Plates Moving Apart
Types of Boundaries

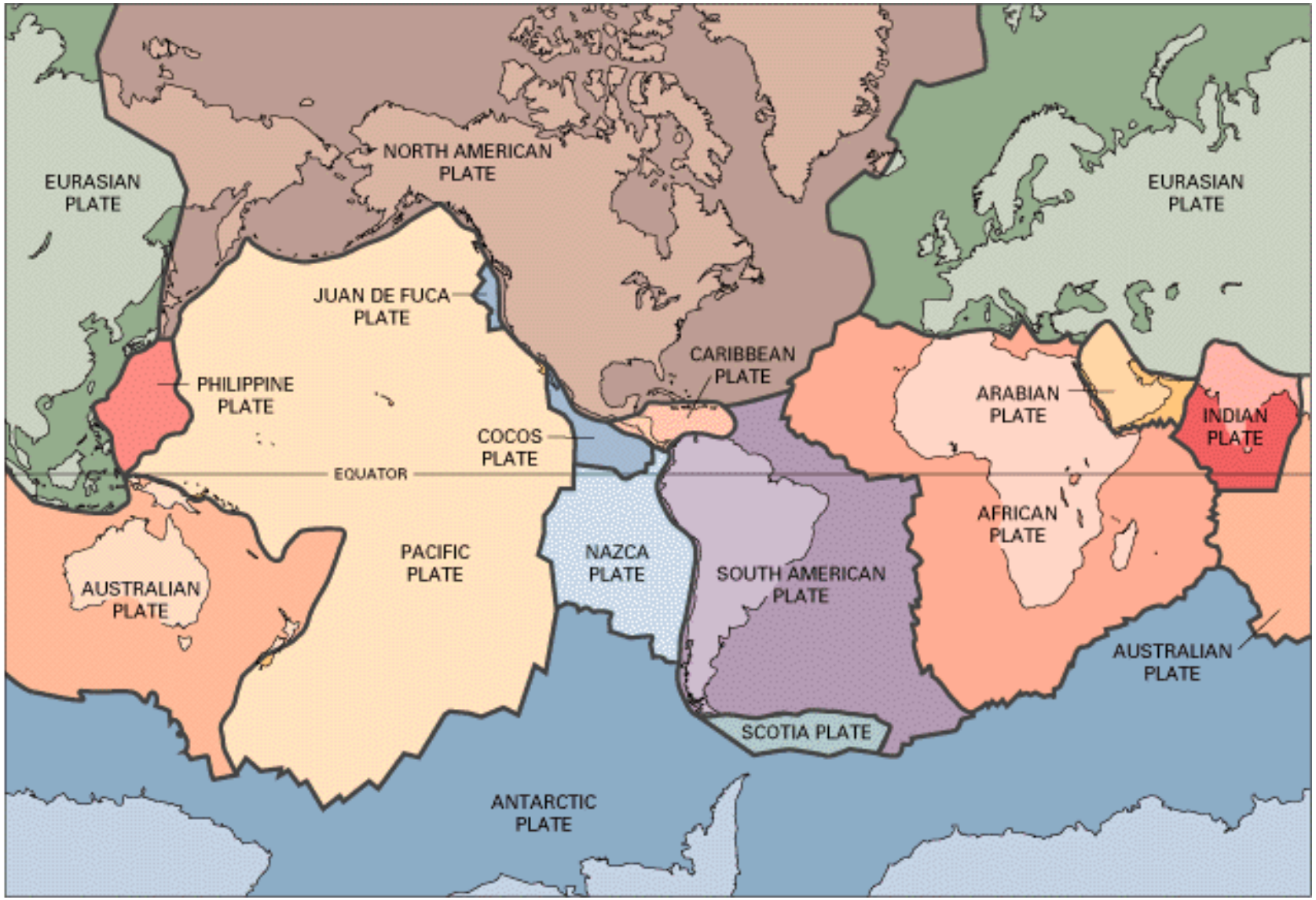
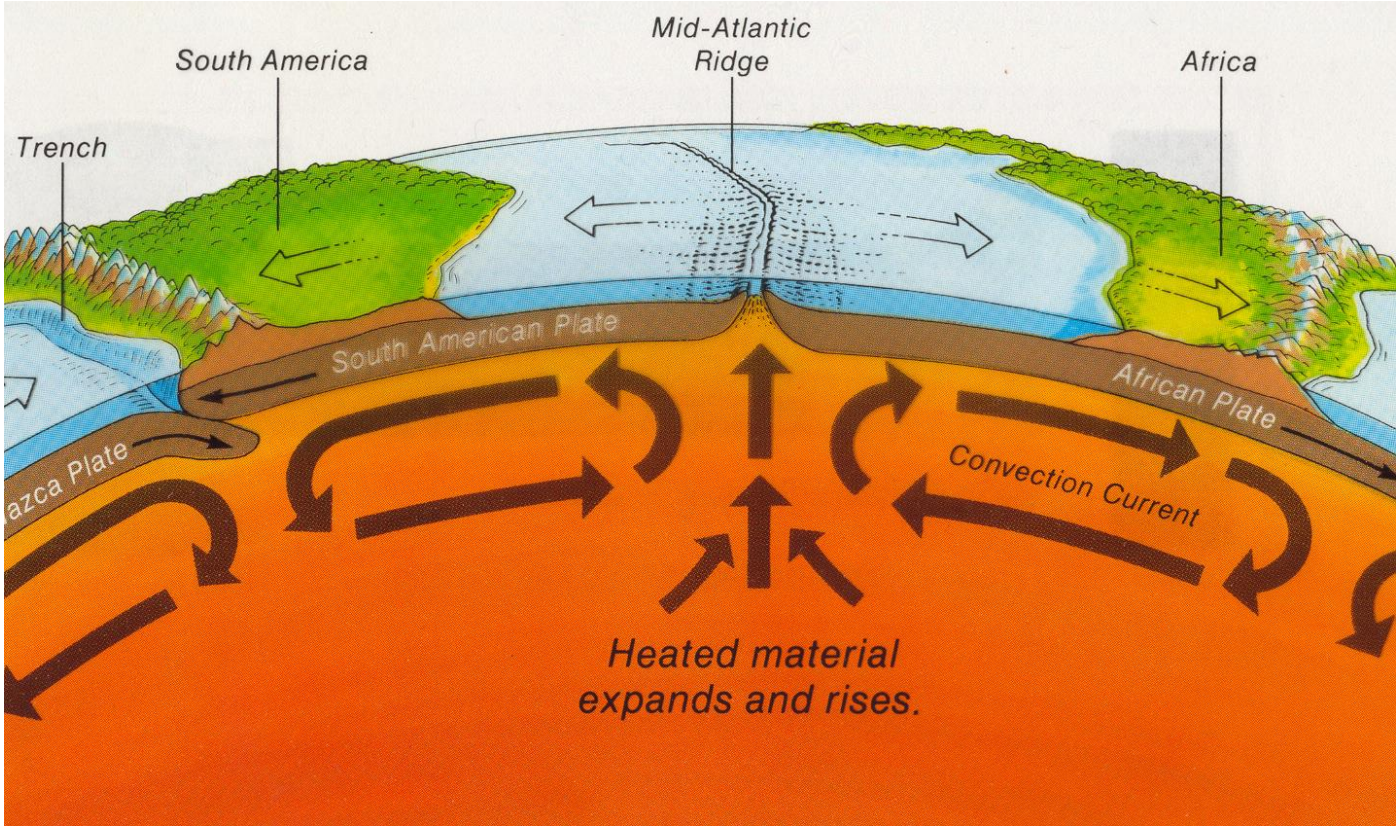


PLATE TECTONICS IS

The theory that the Earth's crust is broken into slabs of rock that move around on top of the asthenosphere.



How fast are plates moving?

- **The Arctic Ridge has the slowest rate (less than 2.5 cm/yr)**

- **East Pacific Rise near Easter Island, in the South Pacific about 3,400 km west of Chile, has the fastest rate (more than 15 cm/yr).**

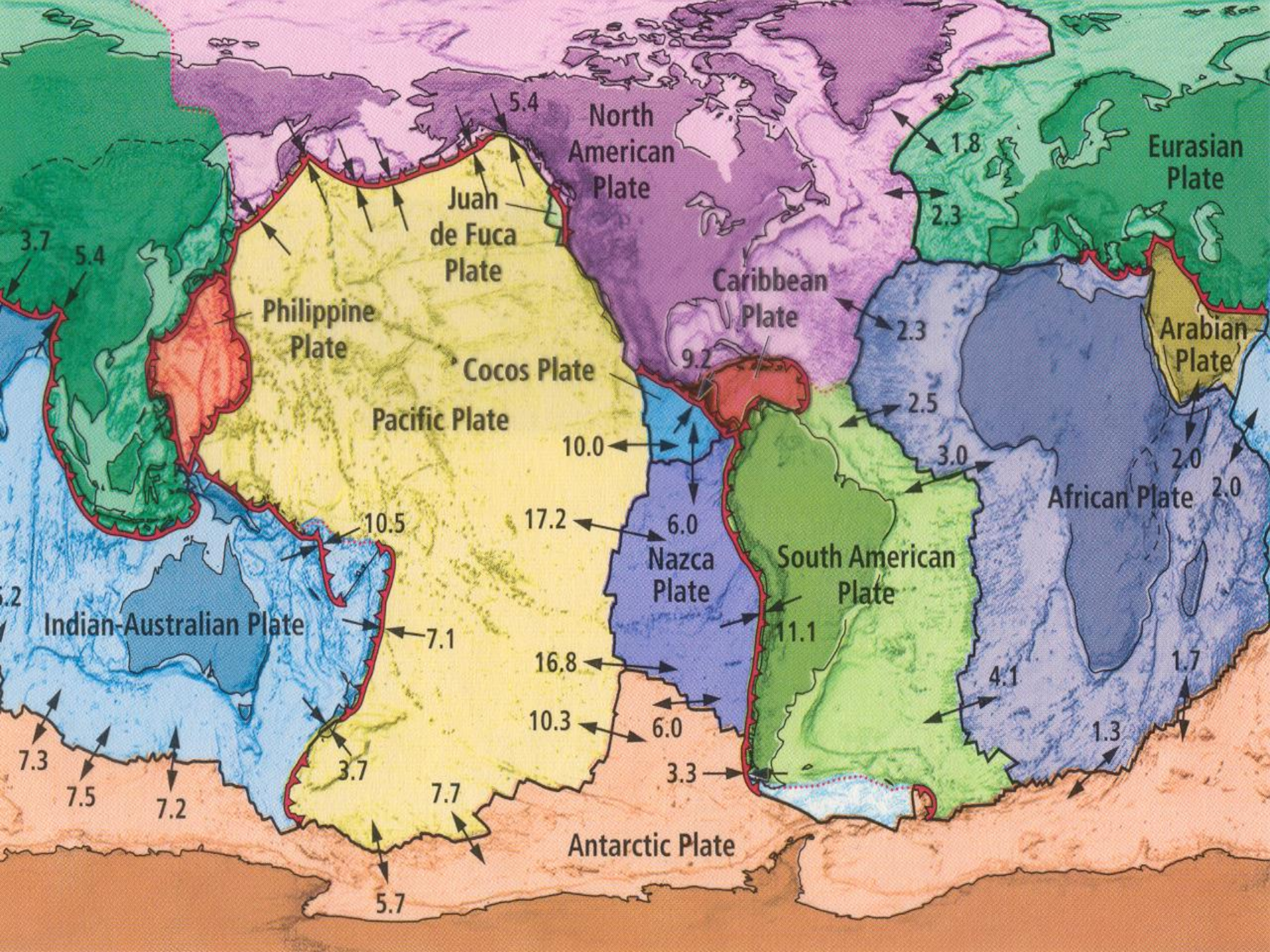
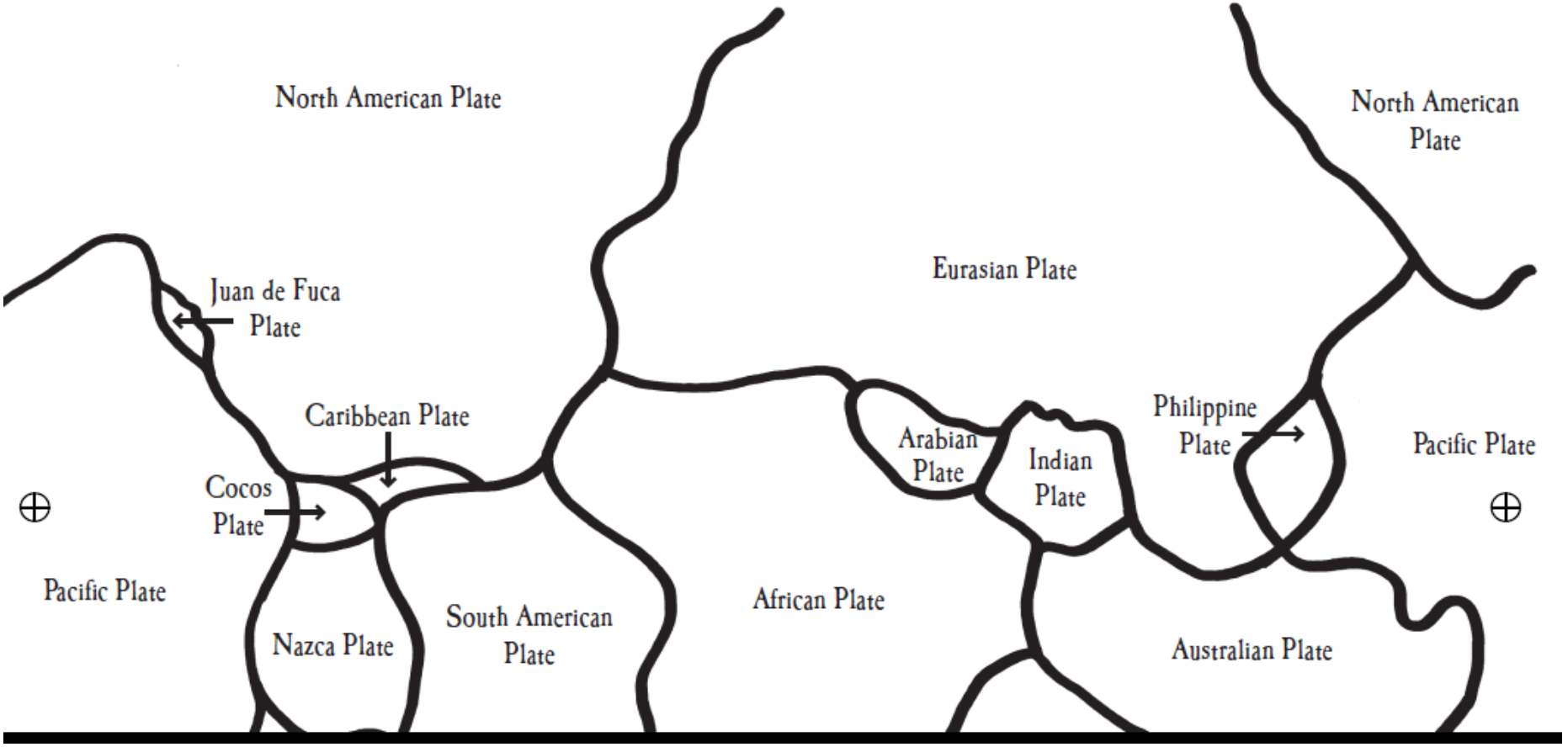

North American Plate
Eurasian Plate
Juan de Fuca Plate
Philippine Plate
Caribbean Plate
Arabian Plate
Cocos Plate
Pacific Plate
African Plate
Nazca Plate
South American Plate
Indian-Australian Plate
Antarctic Plate
5.4
1.8
2.3
3.7
5.4
2.3
9.2
2.5
10.0
3.0
2.0
2.0
10.5
17.2
6.0
7.1
11.1
16.8
4.1
1.7
10.3
6.0
1.3
7.3
7.5
7.2
3.7
3.3
7.7
5.7

Plate Boundaries



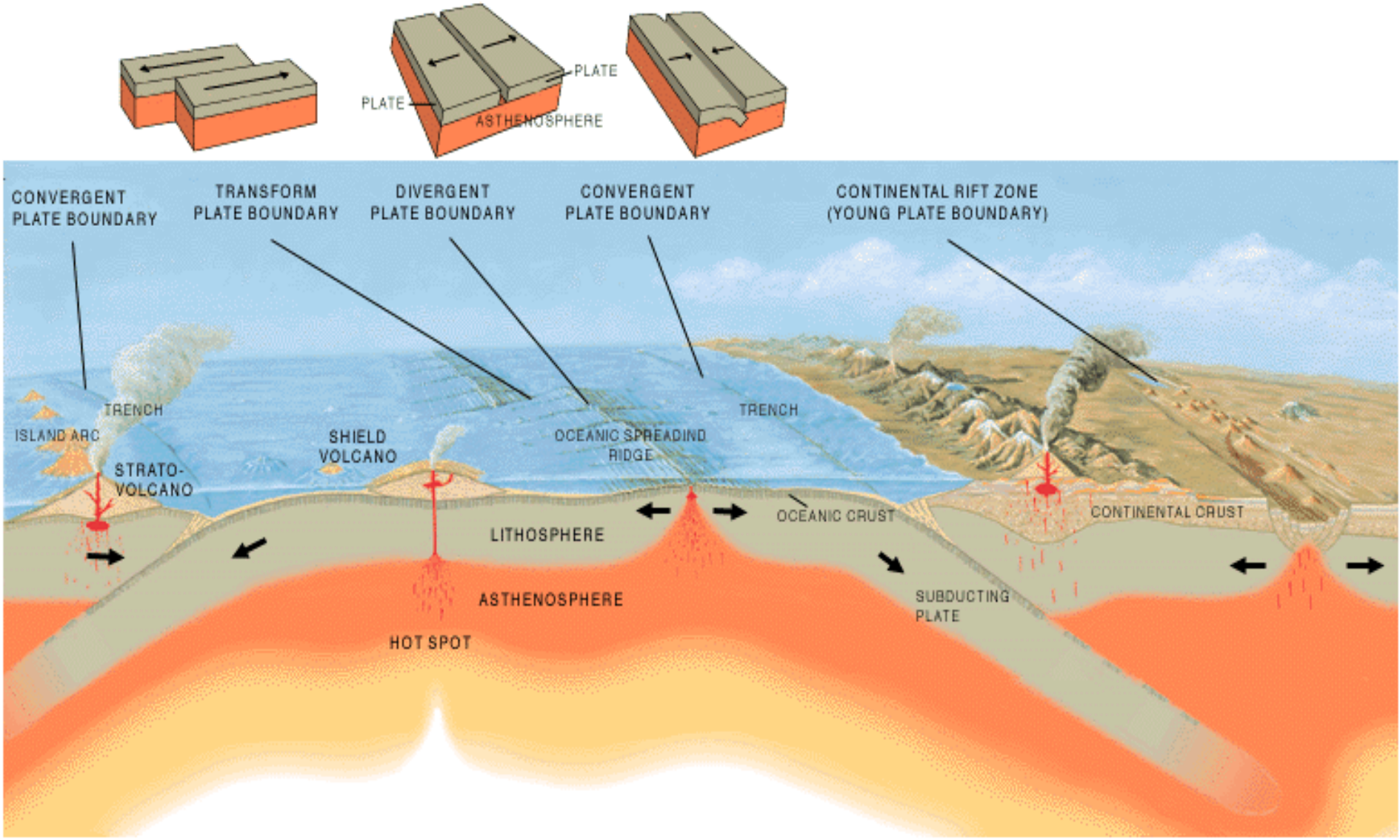
How can the plates move?

The plates can move…

- **– away from each other** Divergent
- **–towards each other** Cpnvergent
- **–or slide past each other** Transform

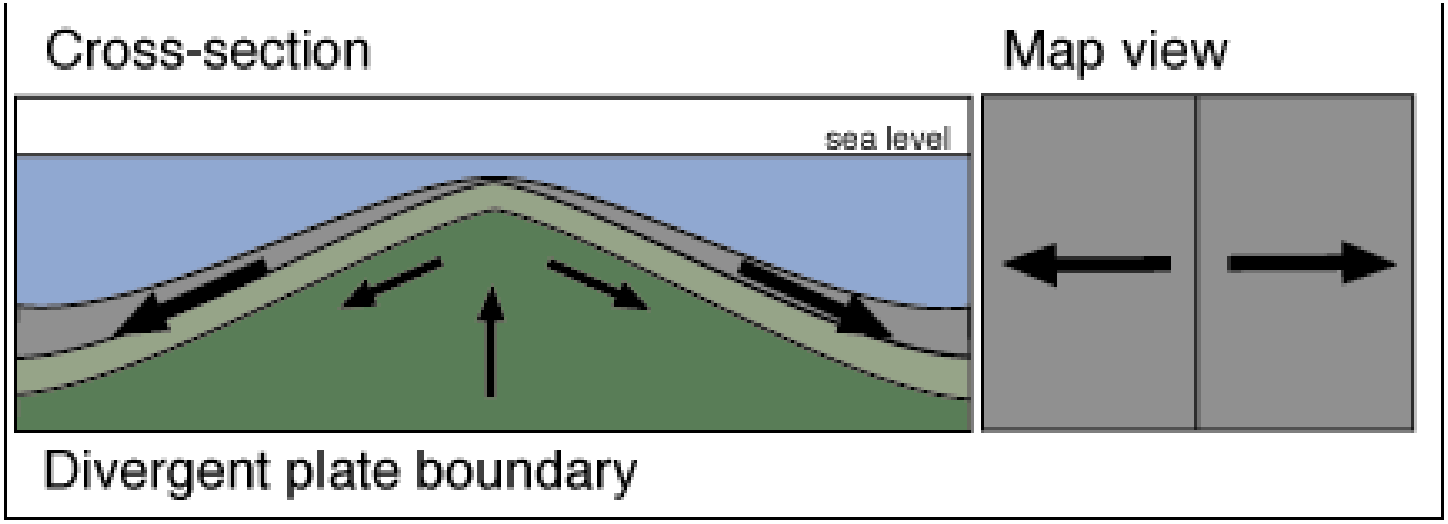
PLATE MOTION

Three types of plate boundary

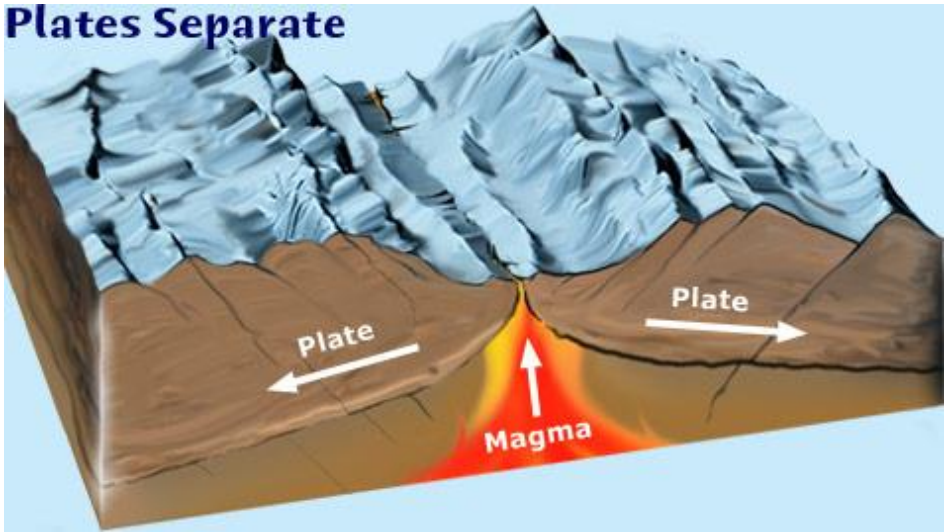


DIVERGENT PLATE BOUNDARY

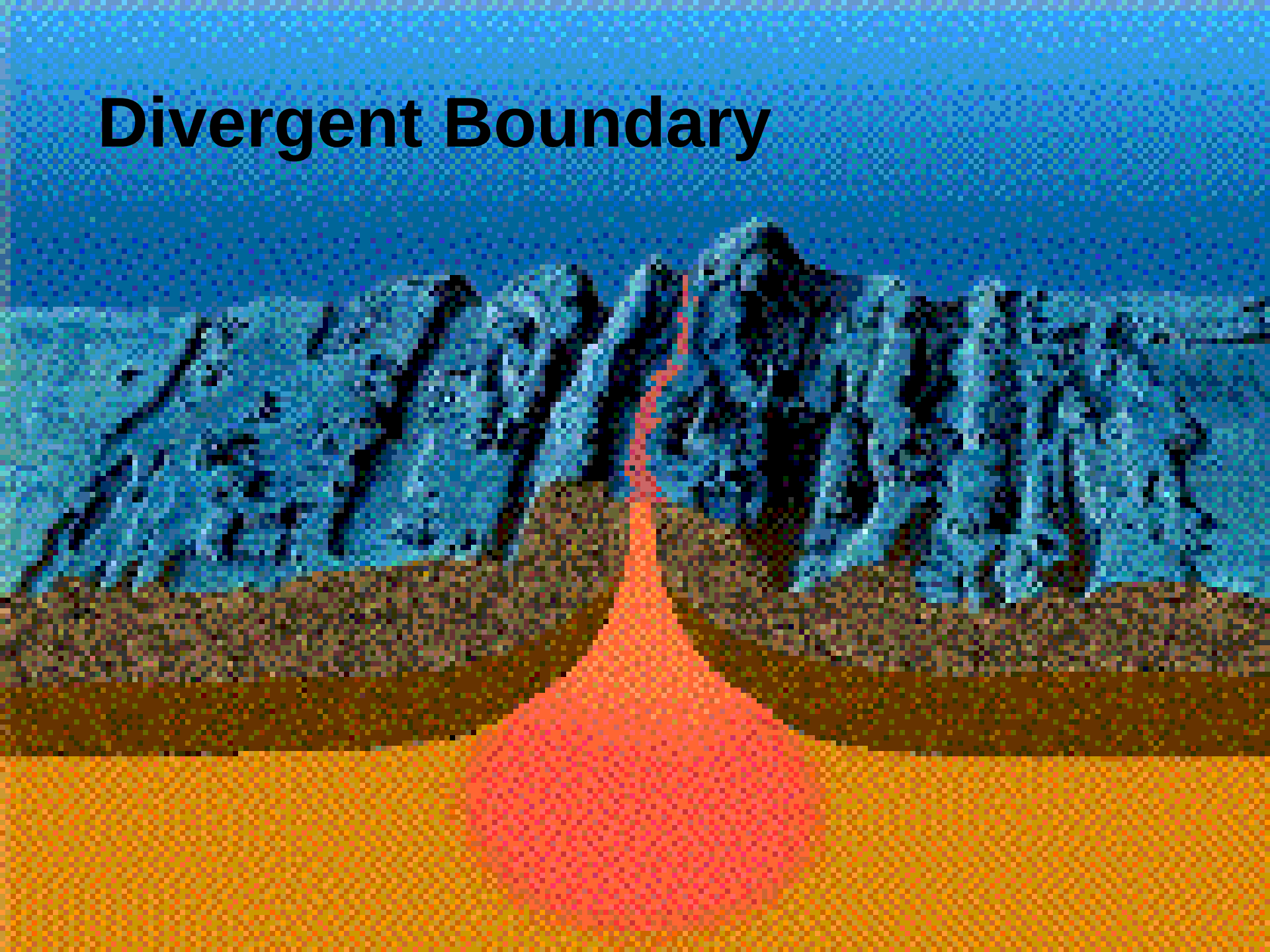
- **Occur along spreading centers where plates are moving apart**
- **New crust is created by magma pushing up from the mantle**

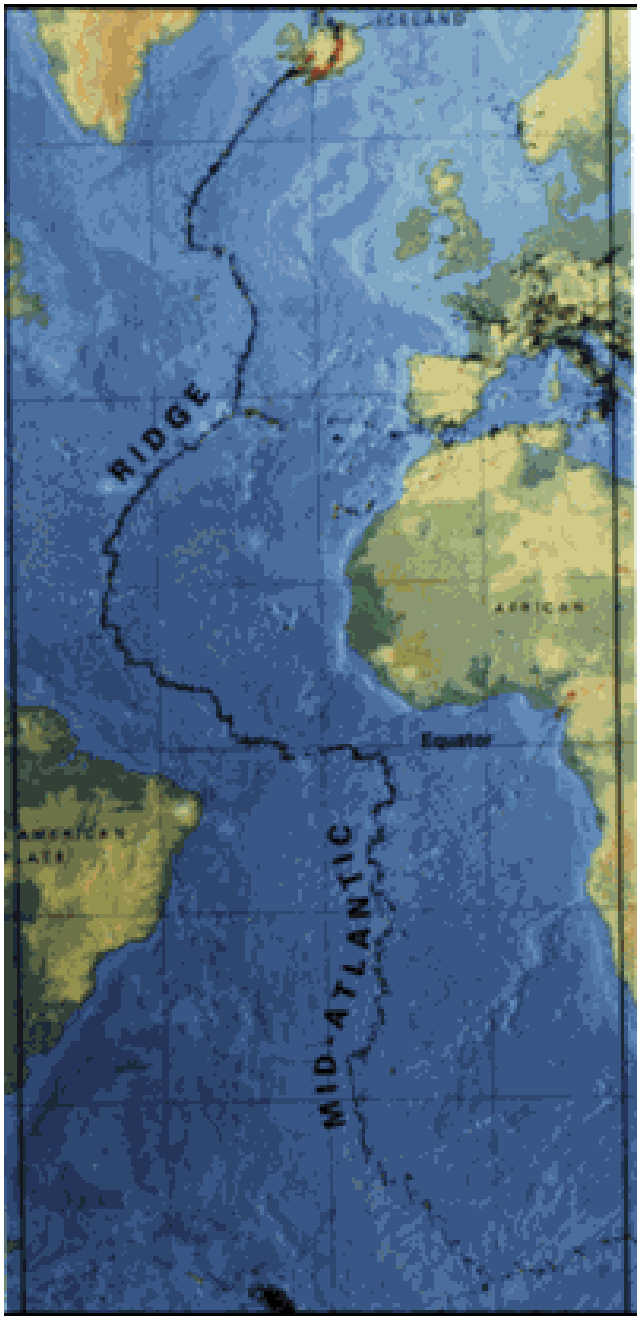


Mid-ocean ridges demonstrate that the ocean floor is spreading. The newer crust is in the center of the ocean. The continents are getting farther apart.



Divergent Boundary





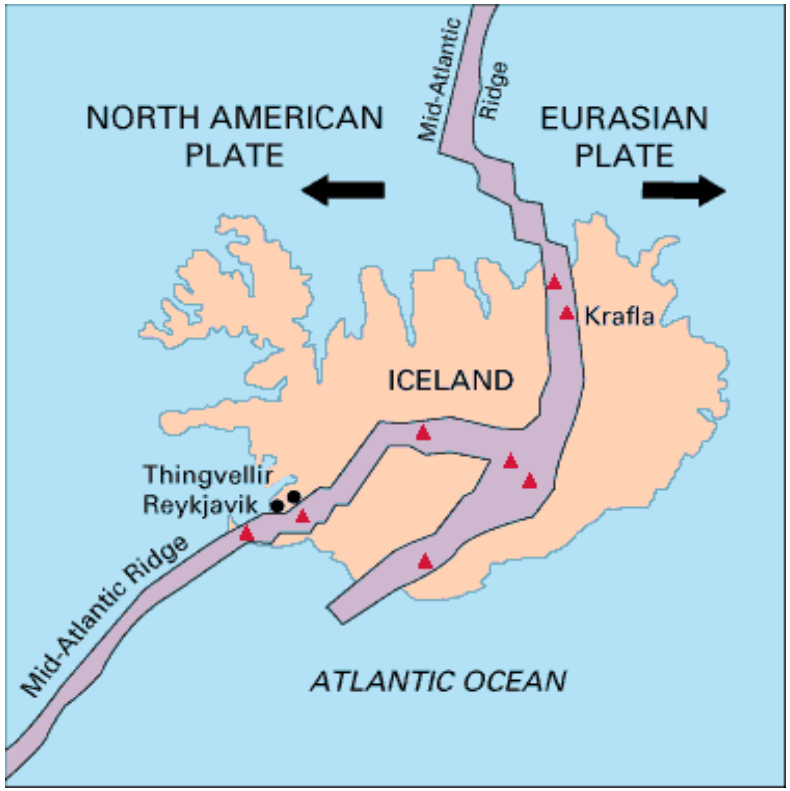
Example:

Mid-Atlantic Ridge

- A topographically high area near the middle of the Atlantic Ocean

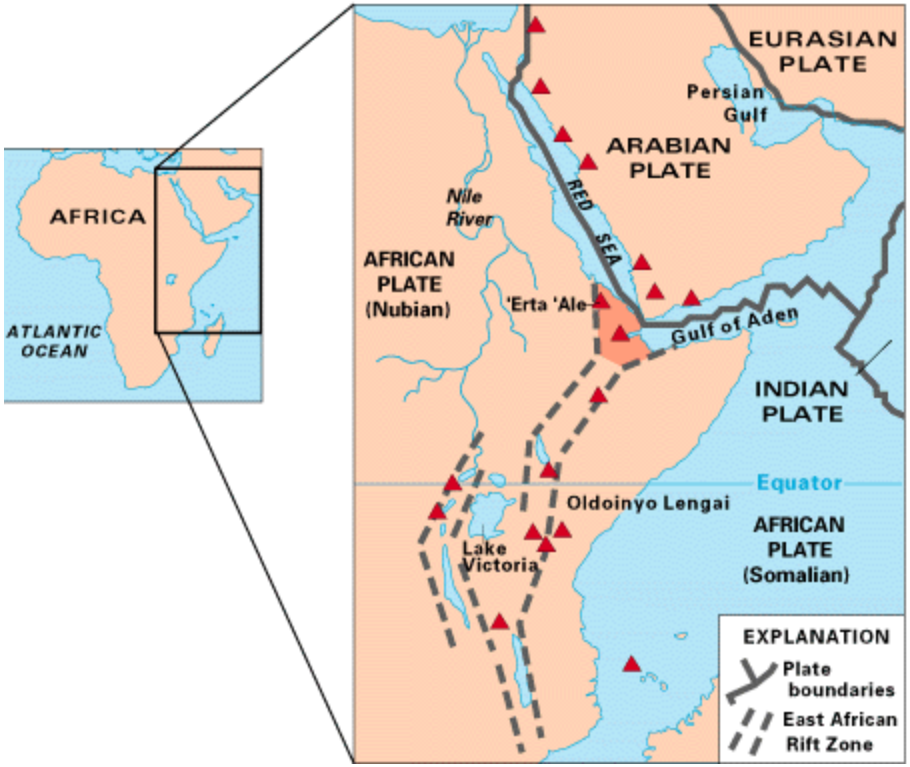
- Splits the Atlantic Ocean, north to south,

Divergent: Atlantic Ridge



LAVA FOUNTAINS
KRAFLA VOLCANO
ICELAND

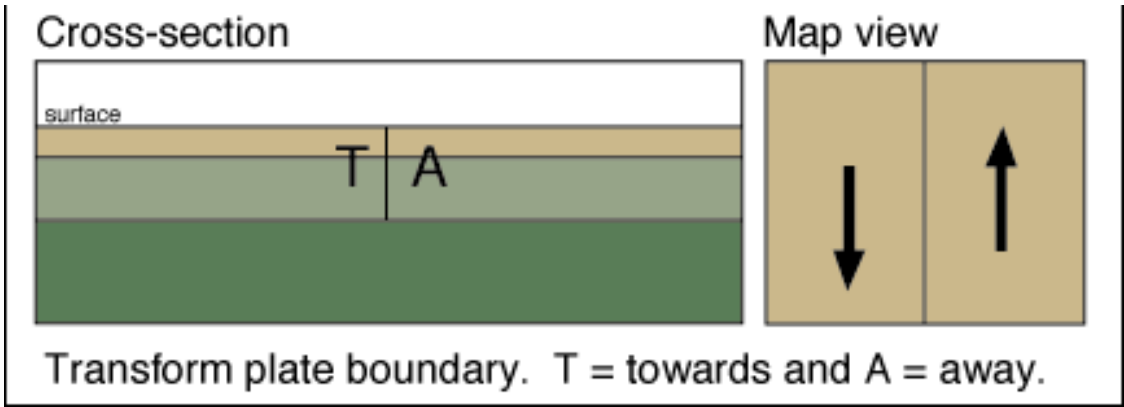
Divergent: East African Rift Valley



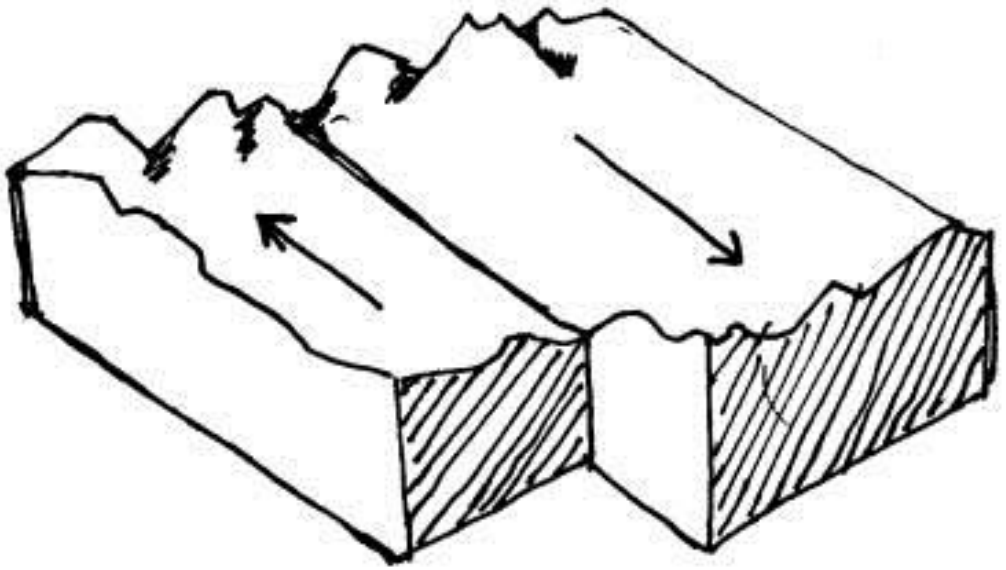
- **Three plates are moving away from each other.**
- **Area of seismic and volcanic activity.**

Transform Boundaries

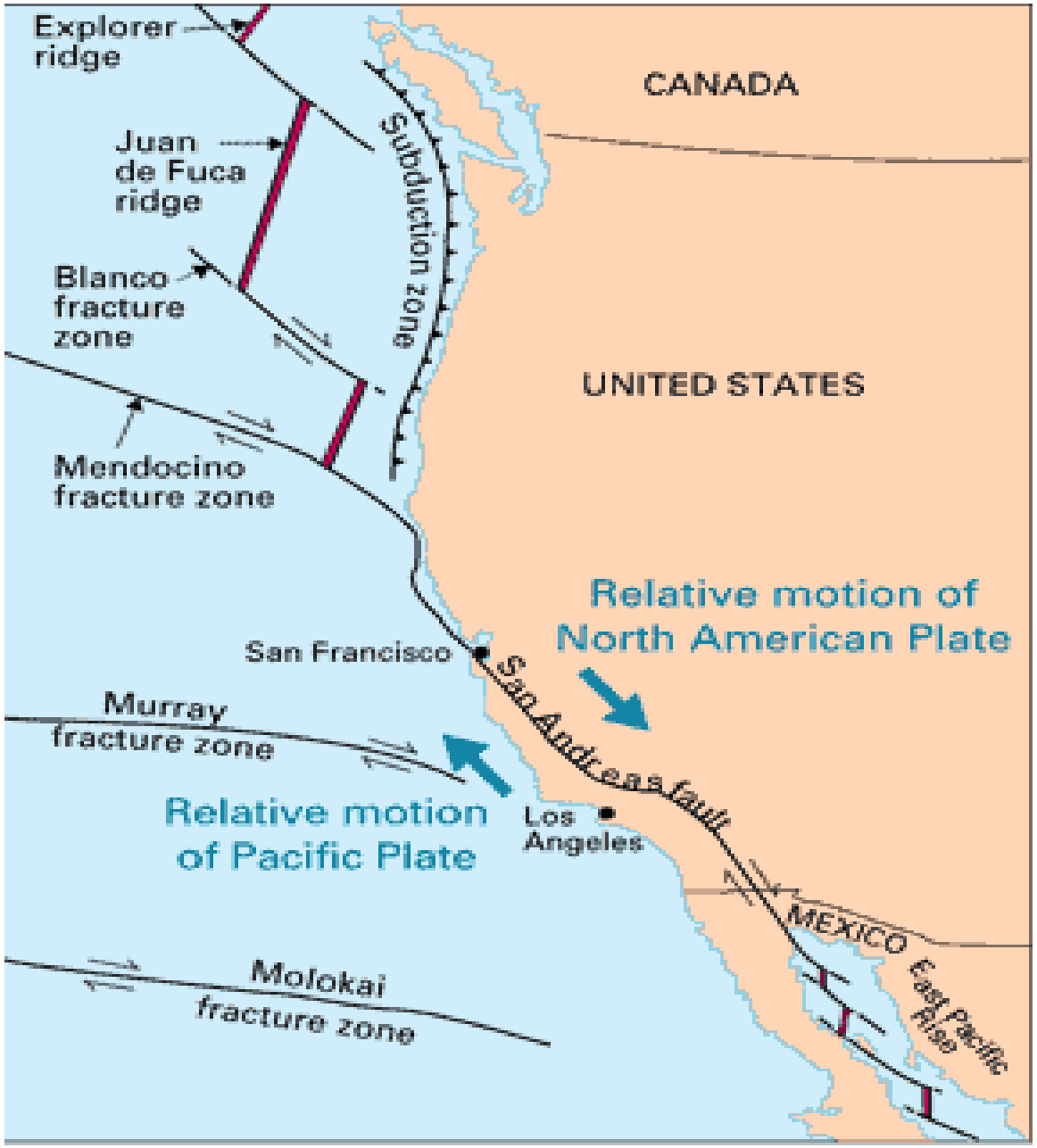
- **<u>Transform Boundaries</u> occur where two plates are sliding past each other.**
- **These areas have large amounts of seismic activity due to plate motion.**



Transform Boundary



Earthquakes occur.



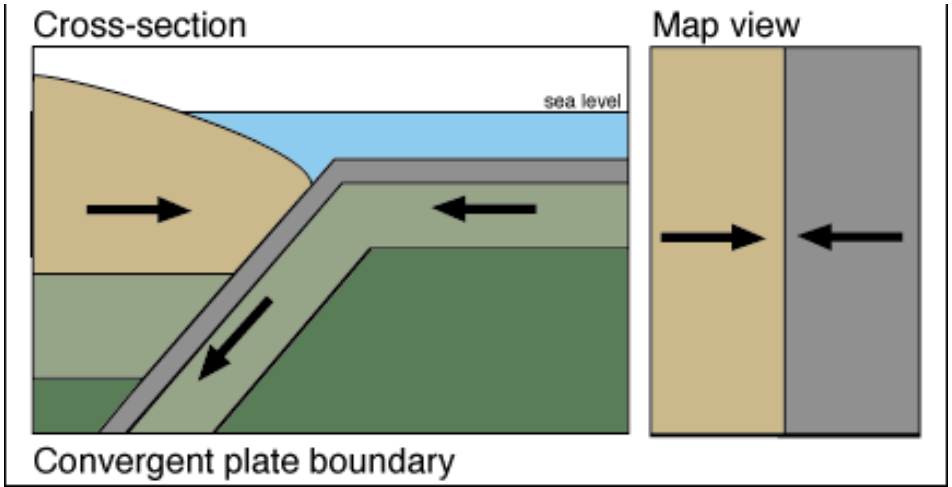
Example:
San Andreas fault in California

Pacific Plate slides past the North American Plate.

Convergent plate boundaries

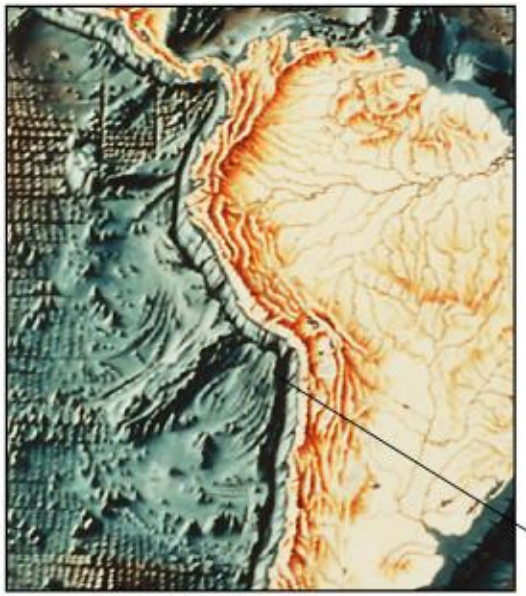
3 types depending on type of plate involved:

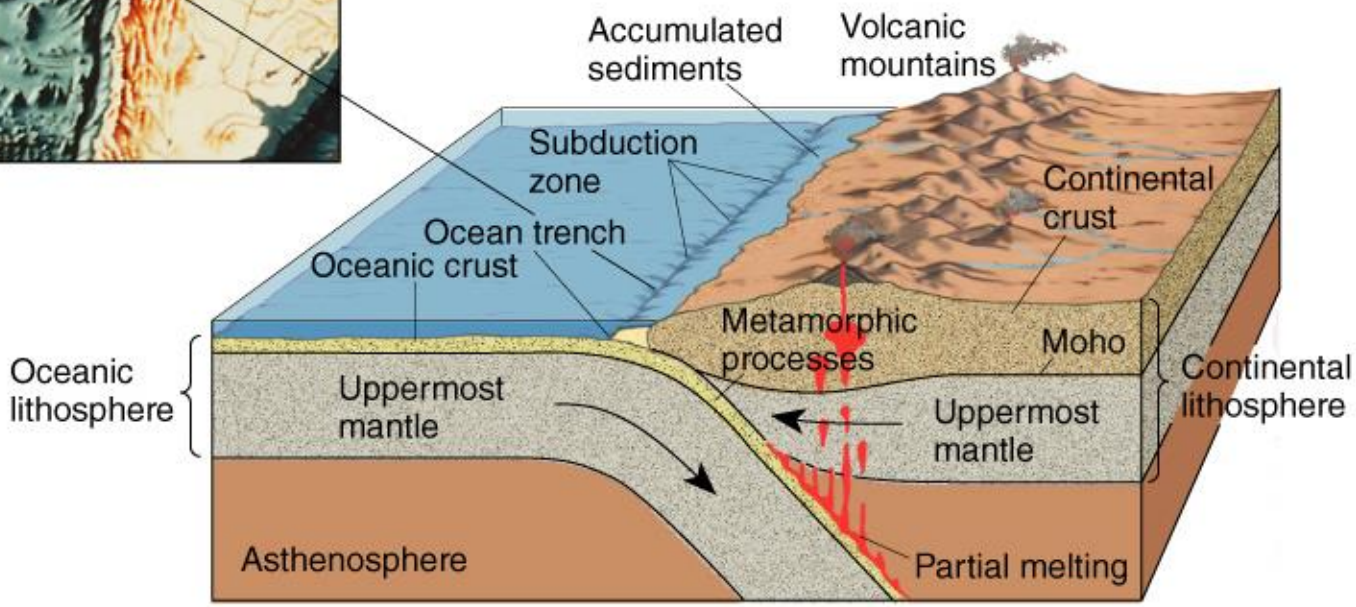
- *Oceanic-continental*
- *Oceanic-oceanic*
- *Continental-continental*



Oceanic-Continental Collision

- Oceanic Nazca Plate is pushing into South American Plate.
- It is being subducted under the continental part of the South American Plate.
- South American Plate is being lifted up, creating the Andes Mountains.
- Strong, destructive earthquakes





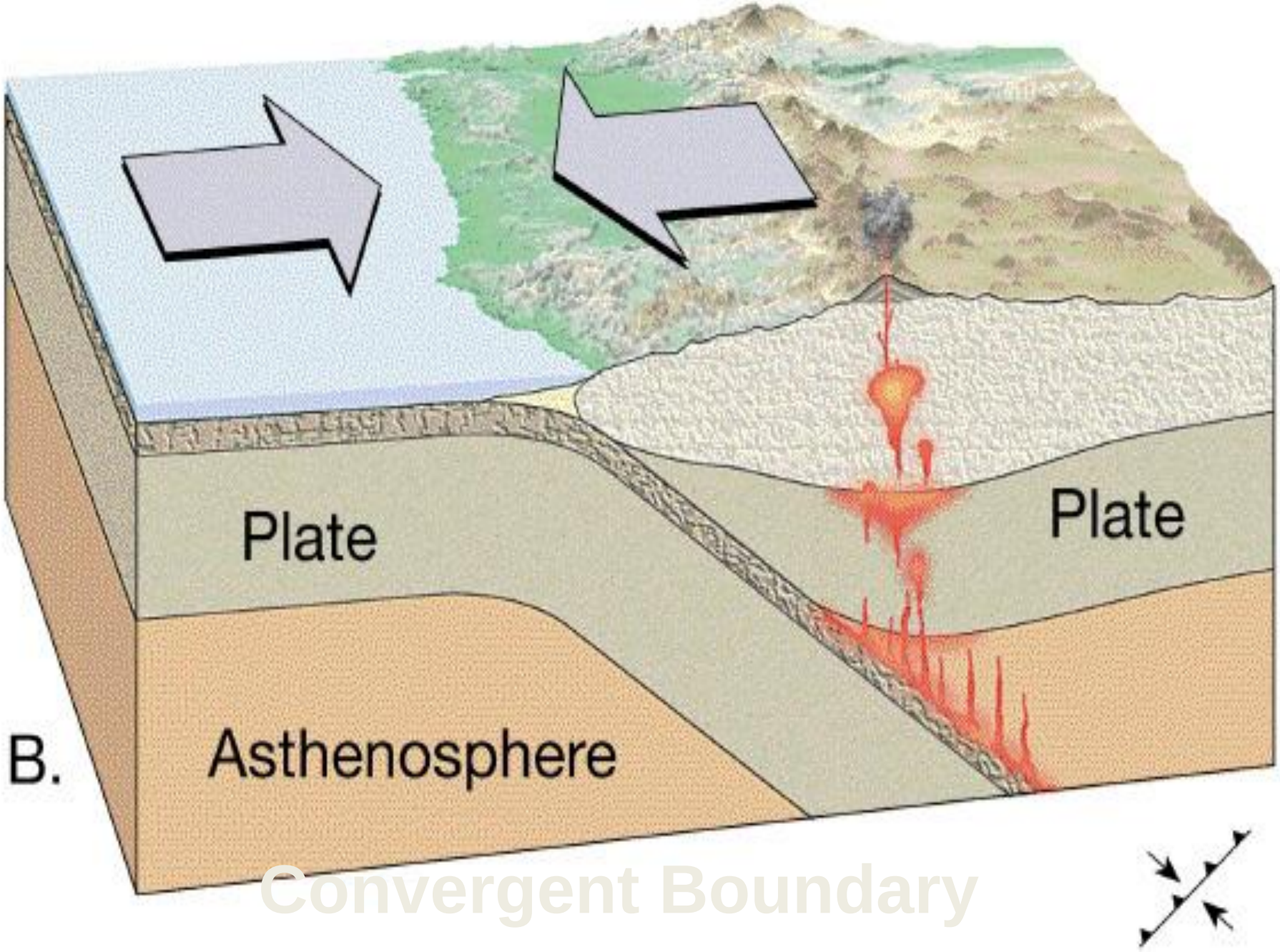
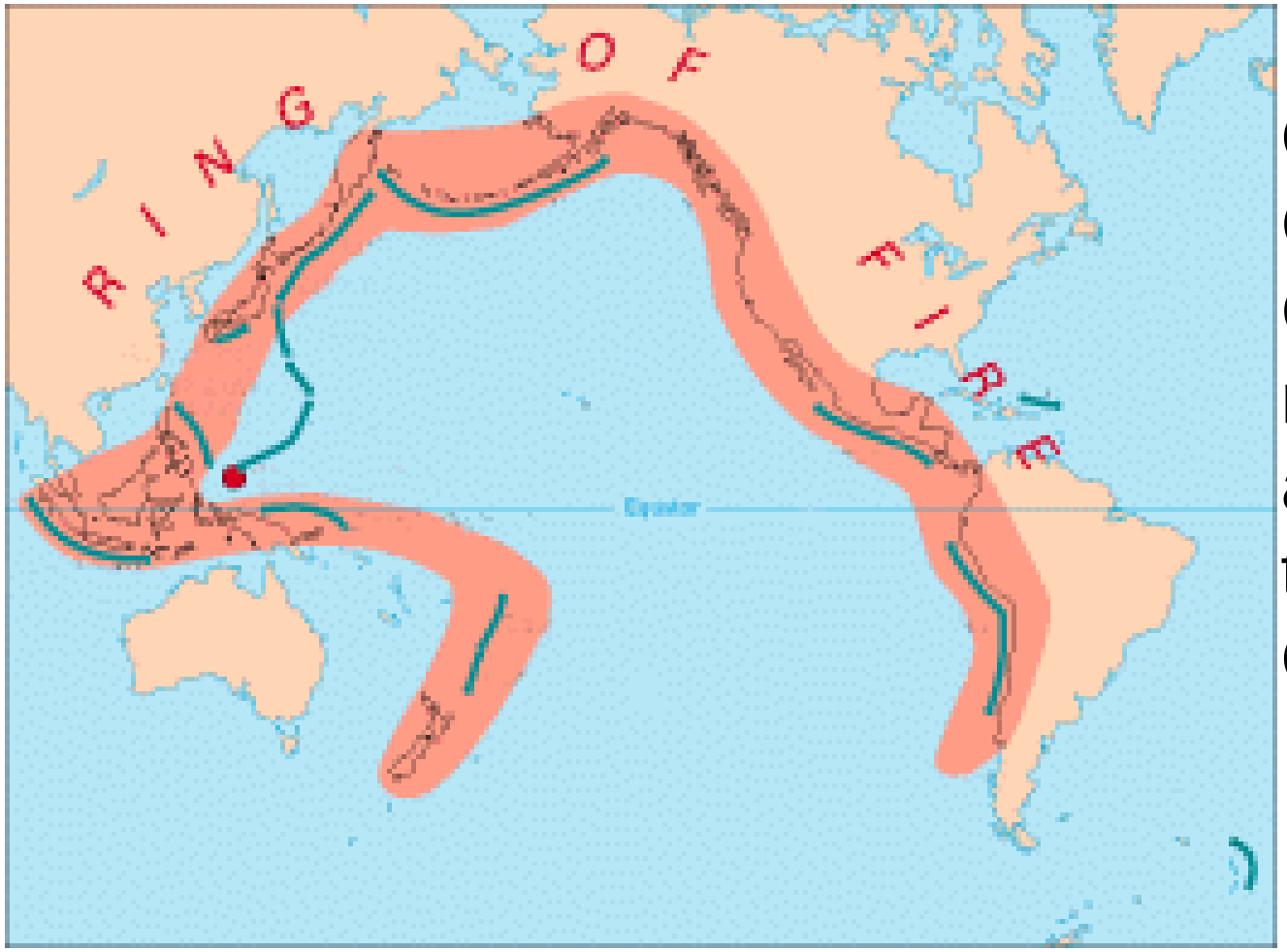


Plate
Plate
B.
Asthenosphere
Convergent Boundary

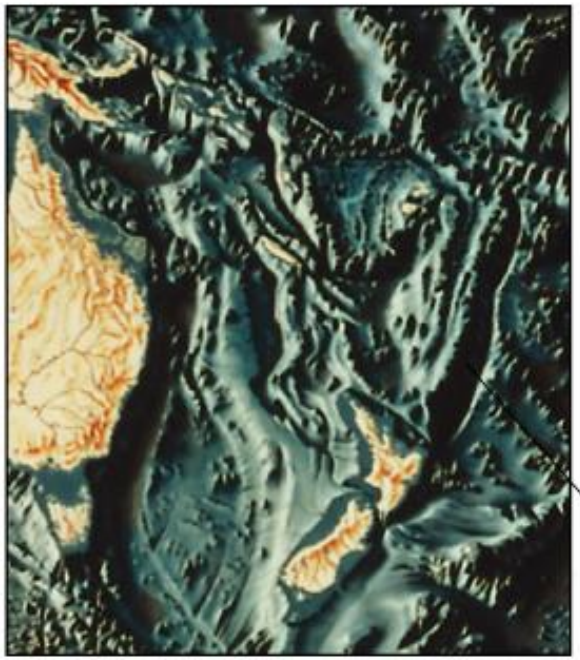
RING OF FIRE



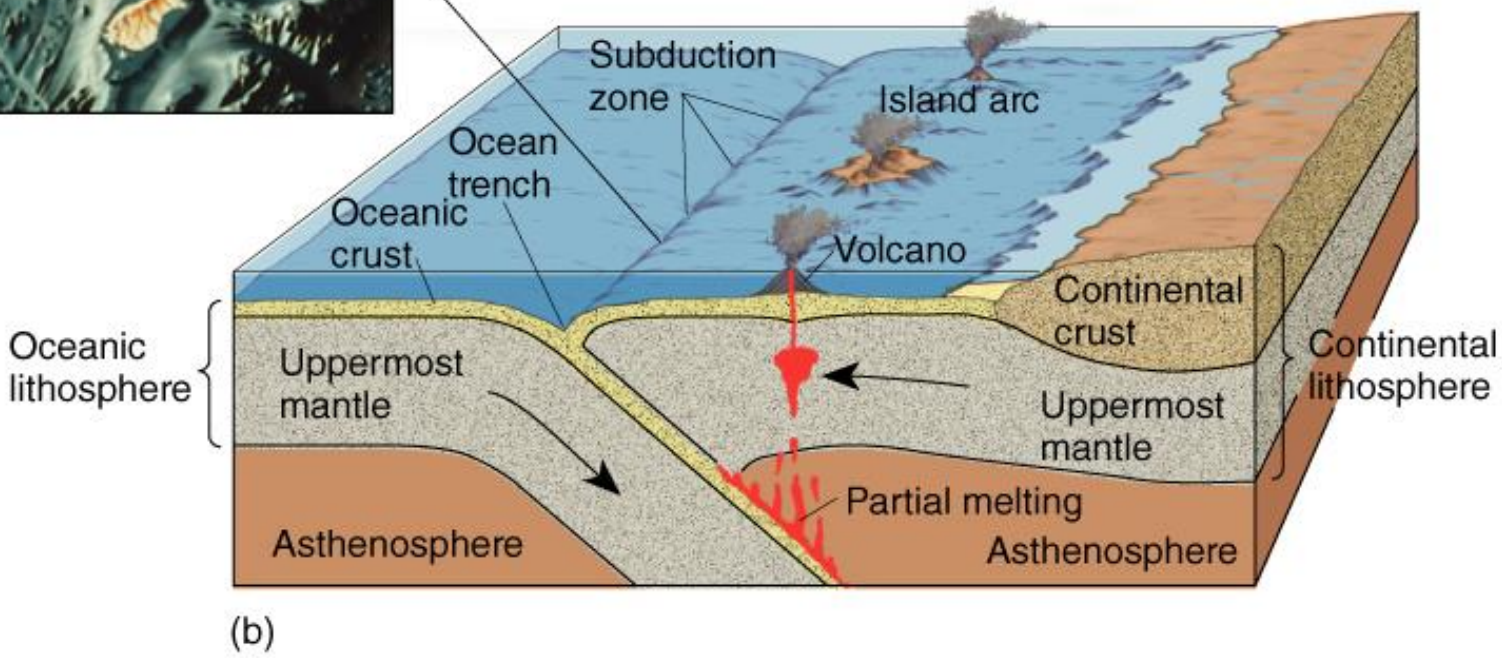
OCEANIC-CONTINENTAL Collisions cause most volcanic activity around the Pacific Ocean.

Nazca - S.America plate collision

Oceanic-oceanic Collision



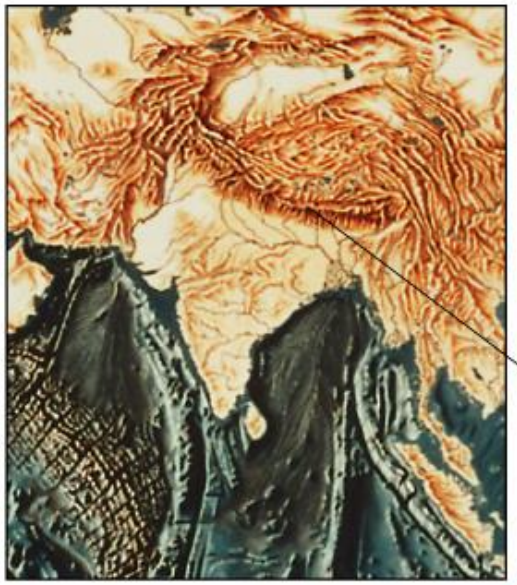
Subduction processes in oceanic-oceanic plate convergence result in the formation of volcanic arc islands.



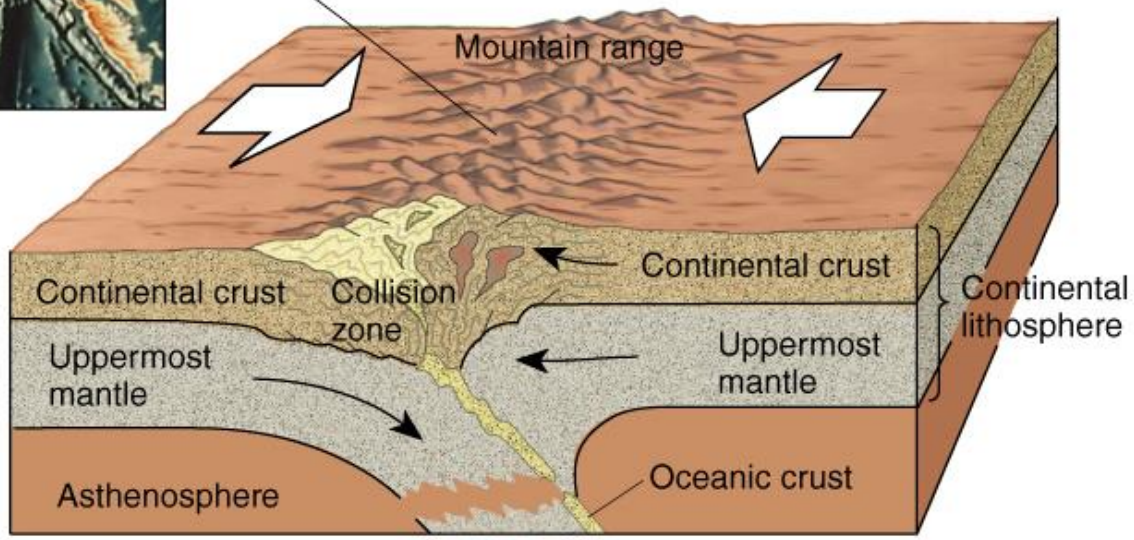
Island Arc Formation

- **Oceanic- oceanic convergence: one plate subducted under the other plate.**
- **A trench is formed, example: Mariana trench.**
- **Erupted lava and volcanic debris pile up on the ocean floor until a submarine volcano rises above sea level to form an island volcano.**

Continental-Continental Collision



- **Neither plate subducts because the continental rocks are relatively light.**
- **Like two colliding icebergs, plates resist downward motion.**

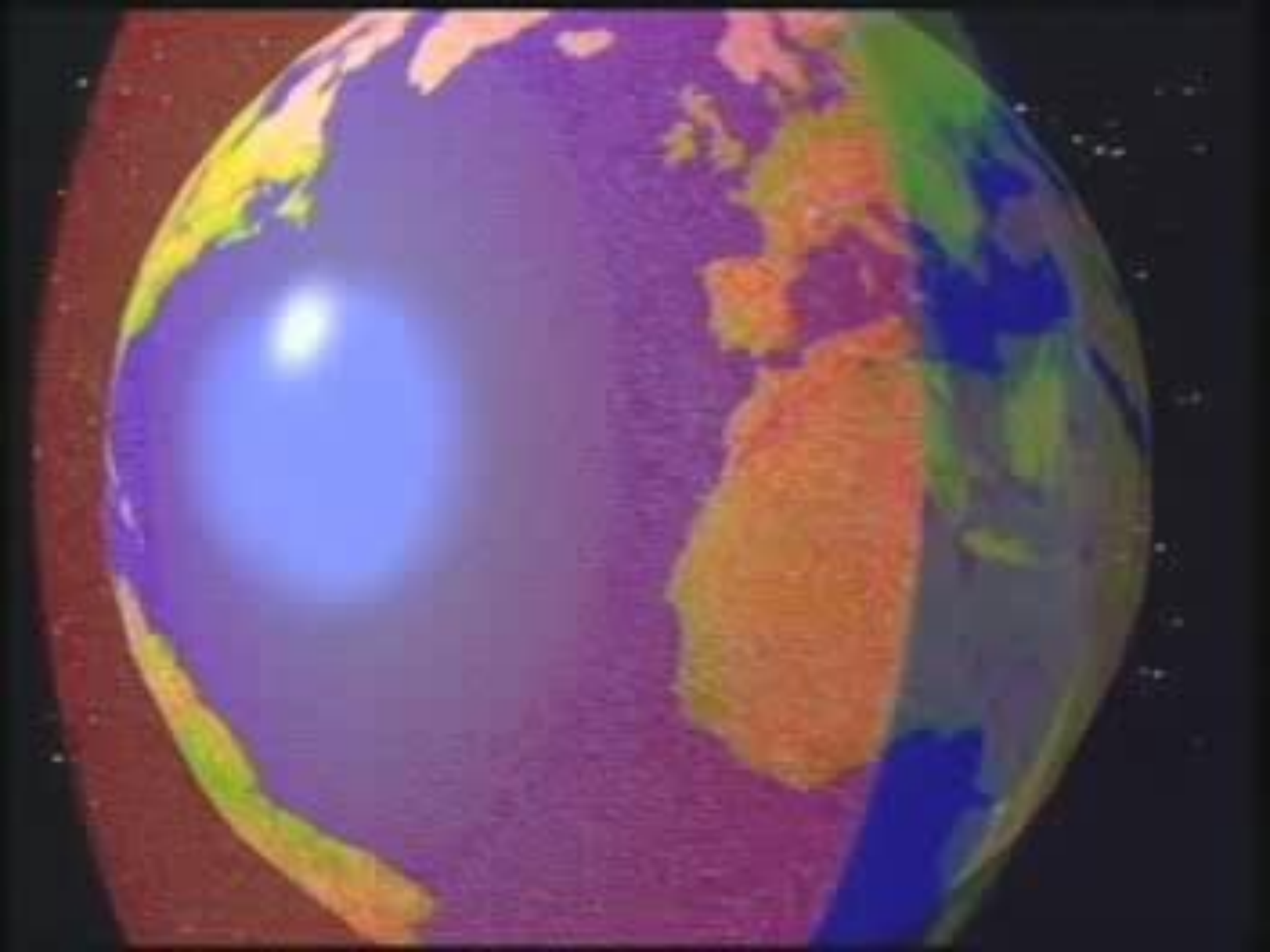


(c)

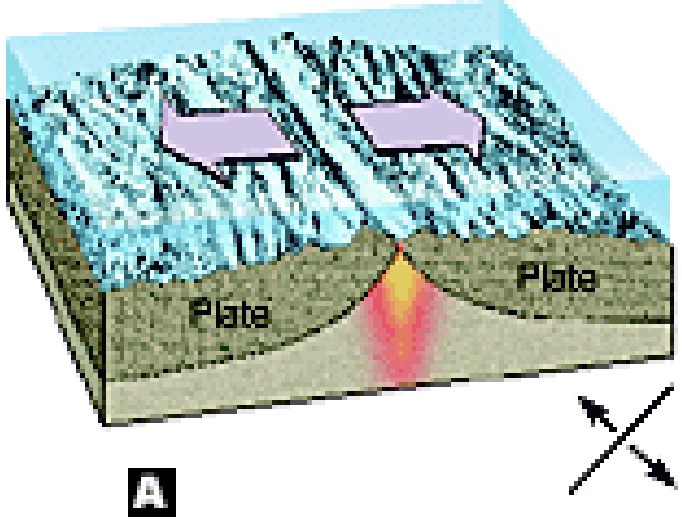
HIMALAYAS

collision between the Indian and Eurasian plates has pushed up the Himalayas and the Tibetan Plateau

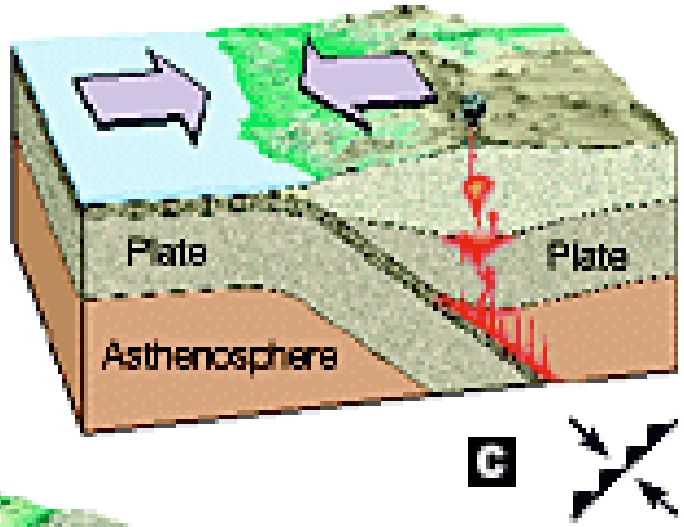
EVEREST, FROM LOBUCHE



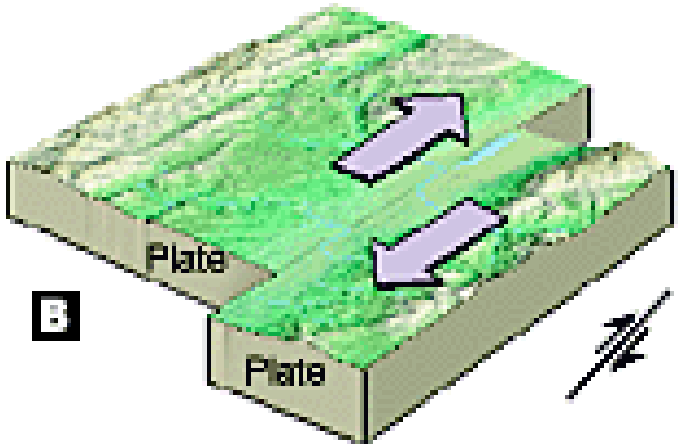
Divergent Boundary



Convergent Boundary

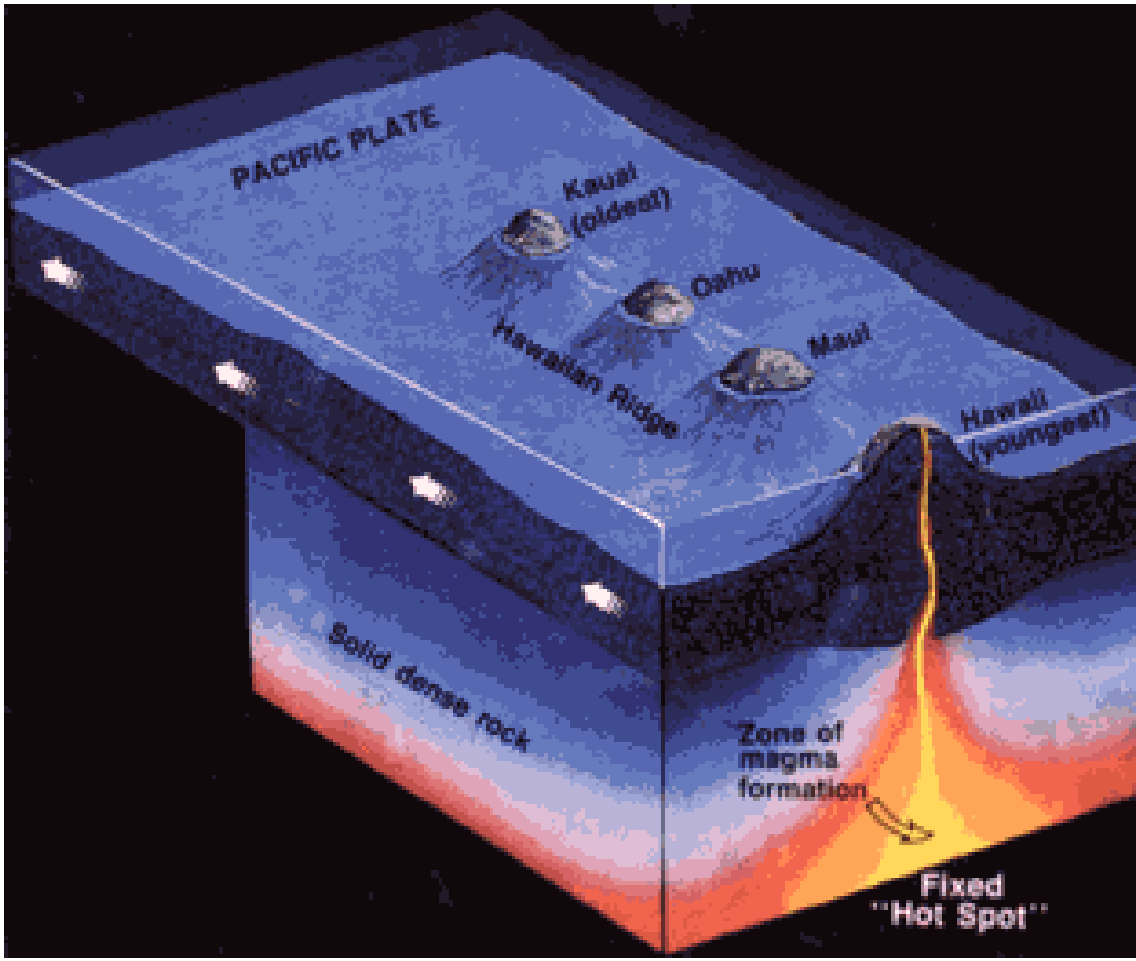


Transform Boundary



Hot Spots

- The plate travels over a fixed spot or weak area in the crust.
- Examples are Hawaii and Yellowstone Park.

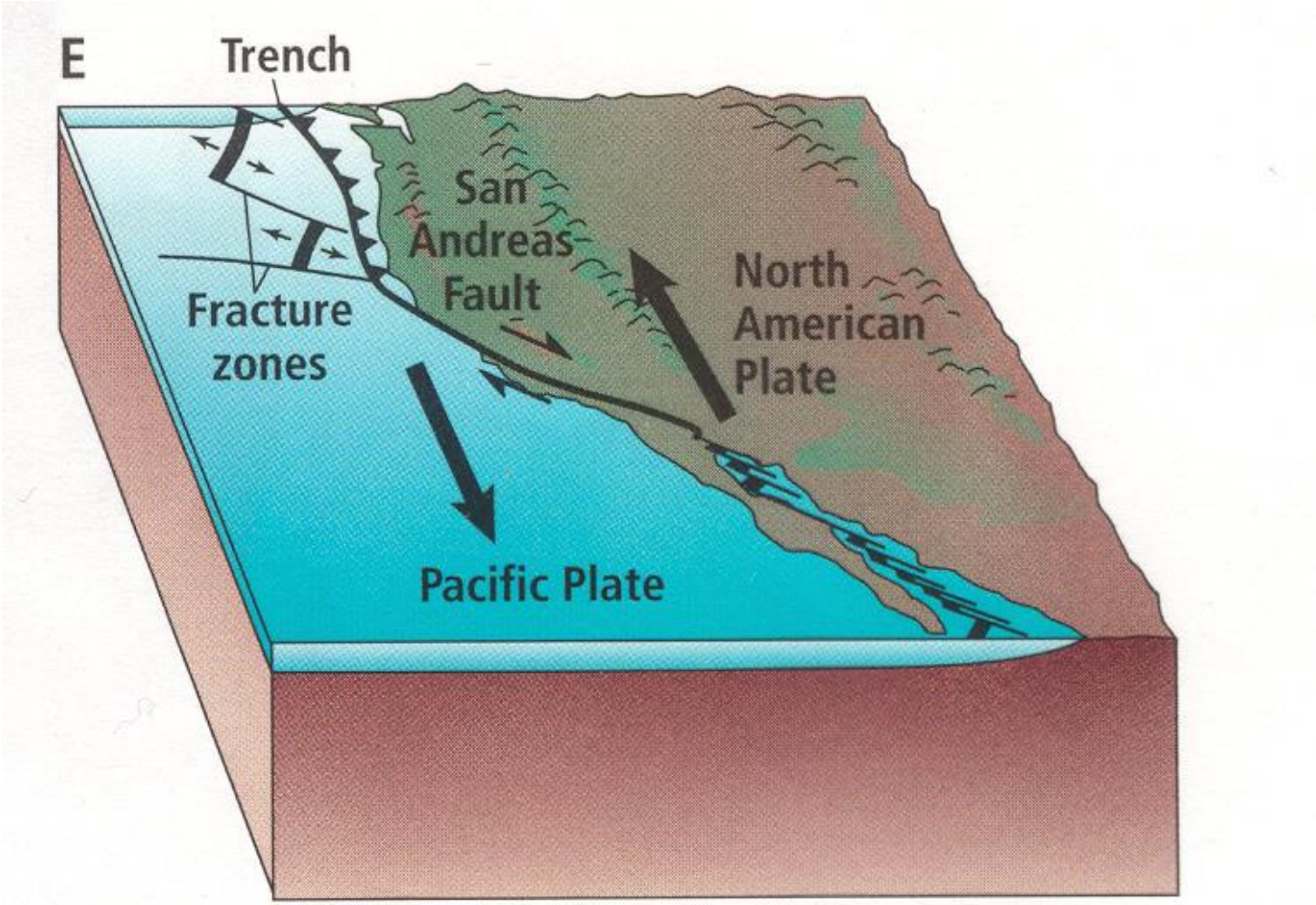


Examples of volcanic arc islands

- Aleutians
- the Kuriles
- Japan,
- the Ryukyus,
- the Philippines
- Indonesia

Plate Boundaries

- Divergent Boundary – moving apart
- Convergent Boundary – moving together
- Transform Fault Boundary – moving sideways past each other



Transform-fault boundary where the North American and Pacific plates are moving past each other.

Example: San Andreas Fault in California

Plate Boundaries Review

- Places where plates move apart are called divergent boundaries.
- When continental plates diverge a rift valley is formed.
- When two oceanic plates converge what is created?
  an island arc and a trench
- The Appalachians formed mainly from continental plate collisions and therefore are a folded mountain range.
- The force moving the plates is Convection currents.