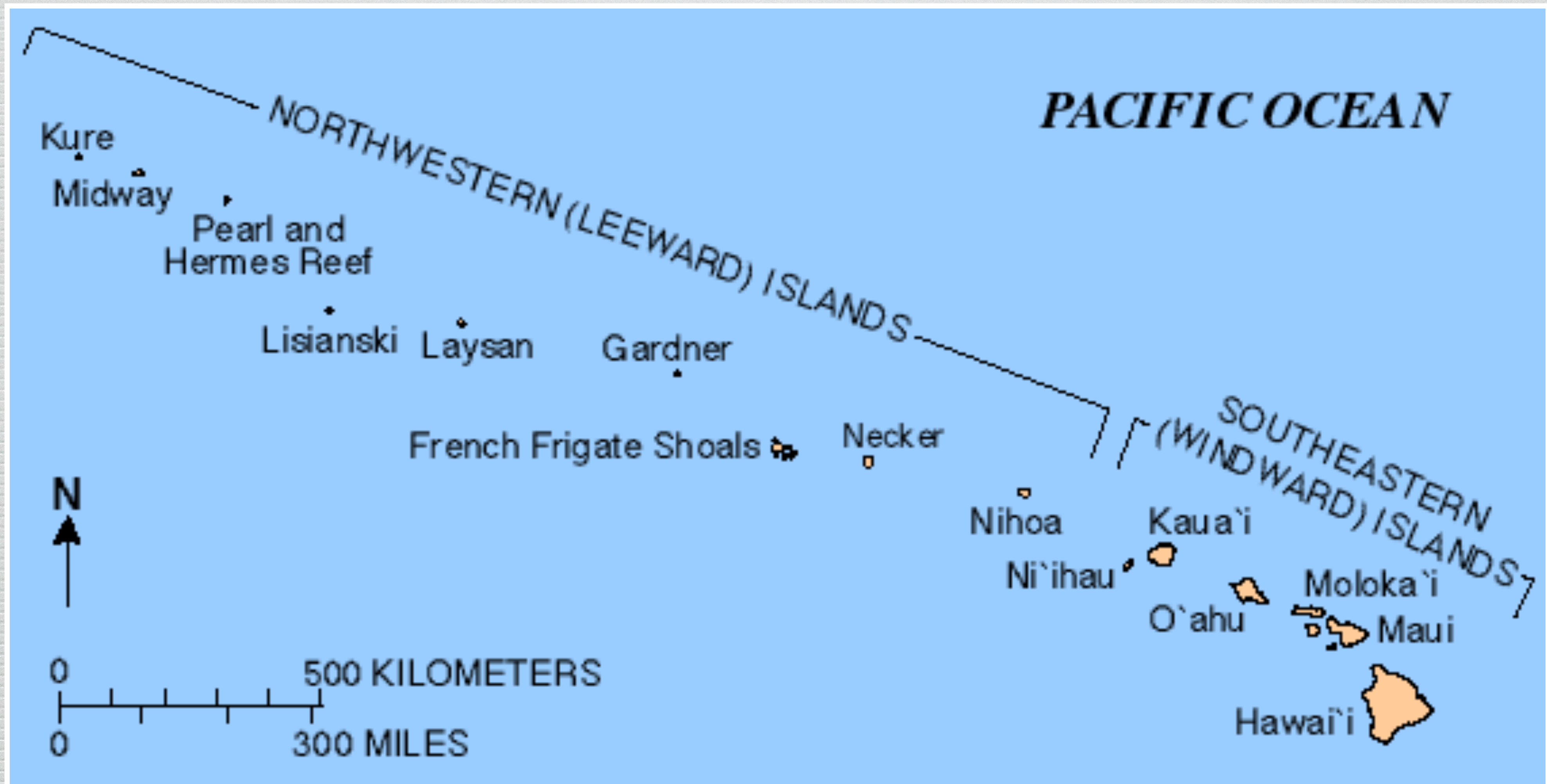
Volcanoes and Hazards

- Hotspots - thinner portions of the crust where rising convection currents deliver magma to the surface
 - Example: Hawaiian Islands



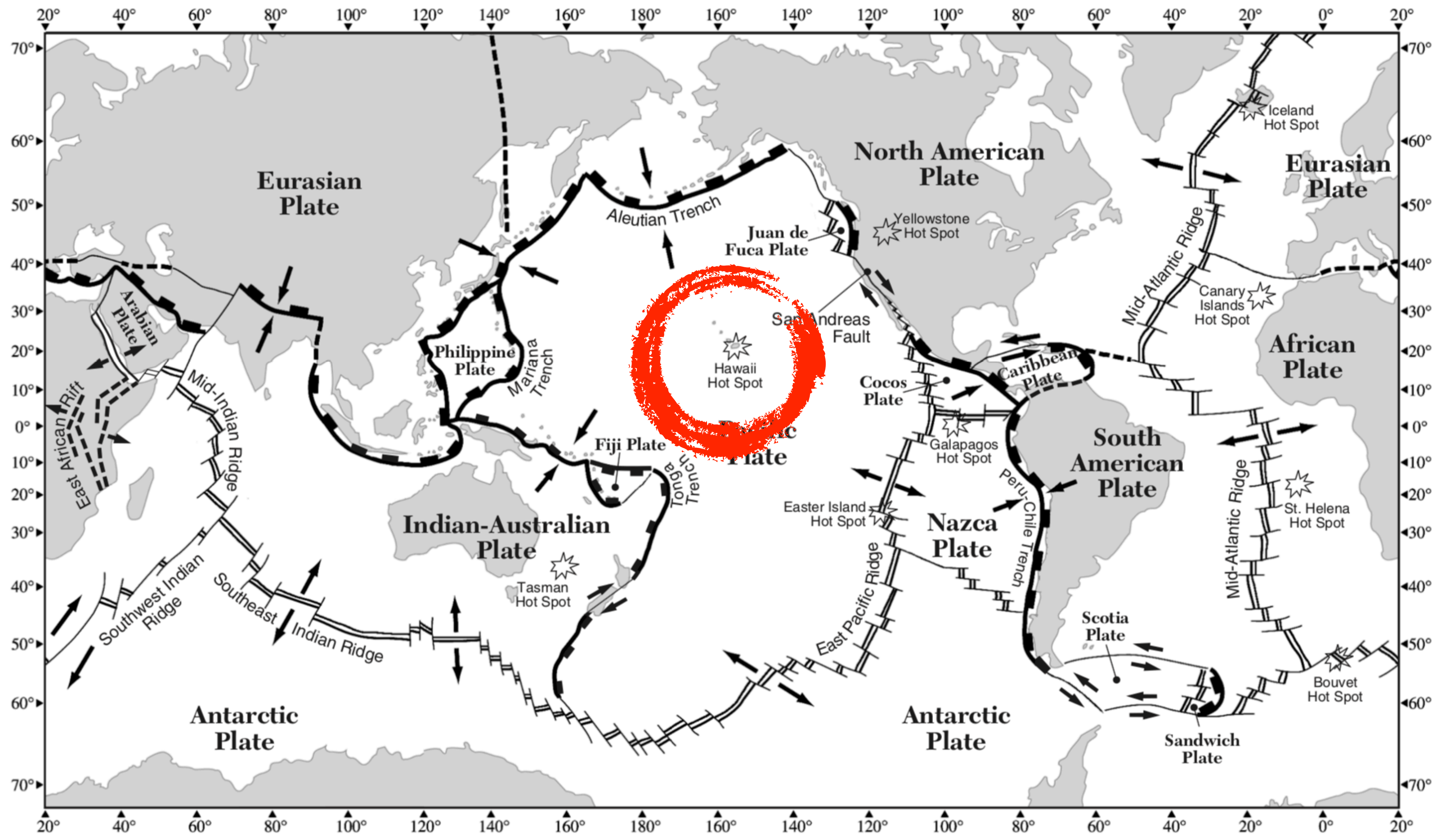


The Hawaiian Island Chain



The Hawaiian Island Chain

Tectonic Plates

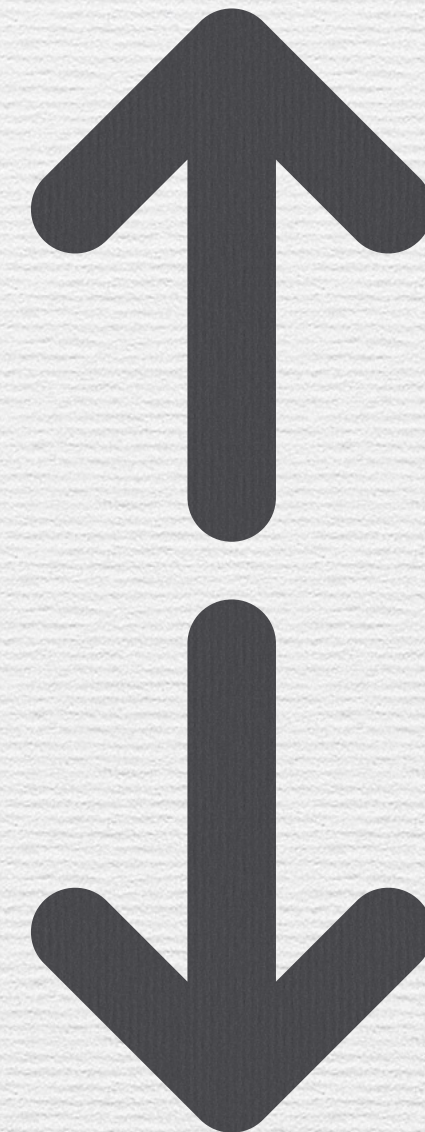


Volcanoes and Hazards

- Converging and diverging tectonic plates

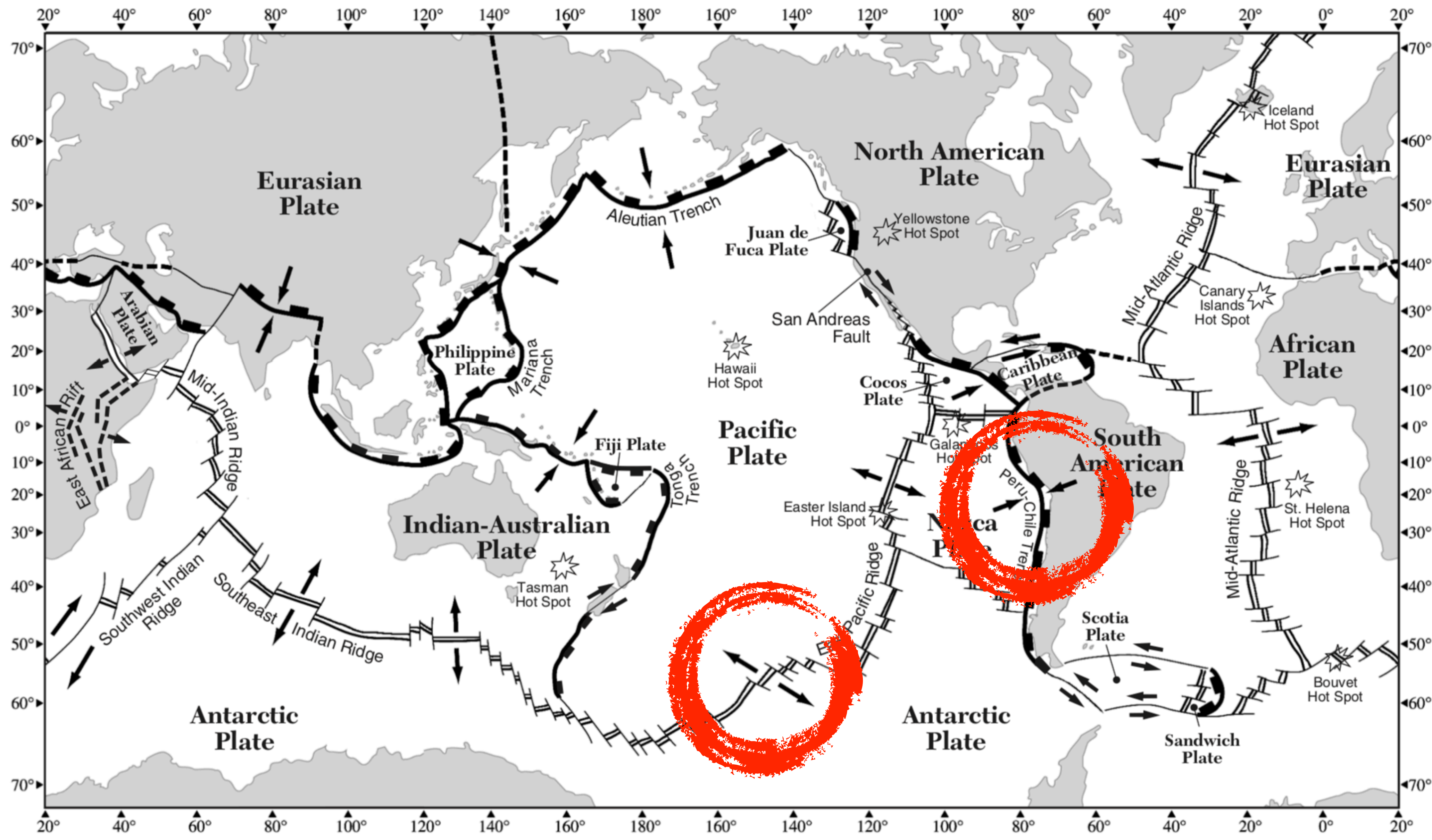


Convergent



Divergent

Tectonic Plates



Volcanoes and Hazards

- 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]

Volcanoes and Hazards

- 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





dust and gas that flow down the sides of a volcano



Volcanoes and Hazards

- 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



Shield Volcano

Volcanoes and Hazards

- 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

Volcanoes and Hazards

- 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

Volcanoes and Hazards

- Predicting eruptions have been sought after by volcanologists, but is still not precise
- 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, Philippines



Mount Pinatubo, Philippines

Volcanoes and Hazards

- 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?

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