Plate Tectonics

- If you look at a map of the world, you may notice that some of the continents could fit together like pieces of a puzzle.

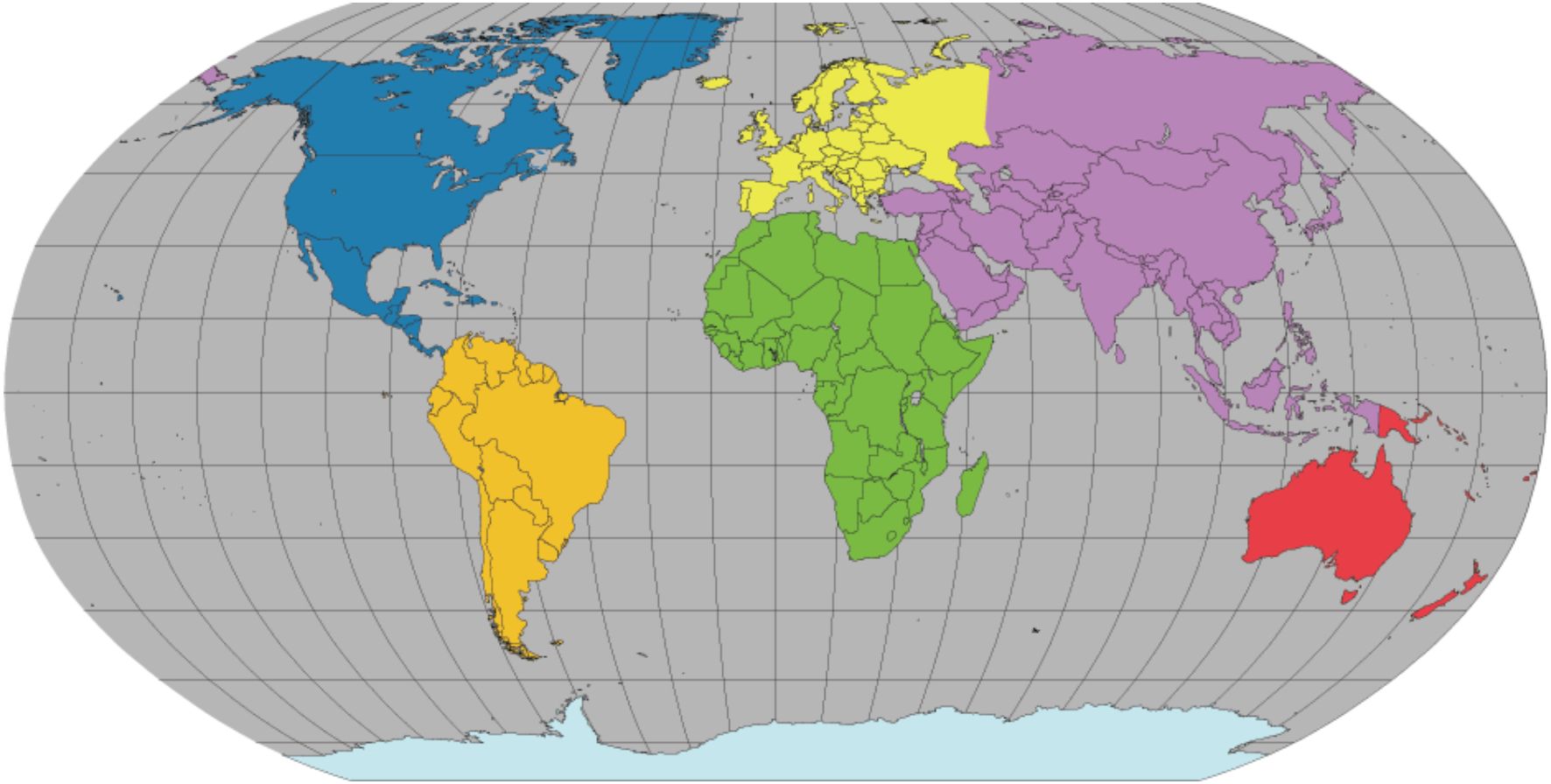
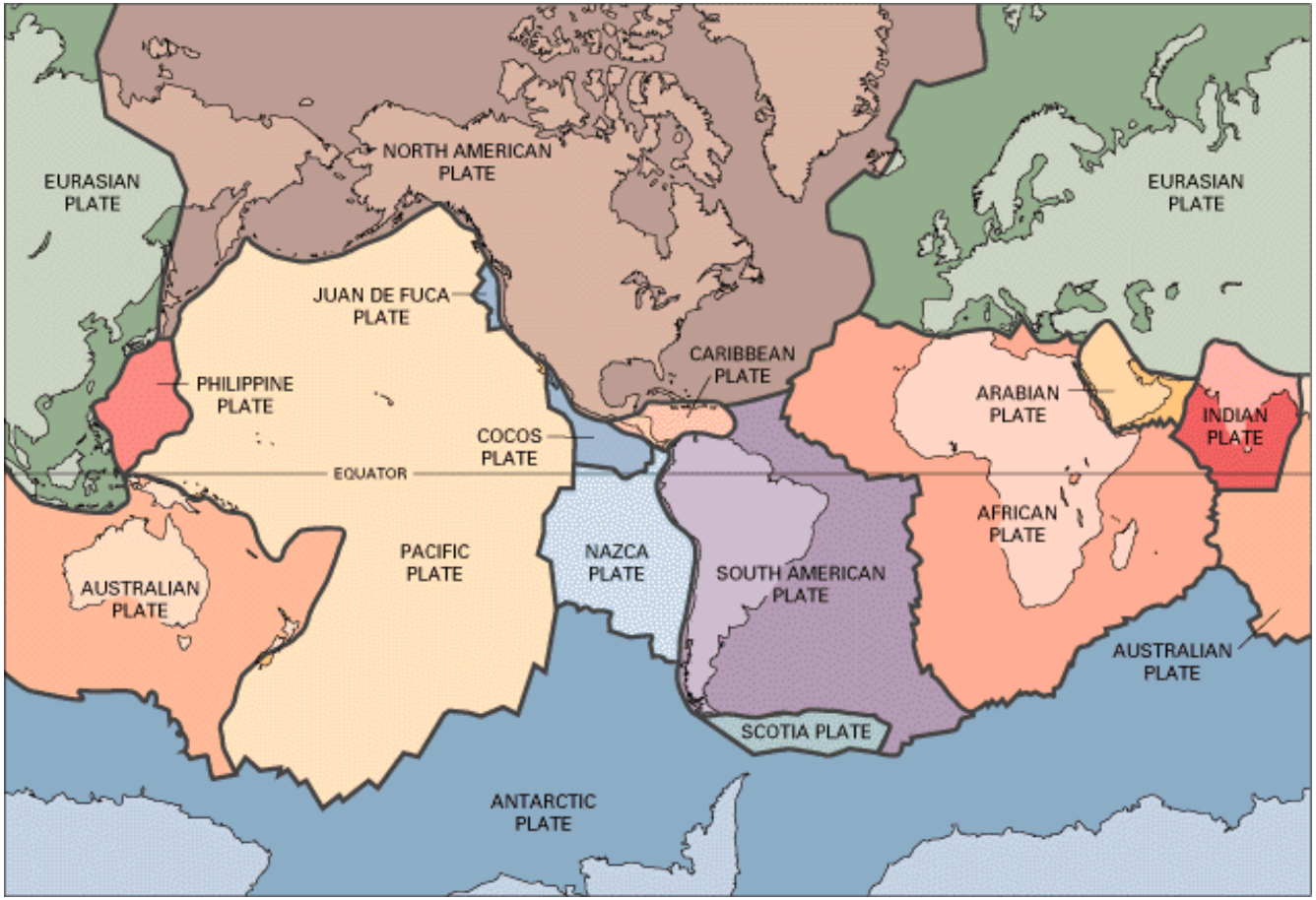


Plate Tectonics

- The Earth's crust is divided into 12 major plates which are moved in various directions.
- This plate motion causes them to collide, pull apart, or scrape against each other.
- Each type of interaction causes a characteristic set of Earth structures or "tectonic" features.
- The word, tectonic, refers to the deformation of the crust as a consequence of plate interaction.

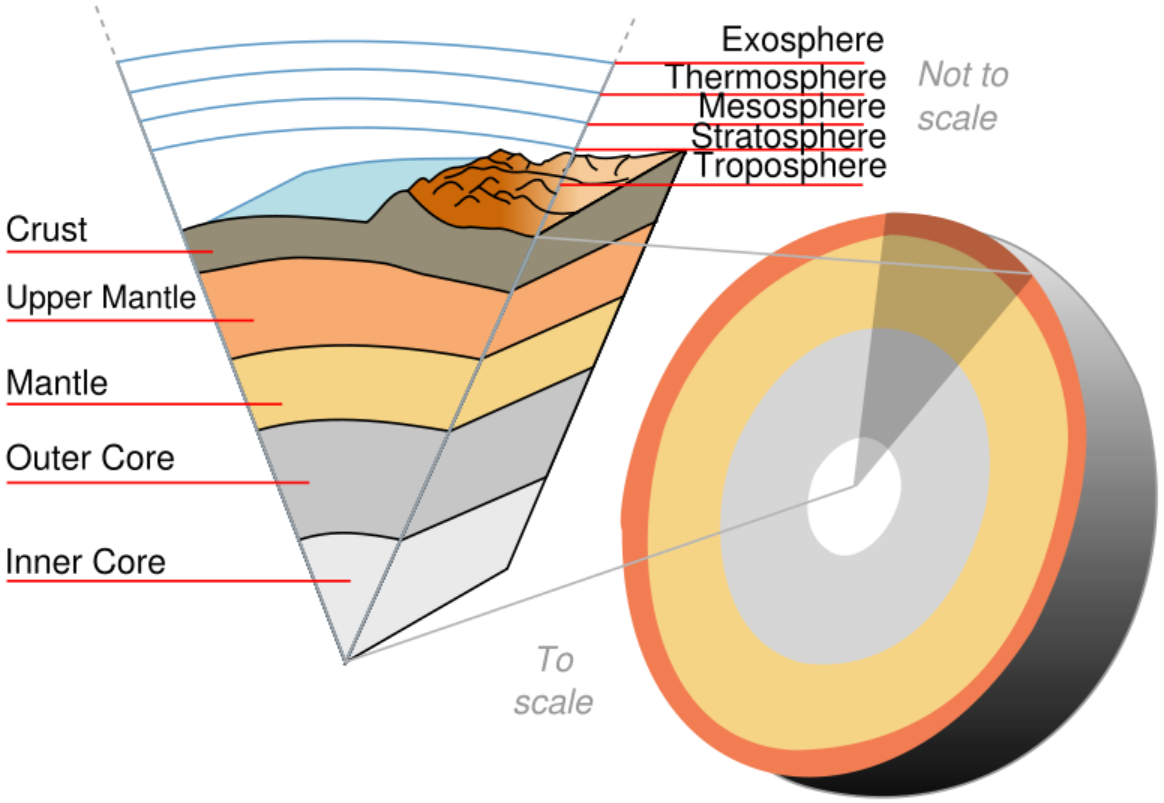
World Plates



What are tectonic plates made of?

- Plates are made of rigid **lithosphere**.

The lithosphere is made up of the crust and the upper part of the mantle.



What lies beneath the tectonic plates?

- Below the lithosphere (which makes up the tectonic plates) is the asthenosphere.
- ***asthenosphere is part of the upper mantle and is very hot. A percentage is liquid which allows it to flow***

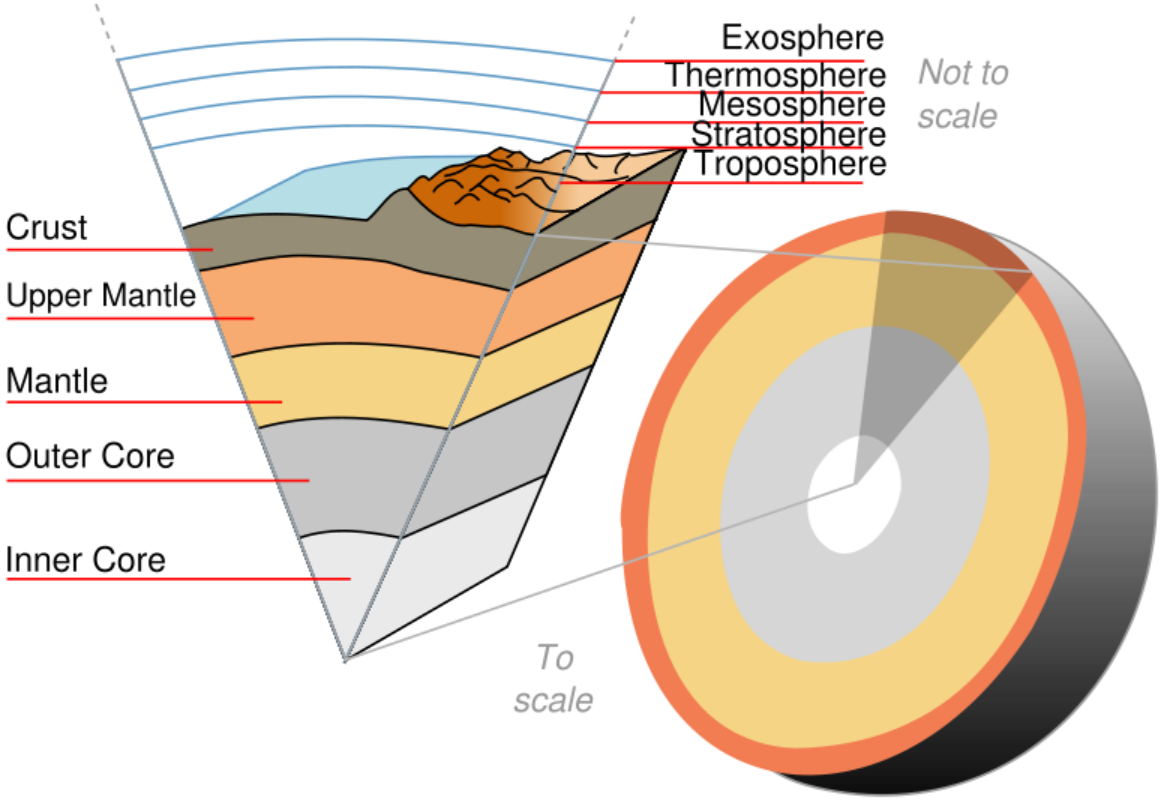
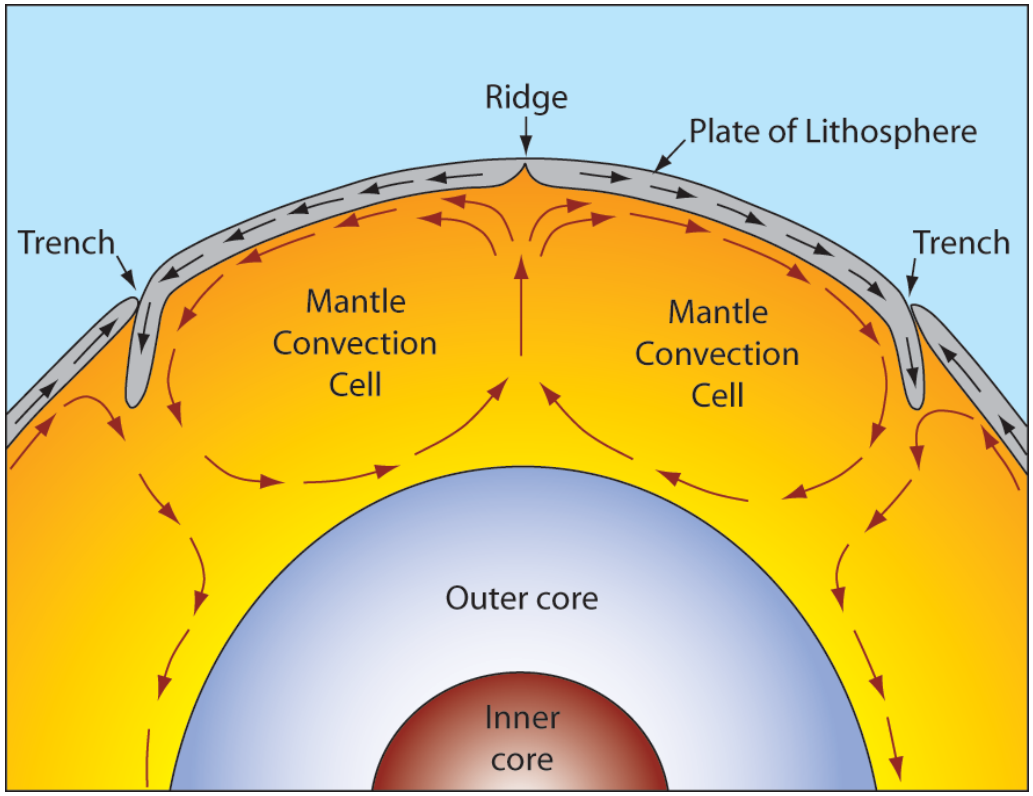


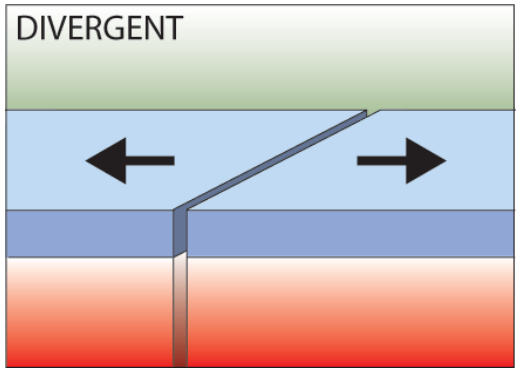
Plate Movement

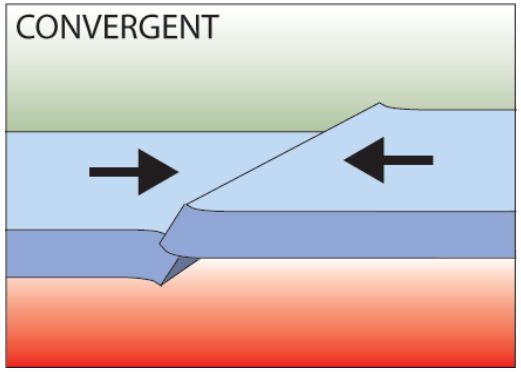
- "Plates" of lithosphere are moved around by the **underlying hot mantle convection cells**

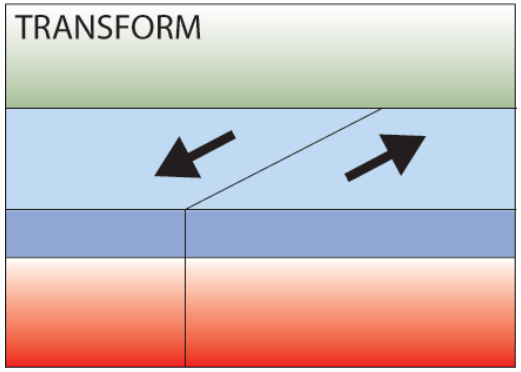


Three types of plate boundary

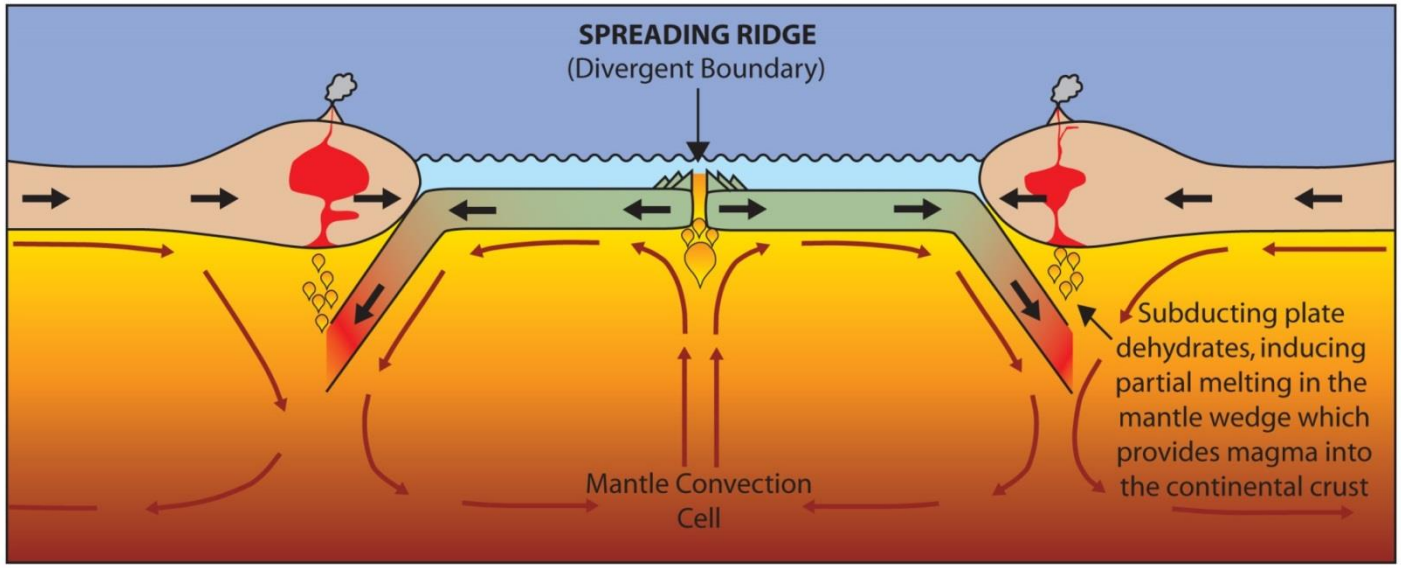
- Divergent
- Convergent
- Transform







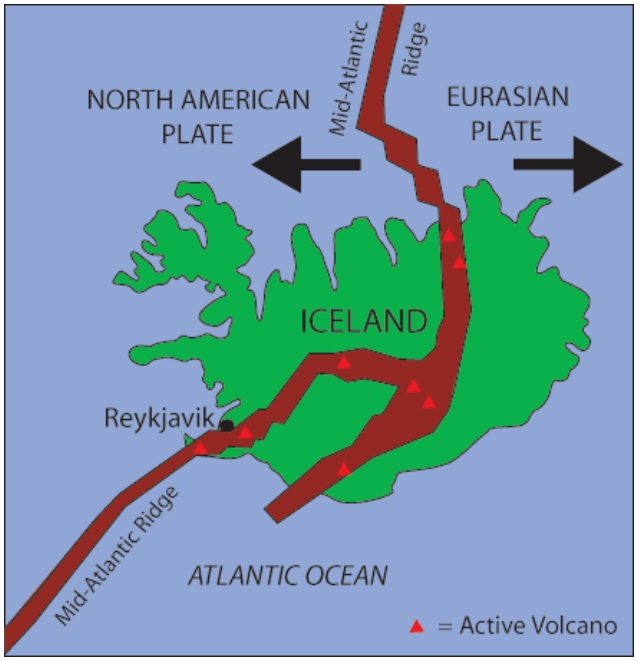
Divergent Boundaries
(plates moving away from each other)



- Spreading ridges
  - As plates move apart new material is erupted to fill the gap

Iceland: An example of continental rifting

- Iceland has a divergent plate boundary running through its middle

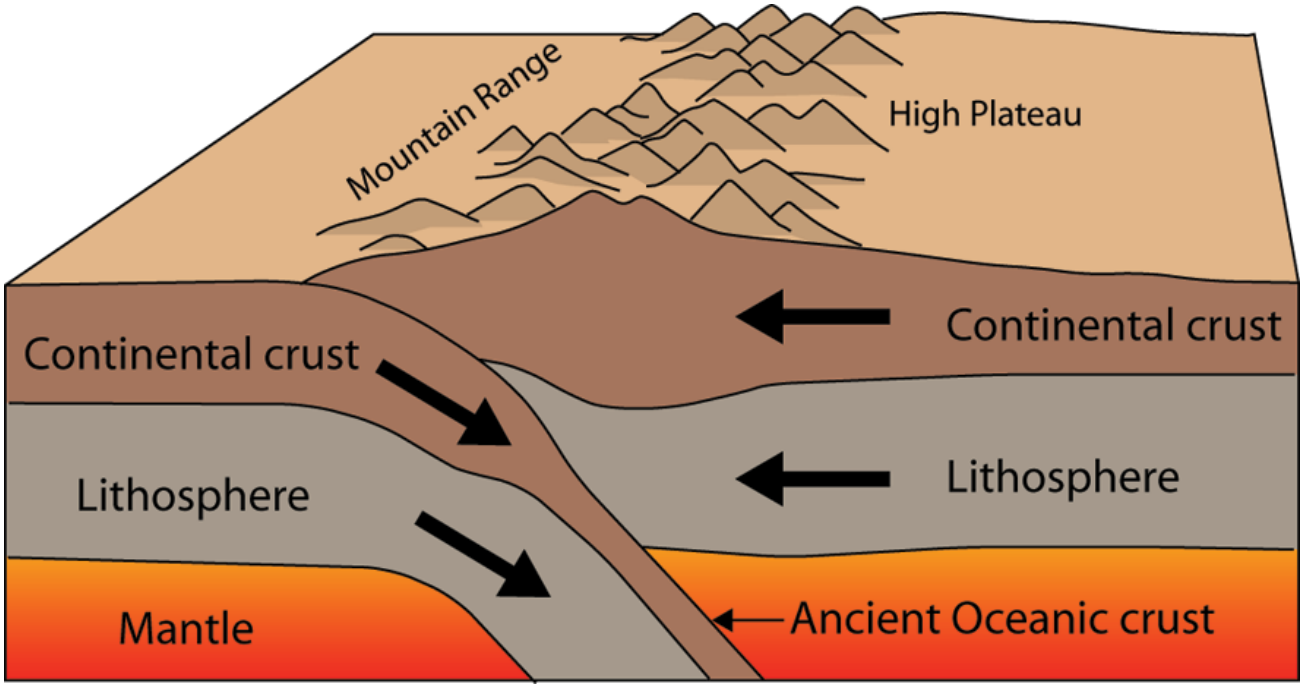


Convergent Boundaries
(Plates moving towards each other)

- There are three styles of convergent plate boundaries
  - Continent-continent collision
  - Continent-oceanic crust collision
  - Ocean-ocean collision

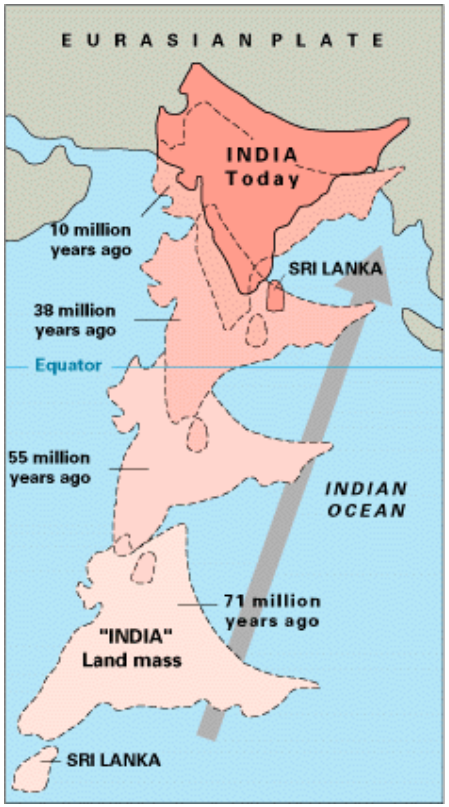
Continent-Continent Collision

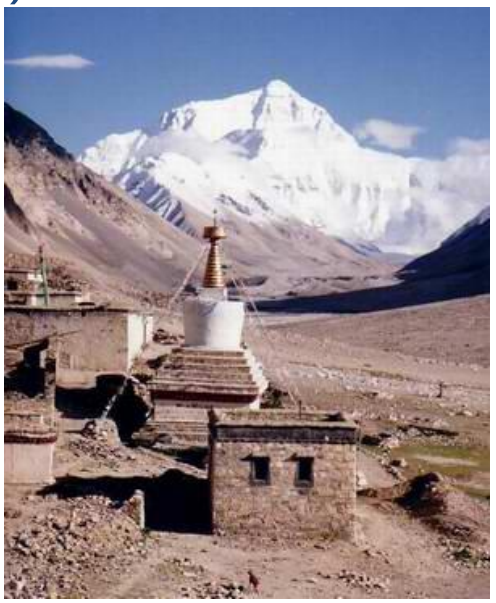
- Forms mountains, e.g. European Alps, Himalayas



Himalayas

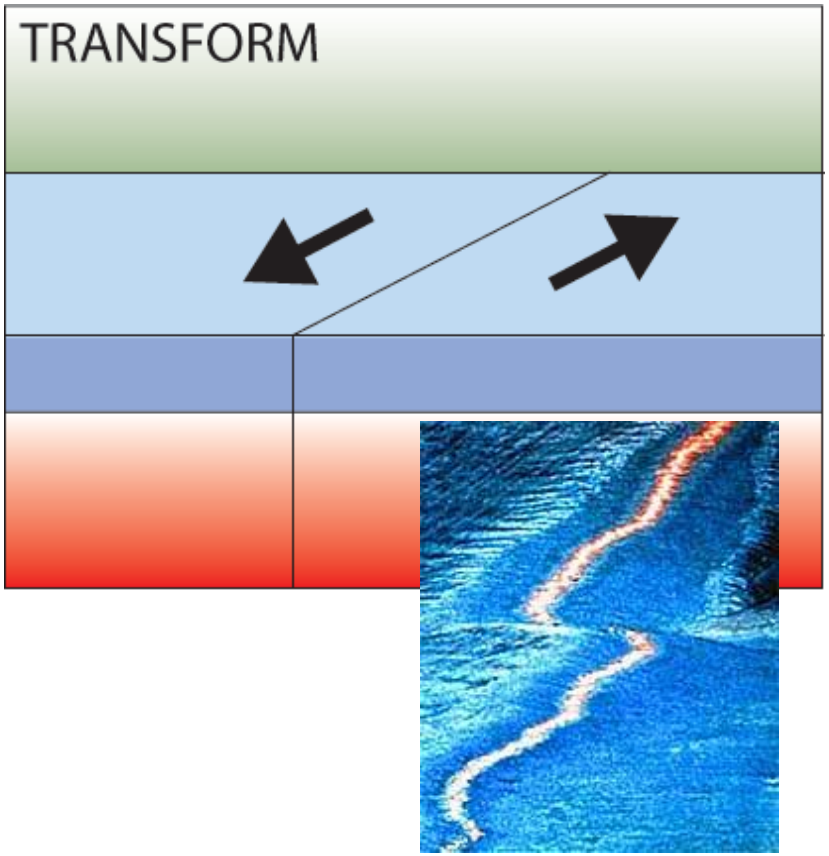
(Created by continent – continent collision)

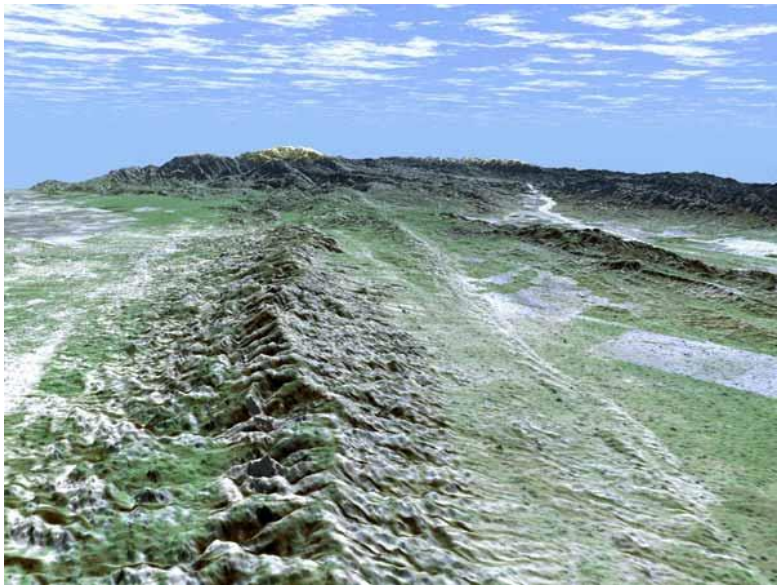




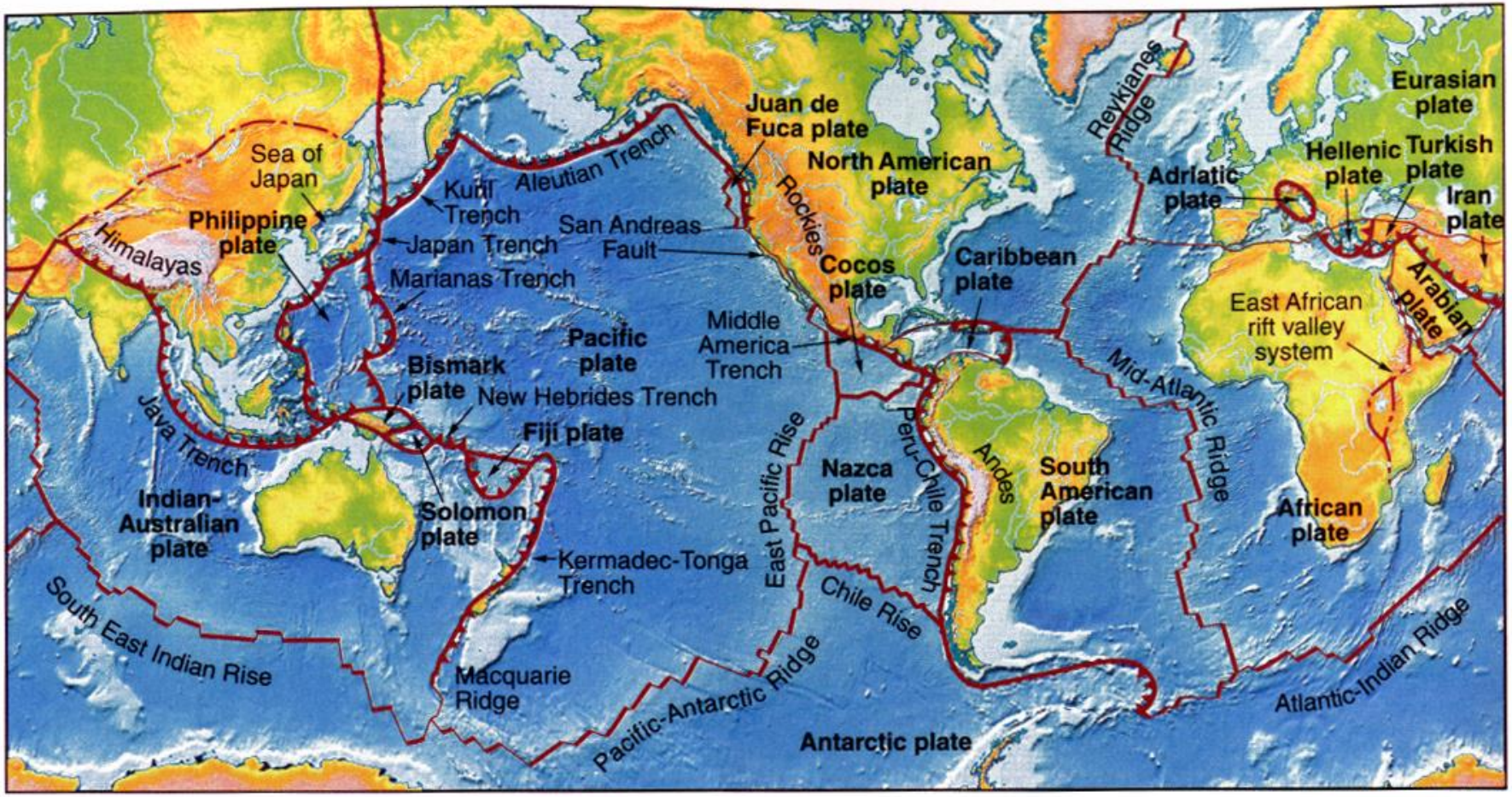
Transform Boundaries

- Where plates slide past each other



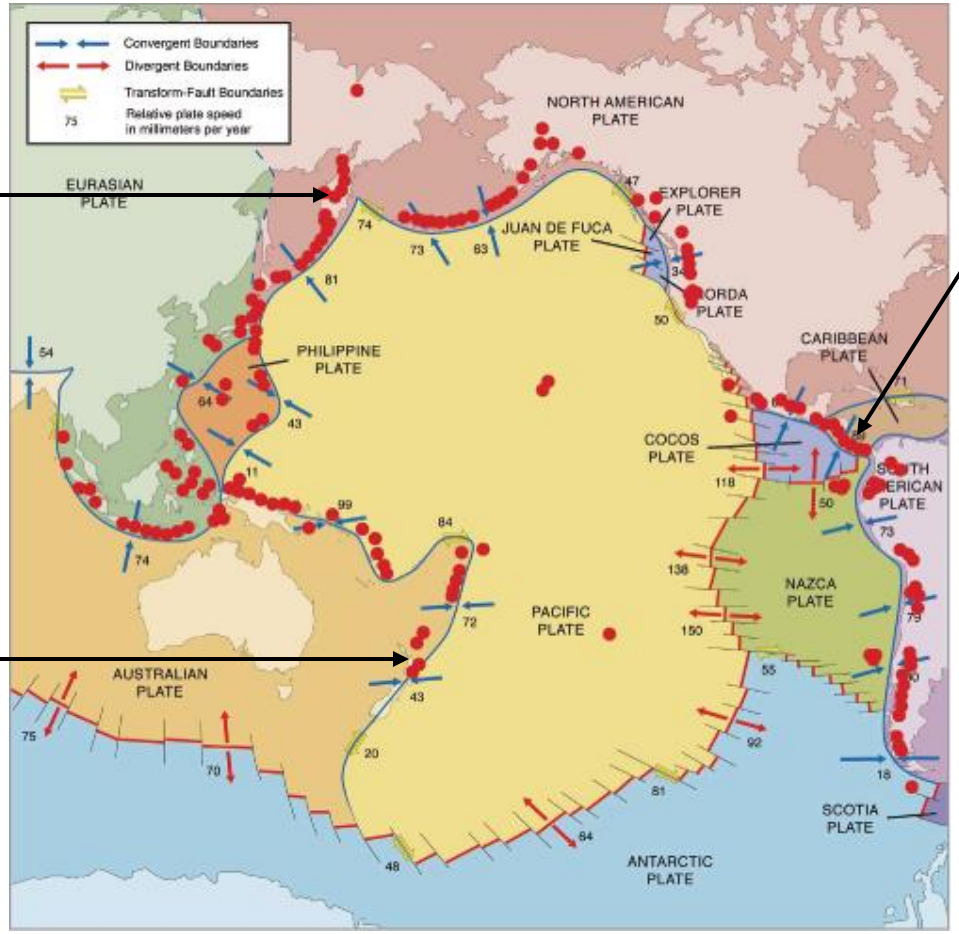


Above: View of the San Andreas transform fault


Sea of Japan
Philippine plate
Himalayas
Kuril Trench
Aleutian Trench
Japan Trench
Marianas Trench
Juan de Fuca plate
North American plate
Rockies
San Andreas Fault
Cocos plate
Caribbean plate
Reykjanes Ridge
Eurasian plate
Hellenic plate
Turkish plate
Adriatic plate
Iran plate
Arabian plate
East African rift valley system
Middle America Trench
Pacific plate
Bismark plate
New Hebrides Trench
Fiji plate
Java Trench
Indian-Australian plate
Solomon plate
Kermadec-Tonga Trench
East Pacific Rise
Nazca plate
Peru-Chile Trench
Andes
South American plate
Mid-Atlantic Ridge
African plate
Chile Rise
South East Indian Rise
Macquarie Ridge
Pacific-Antarctic Ridge
Antarctic plate
Atlantic-Indian Ridge
Ridge axis divergent boundary
Transform
Subduction zone Convergent boundary
Zones of Extension within continents
Uncertain plate boundary

Earth Plate

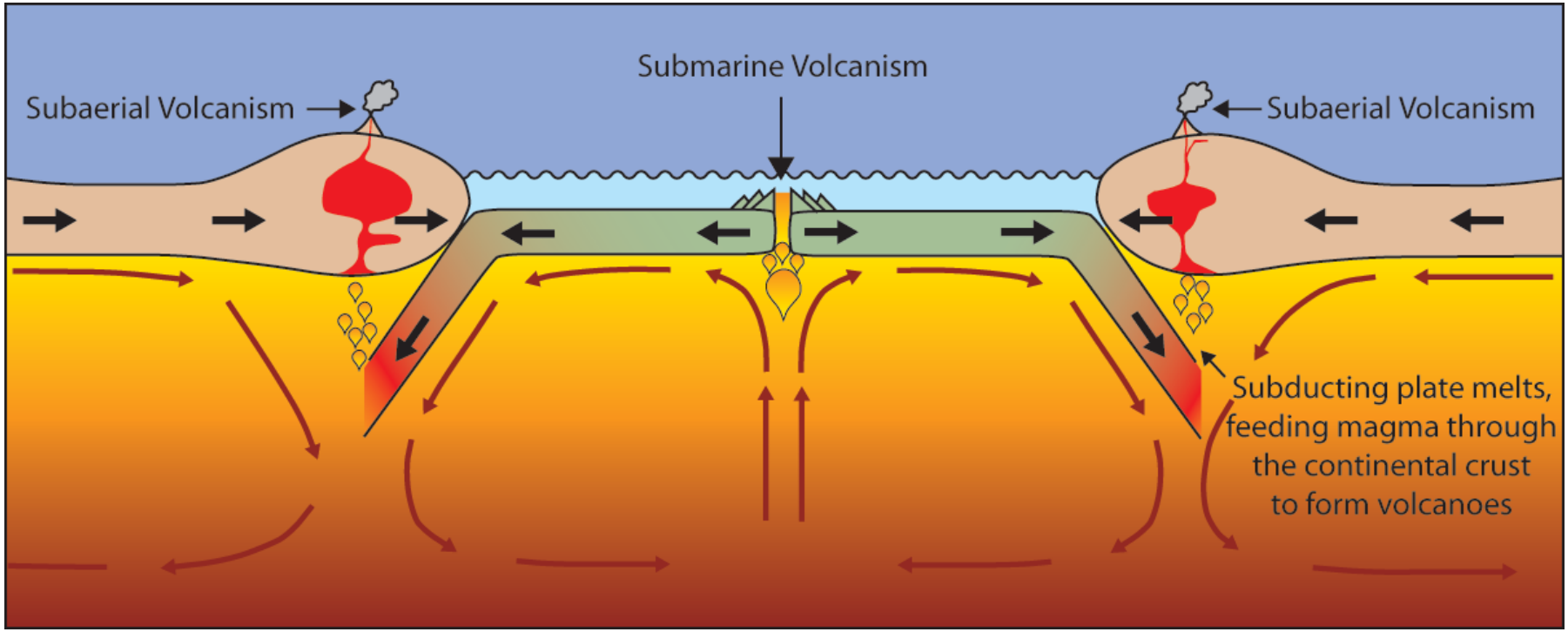
Pacific Ring of Fire



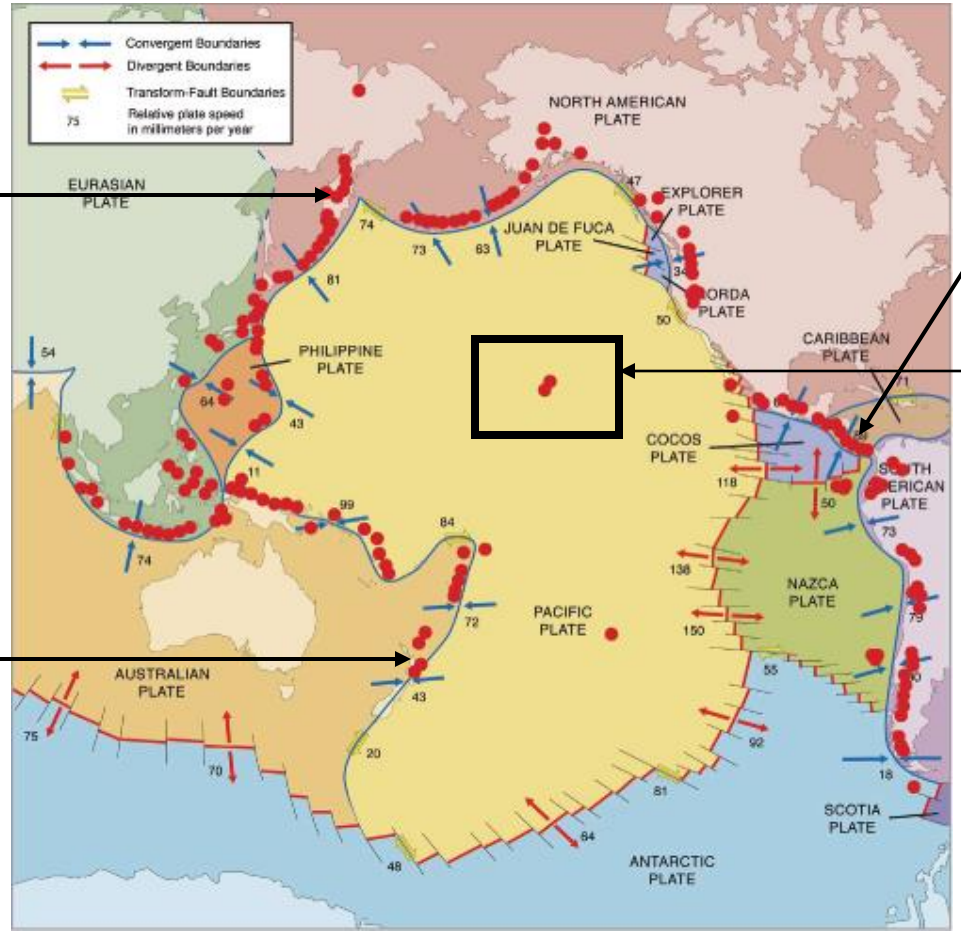
Volcanism is mostly focused at plate margins

Volcanoes are formed by:

- Subduction - Rifting - Hotspots



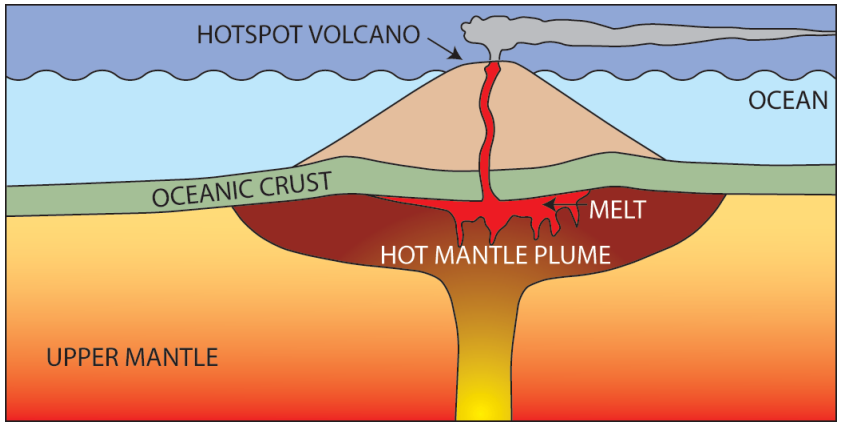
Pacific Ring of Fire



Hotspot volcanoes

What are Hotspot Volcanoes?

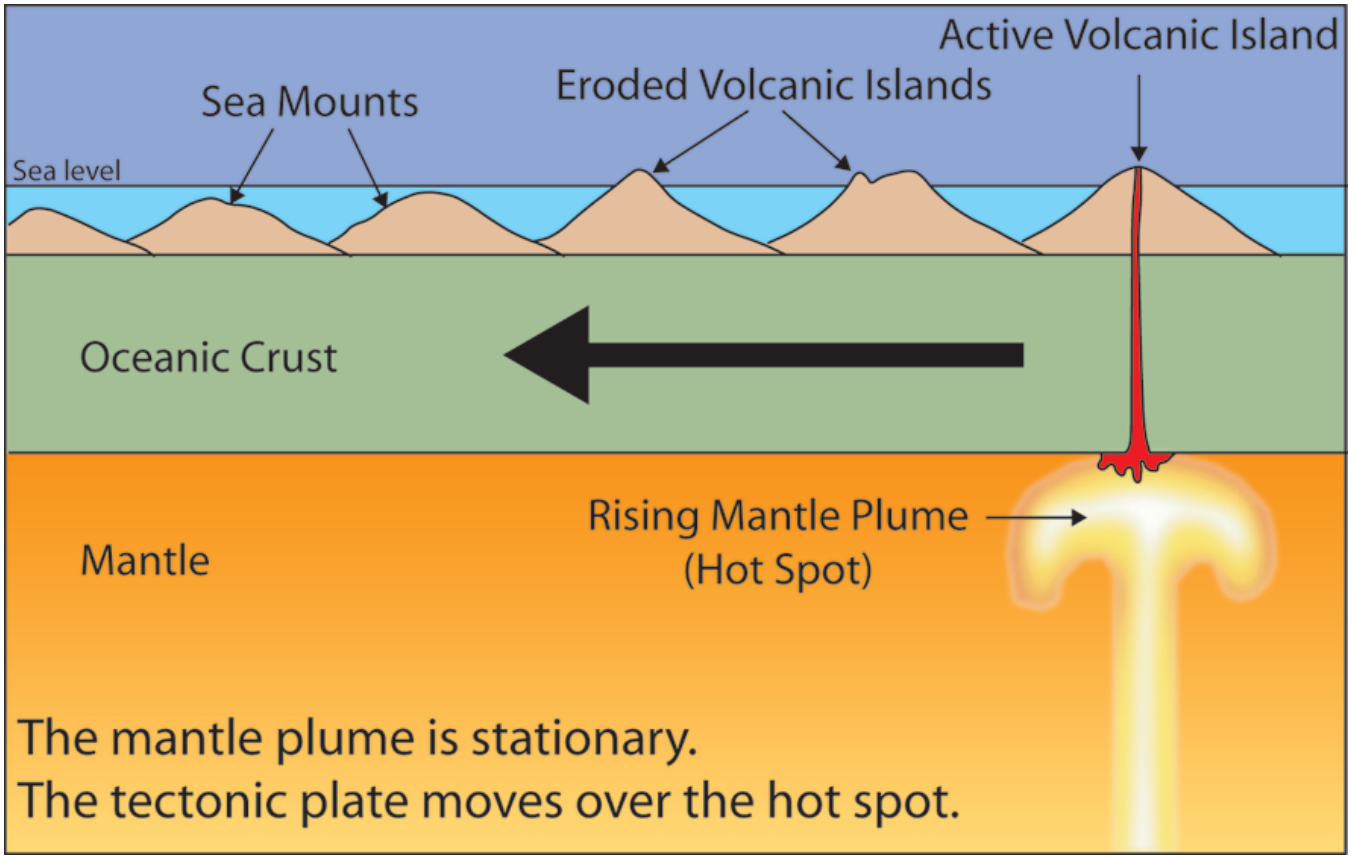
- Hot mantle plumes breaching the surface in the middle of a tectonic plate



The Hawaiian island chain are examples of hotspot volcanoes.

Photo: Tom Pfeiffer / www.volcanodiscovery.com

The tectonic plate moves over a fixed hotspot forming a chain of volcanoes.



The volcanoes get younger from one end to the other.