

# Crustal Boundaries

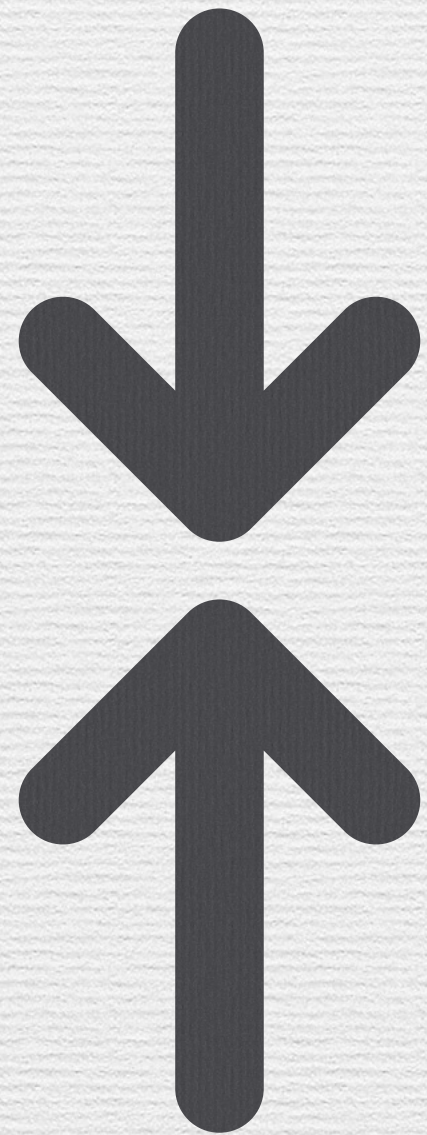
How do plates interact at their boundaries?

# Crustal Boundaries

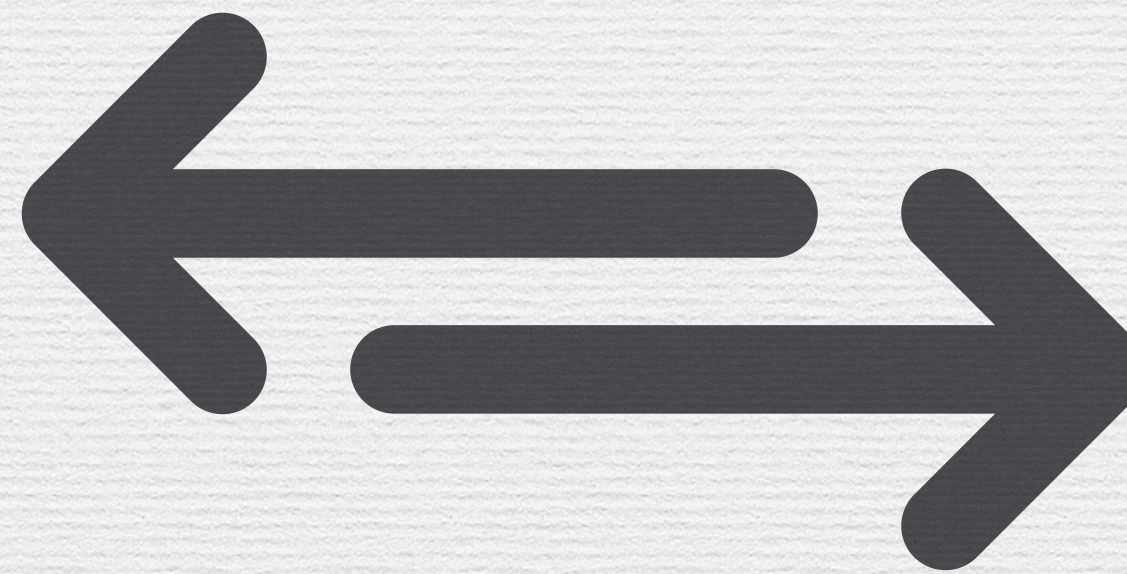
- Tectonic plates are constantly moving and interacting
- As they move across the asthenosphere and form plate boundaries they interact in various ways

# Crustal Boundaries

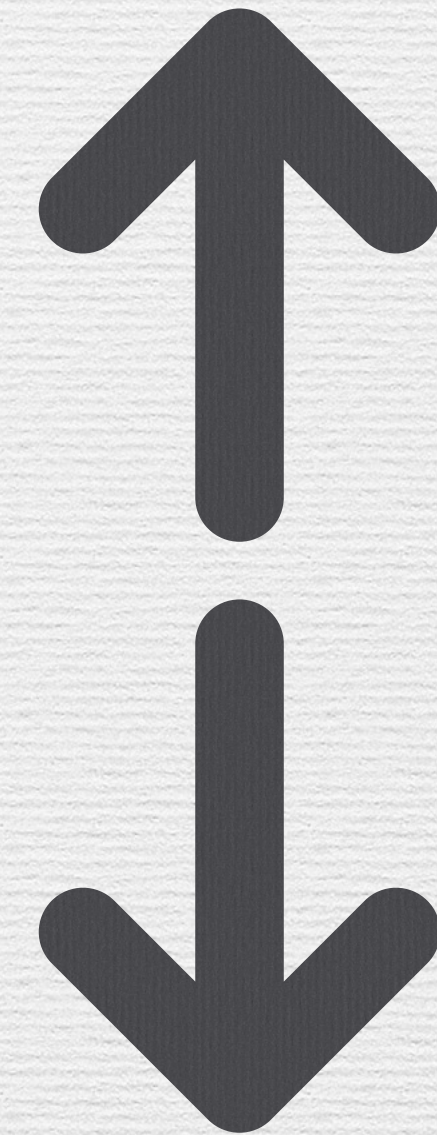
- The types of plate boundaries are:



Convergent



Transform



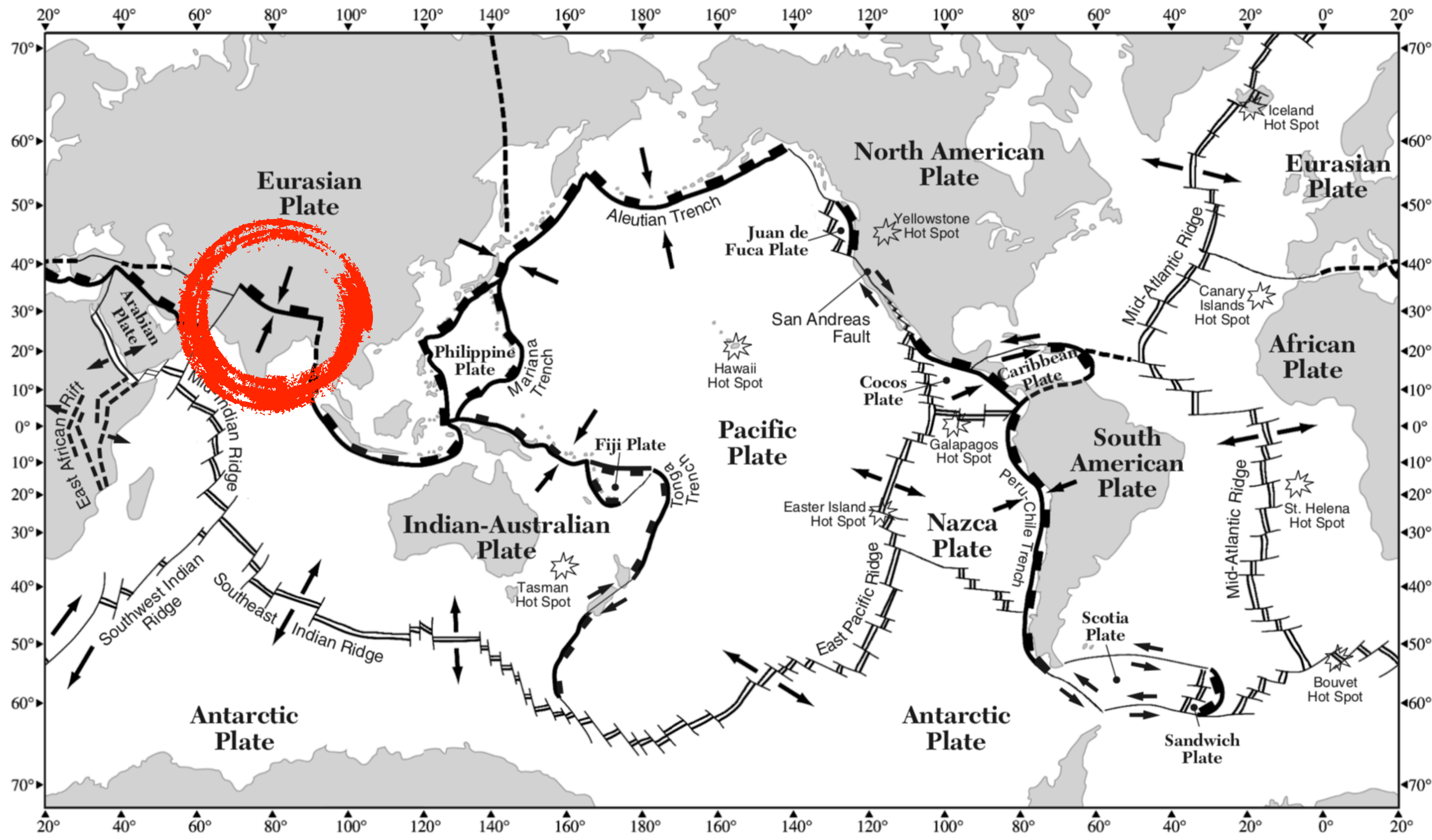
Divergent

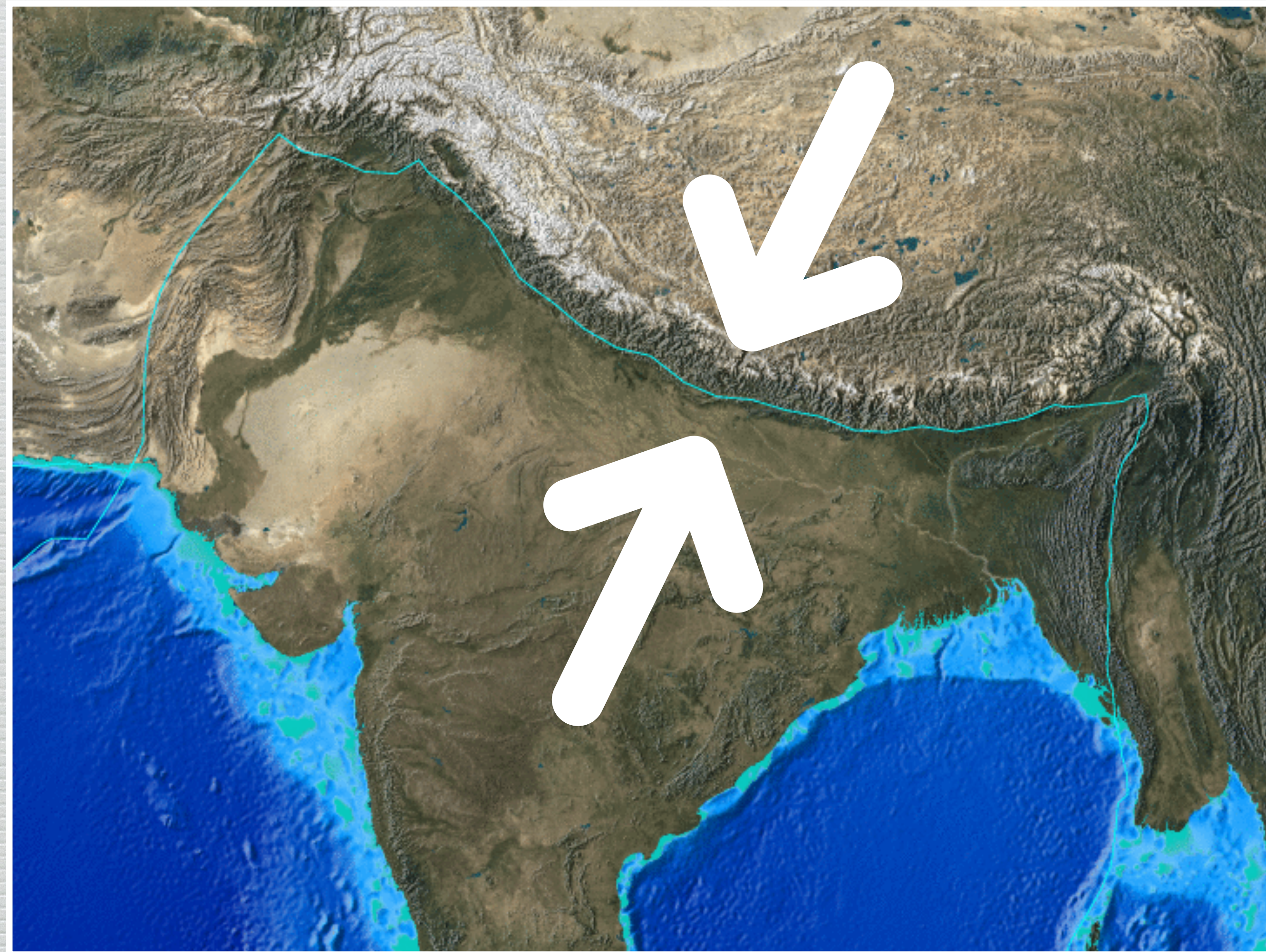
# Crustal Boundaries

- Convergent Boundary - boundary where two lithospheric plates are coming together
  - Example: the Indian-Australian Plate is pushing upward into Eurasian Plate



# Tectonic Plates



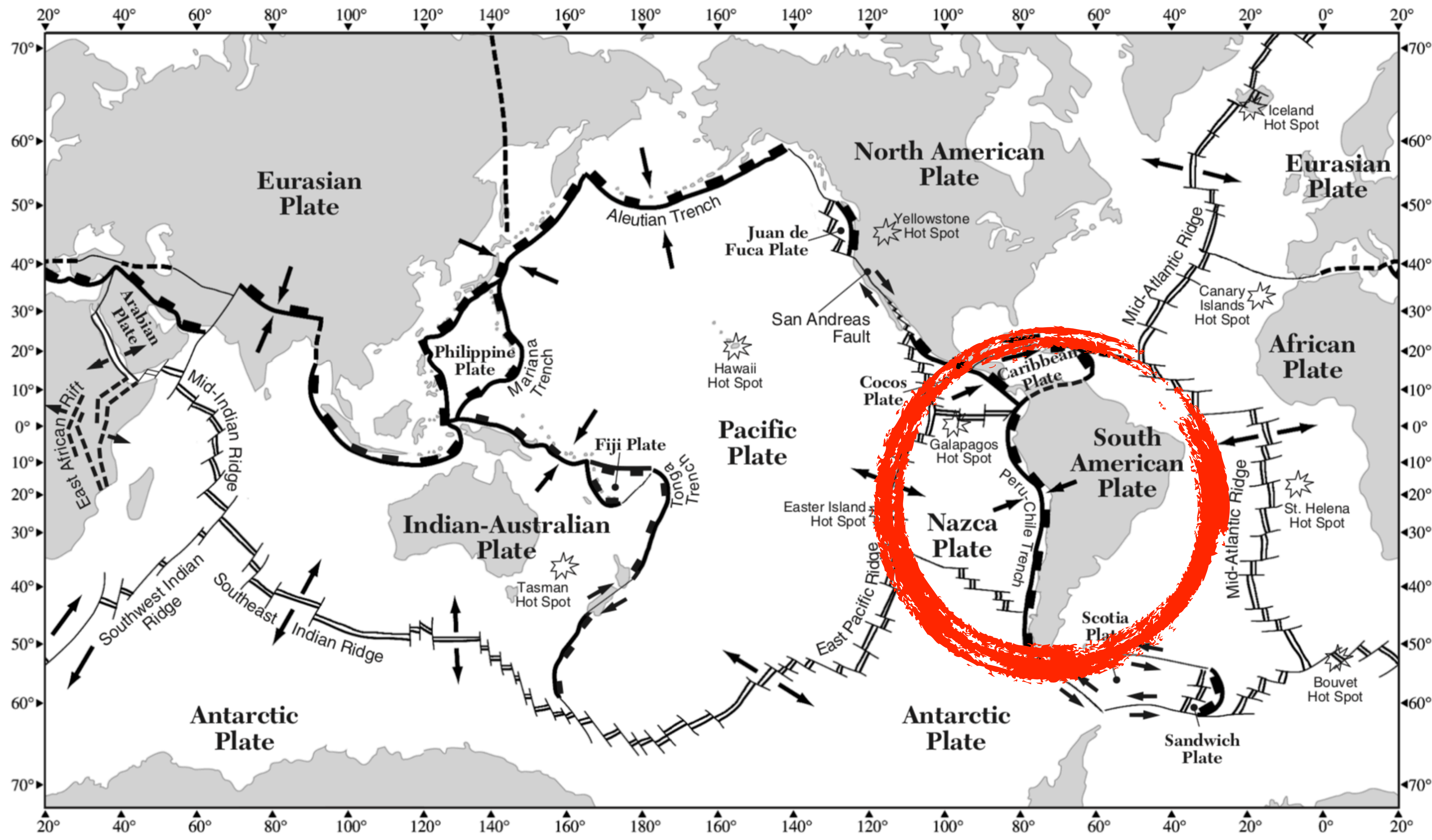


Convergent Plate Boundary - Himalayan Mountains

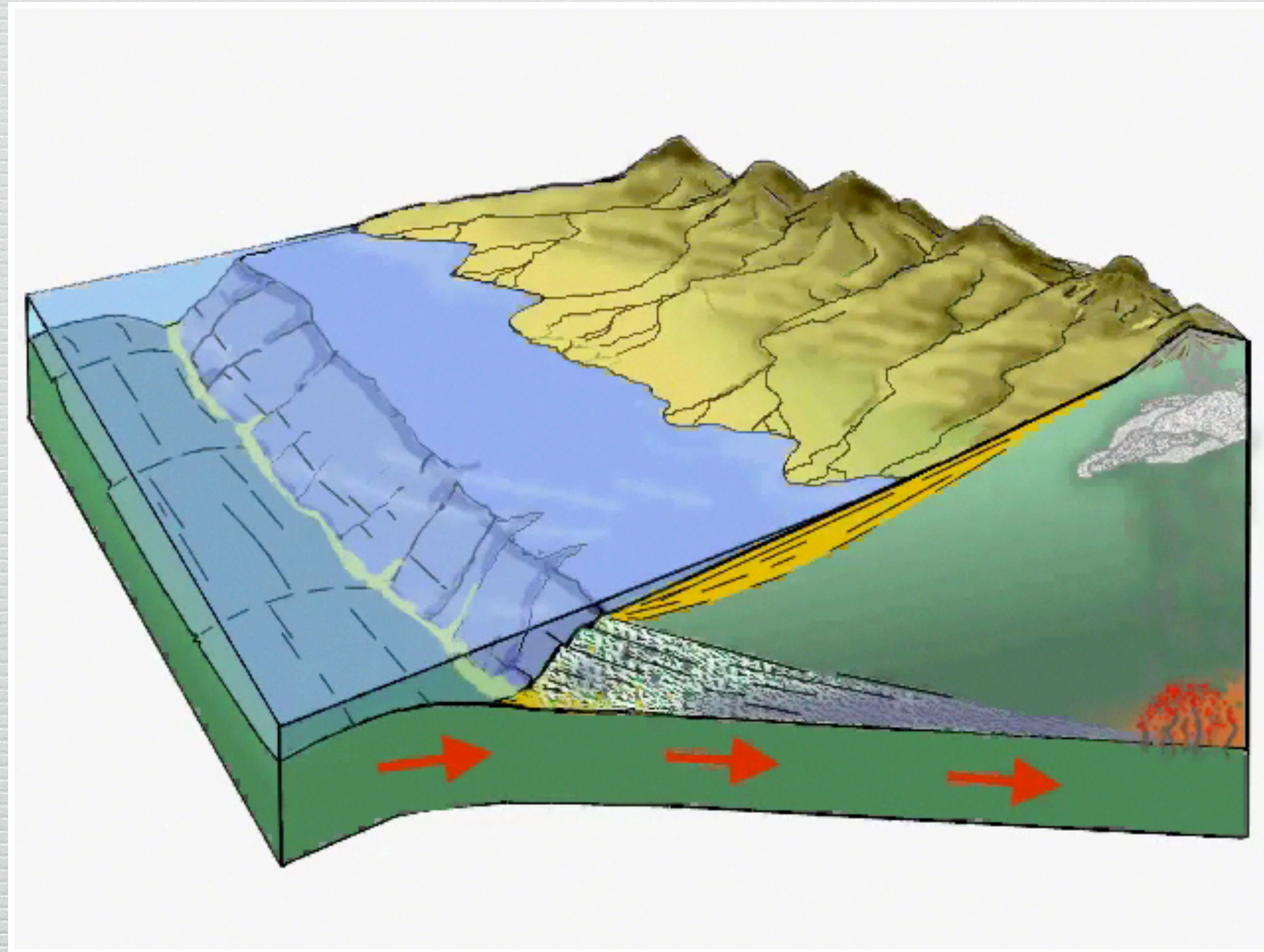
# Crustal Boundaries

- Subduction - the process where one plate is pushed below another and consumed in the mantle
- Trench - long narrow depression of the sea floor that parallels a subduction zone
  - Example: the Nazca Plate being consumed under the South American Plate

# Tectonic Plates

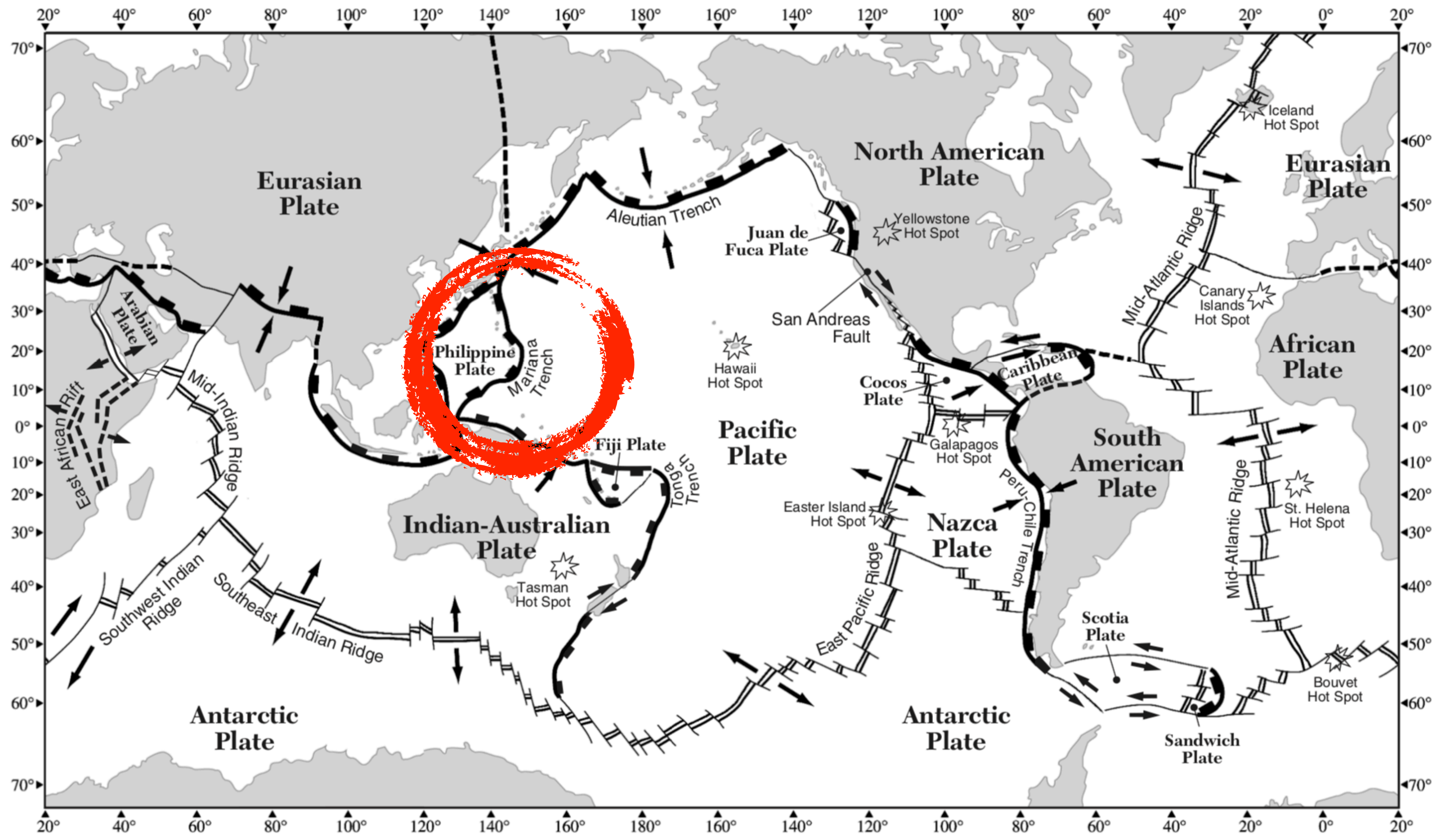






Subduction

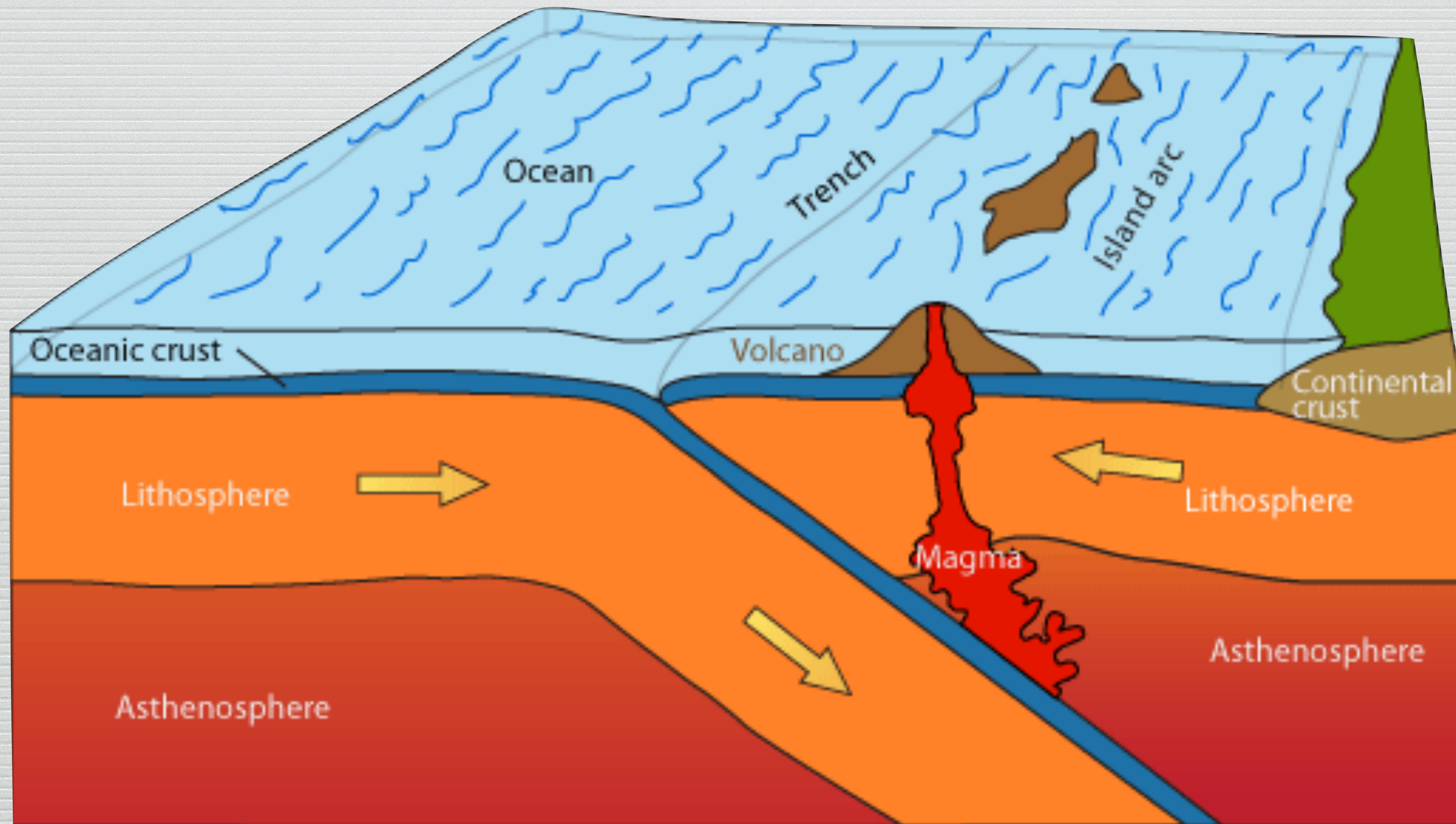
# Tectonic Plates



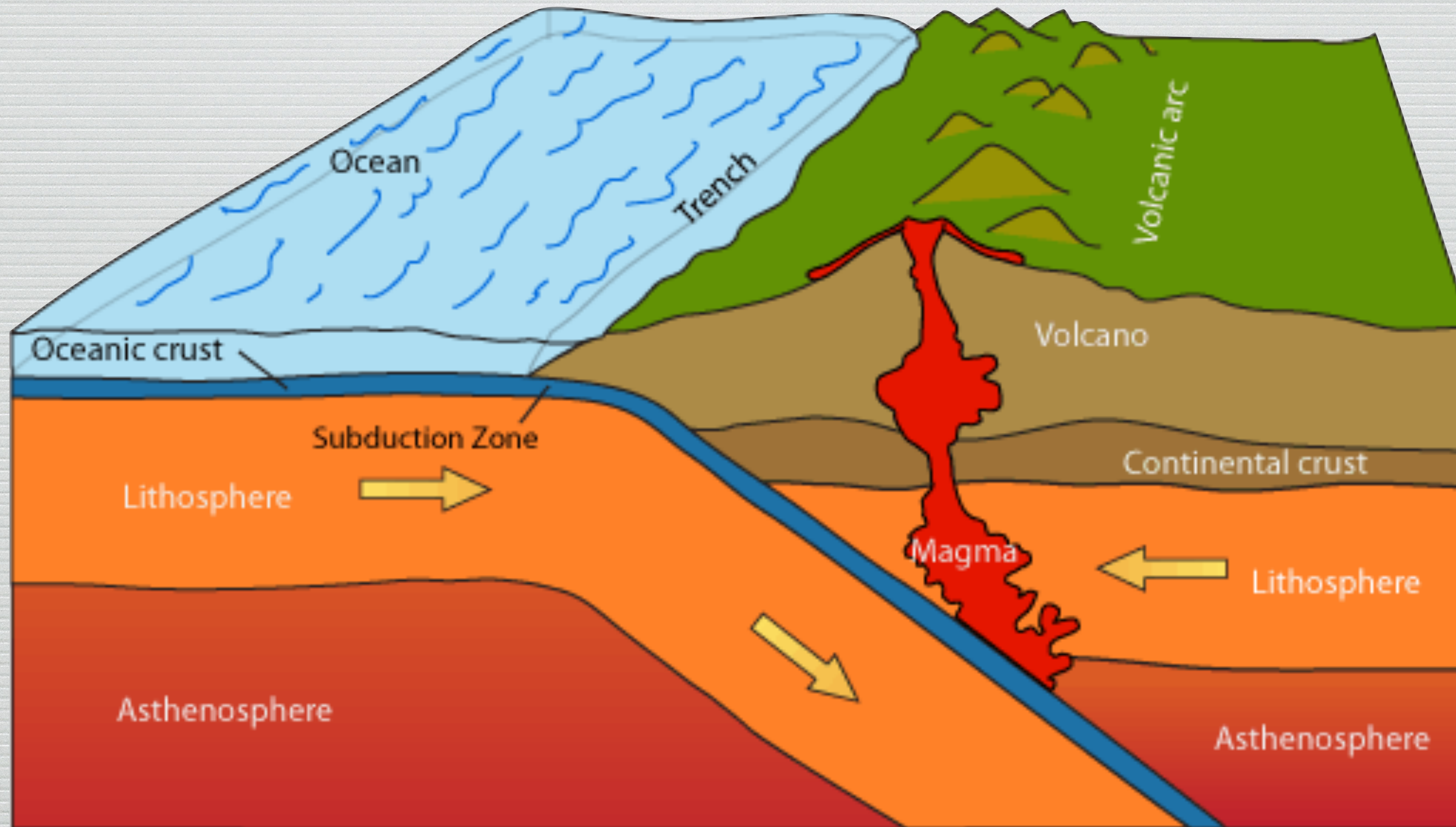


# Crustal Boundaries

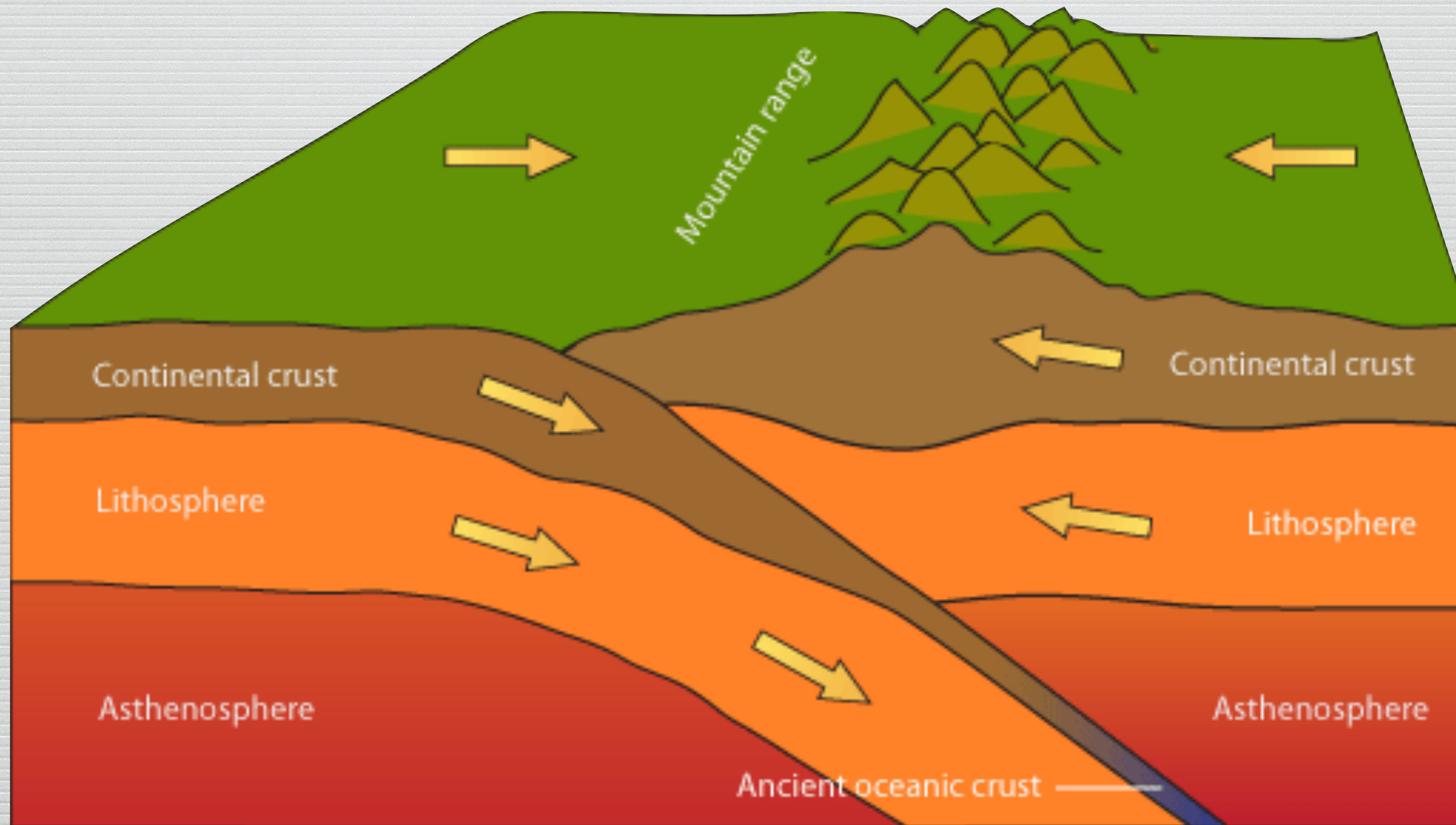
- Three Types of Convergent Boundaries:
  - Ocean - Ocean Boundary
  - Ocean - Continental Boundary
  - Continental - Continental Boundary



Ocean - Ocean Boundary



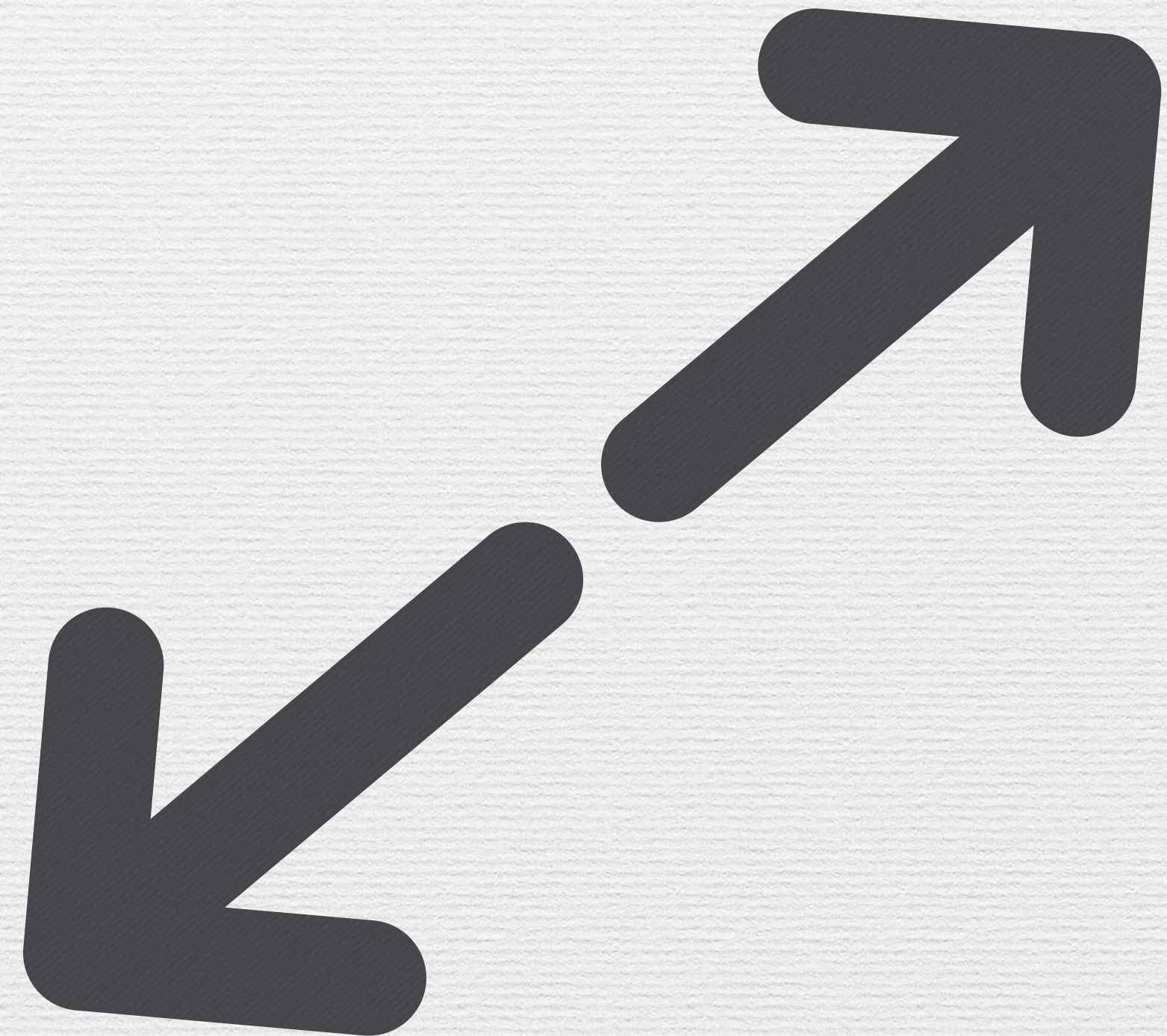
Ocean - Continent Boundary



Continent - Continent Boundary

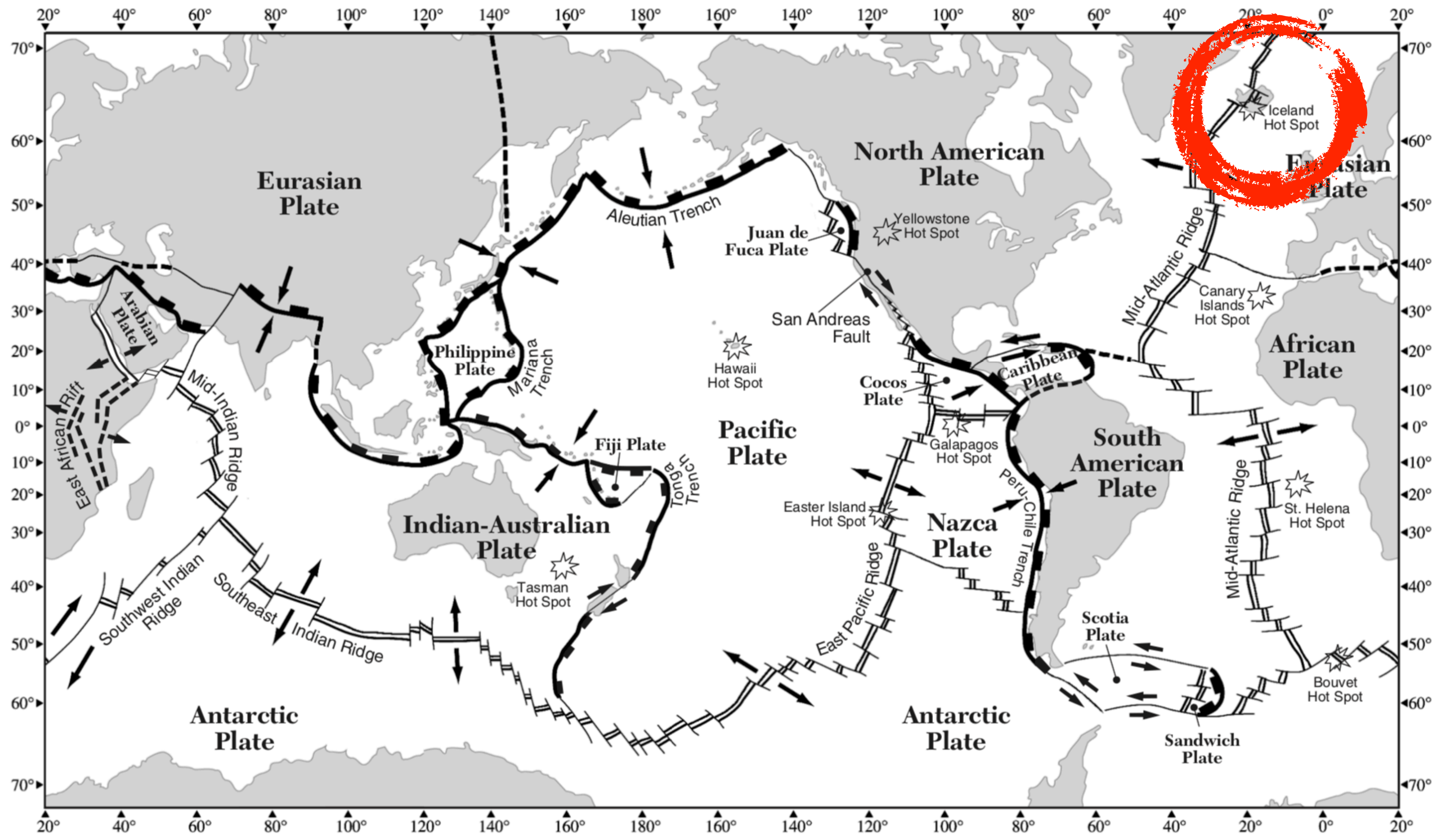
# Crustal Boundaries

- Divergent Boundary - boundary where two lithospheric plates are moving apart
  - Example: part of the Mid-Atlantic Ridge emerges from the ocean and splits Iceland in half





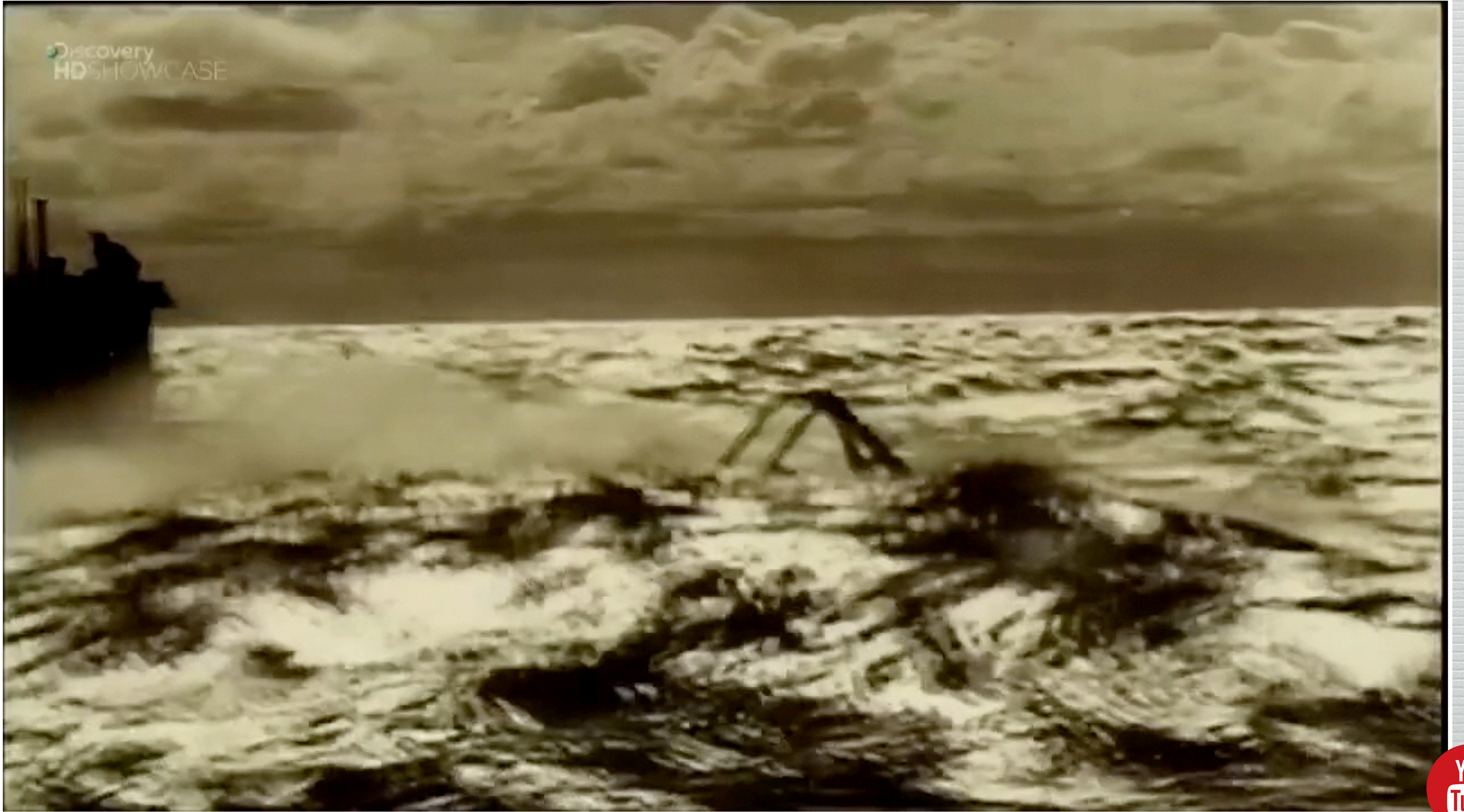
# Tectonic Plates



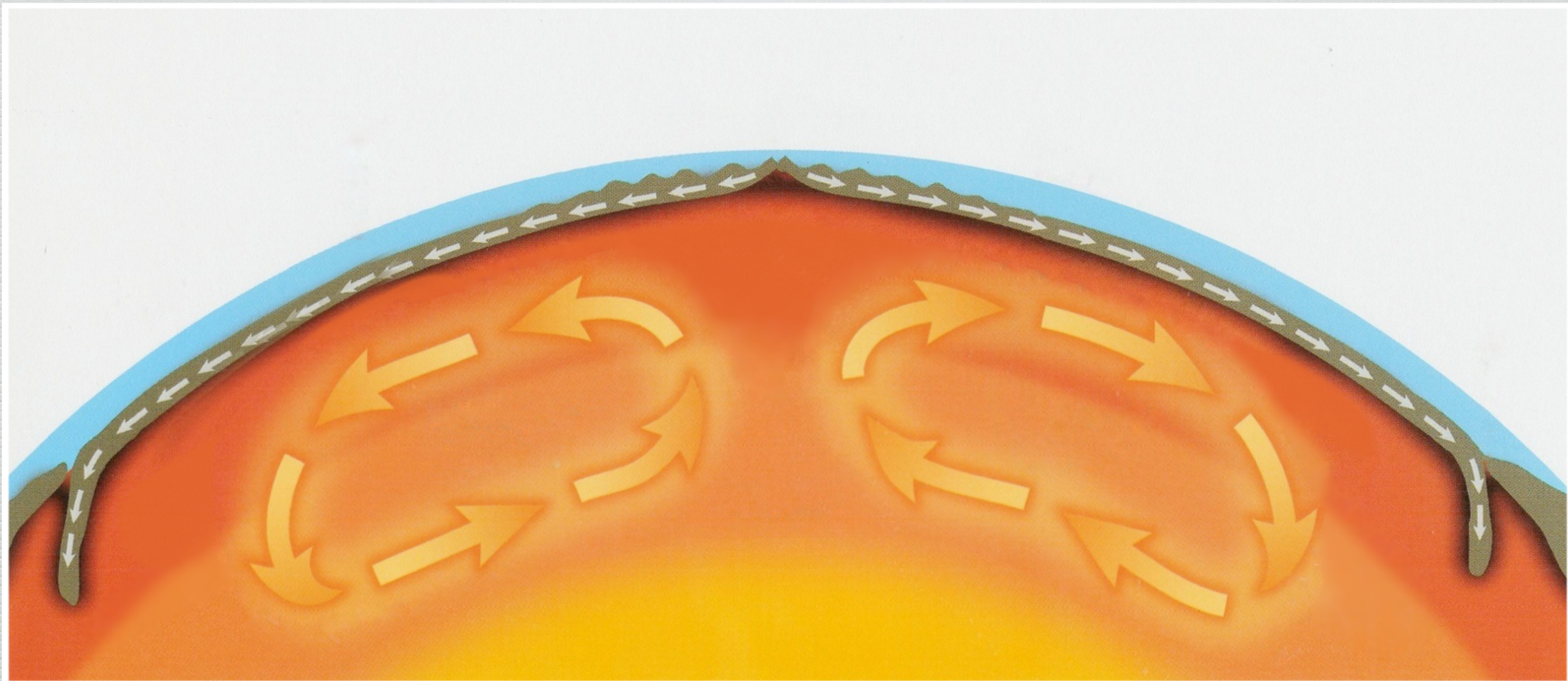


Divergent Plate Boundary - Iceland

Discovery  
HD SHOWCASE



You  
Tube



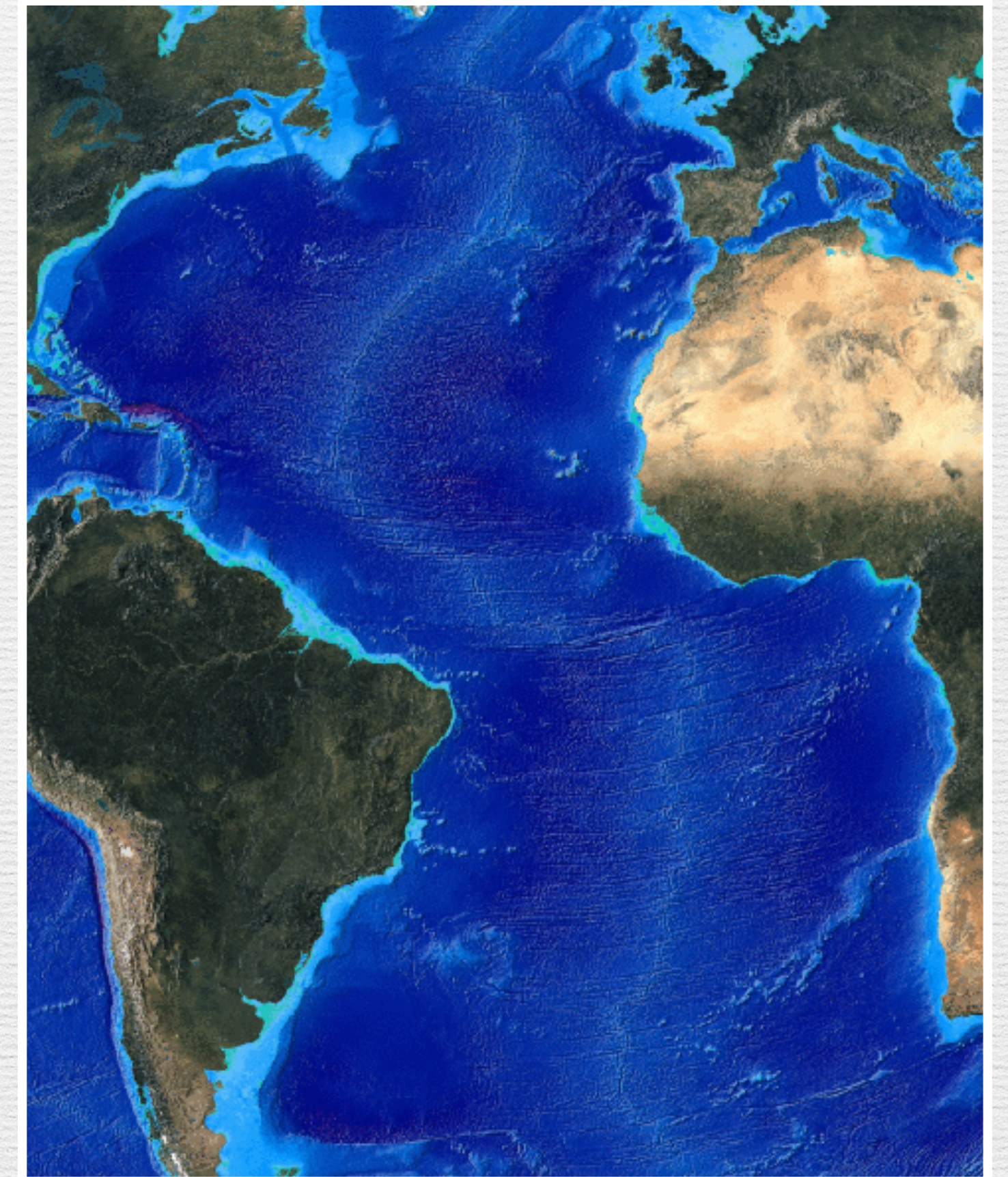
Divergent Plate Boundary

# Crustal Boundaries

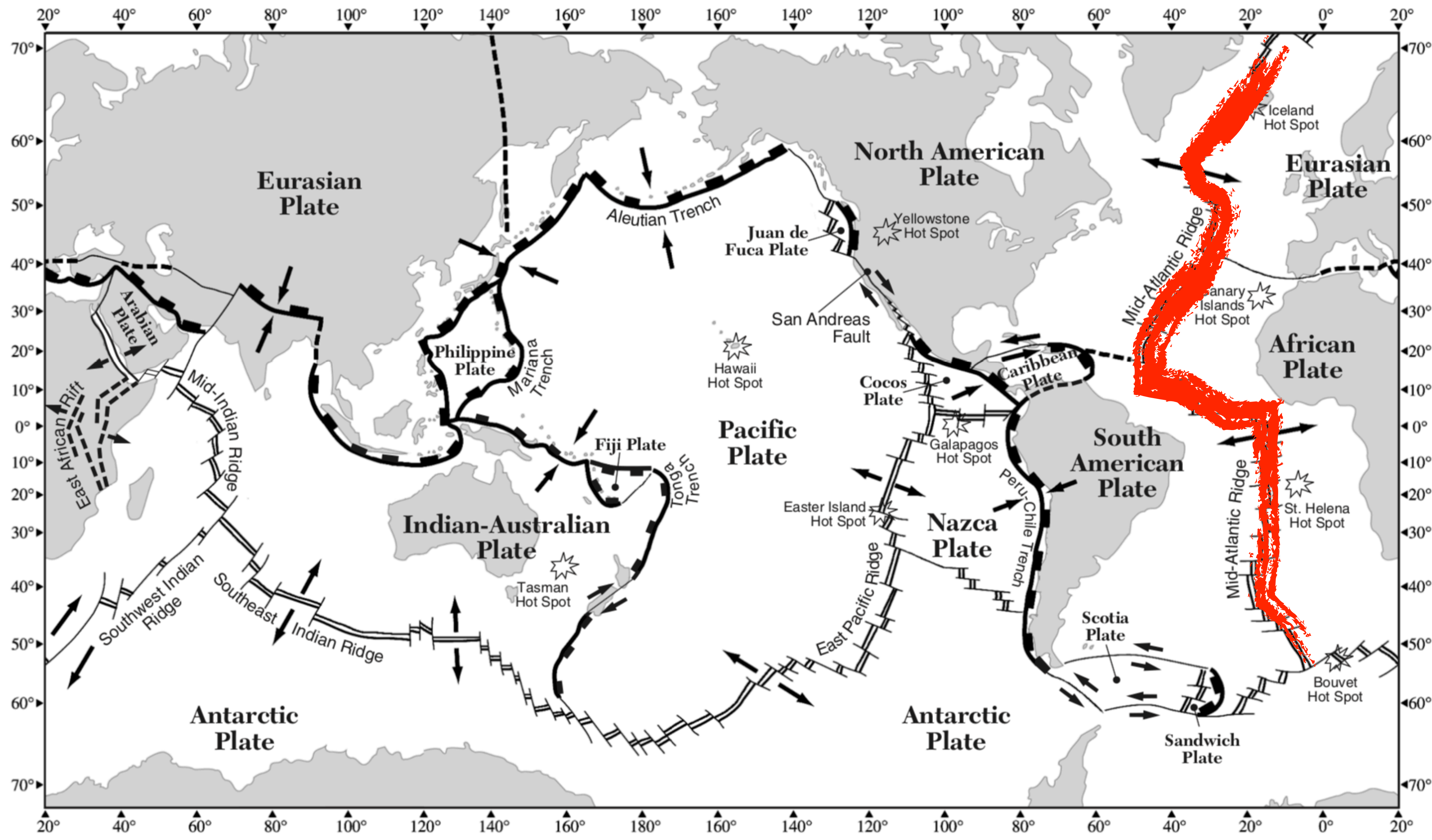
- Sea-Floor Spreading - the process where ocean floor is extended when two plates move apart
- Mid-Ocean Ridge - underwater mountain range created from a divergent plate boundary

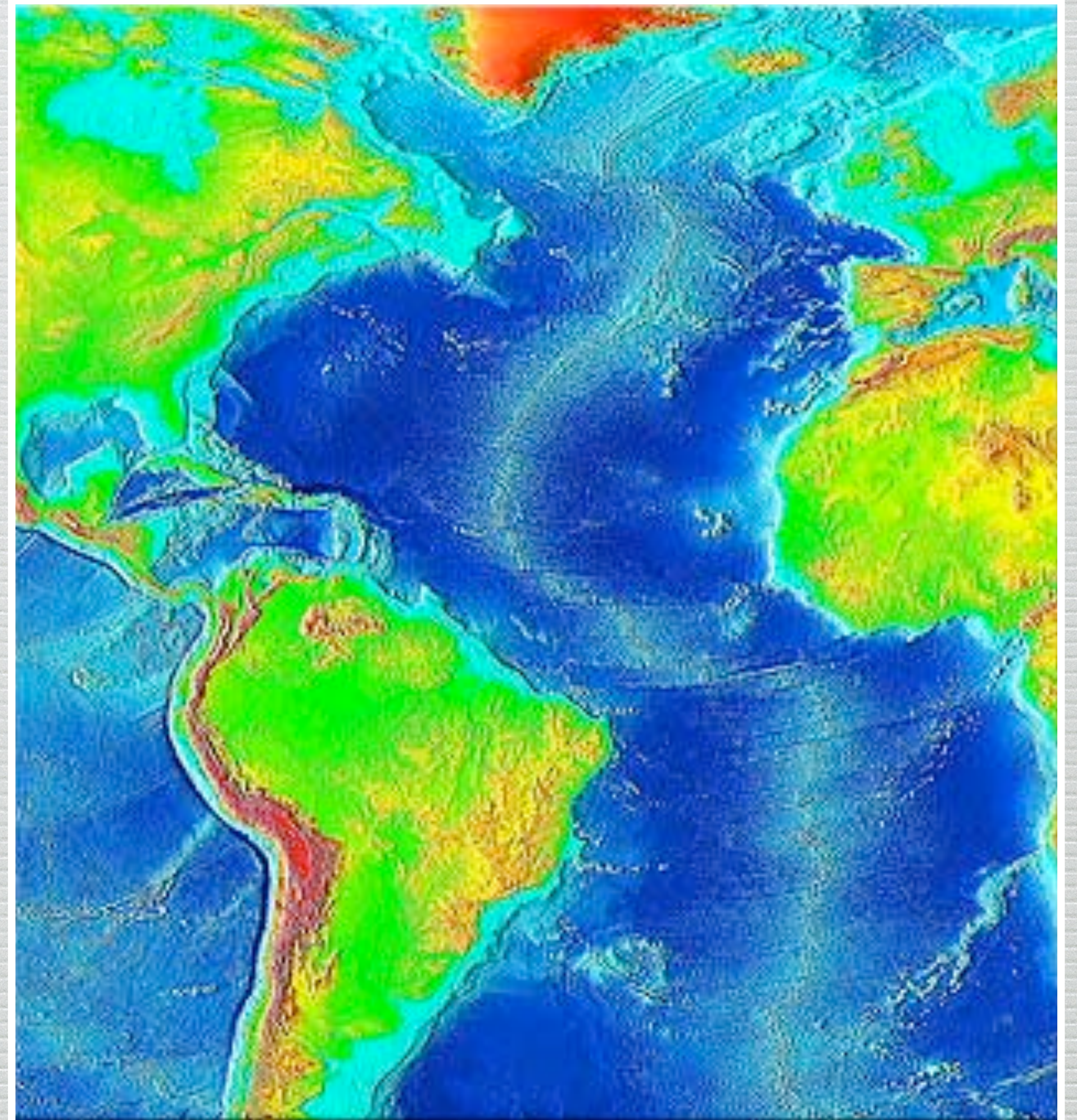
# Crustal Boundaries

- Mid-Atlantic Ridge - a mid-ocean ridge that runs the length of the Atlantic Ocean
  - Separates the North and South American Plates from the Eurasian and African Plates



# Tectonic Plates



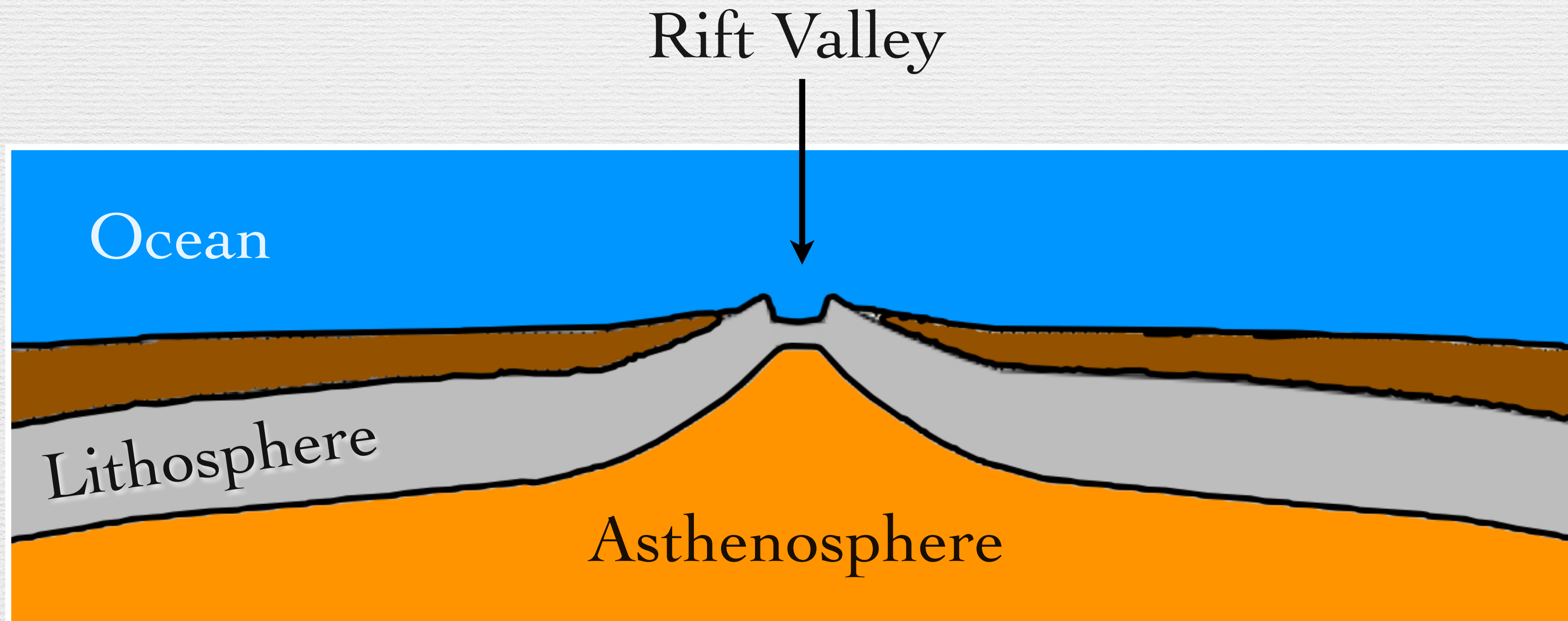


Mid-Atlantic Ridge



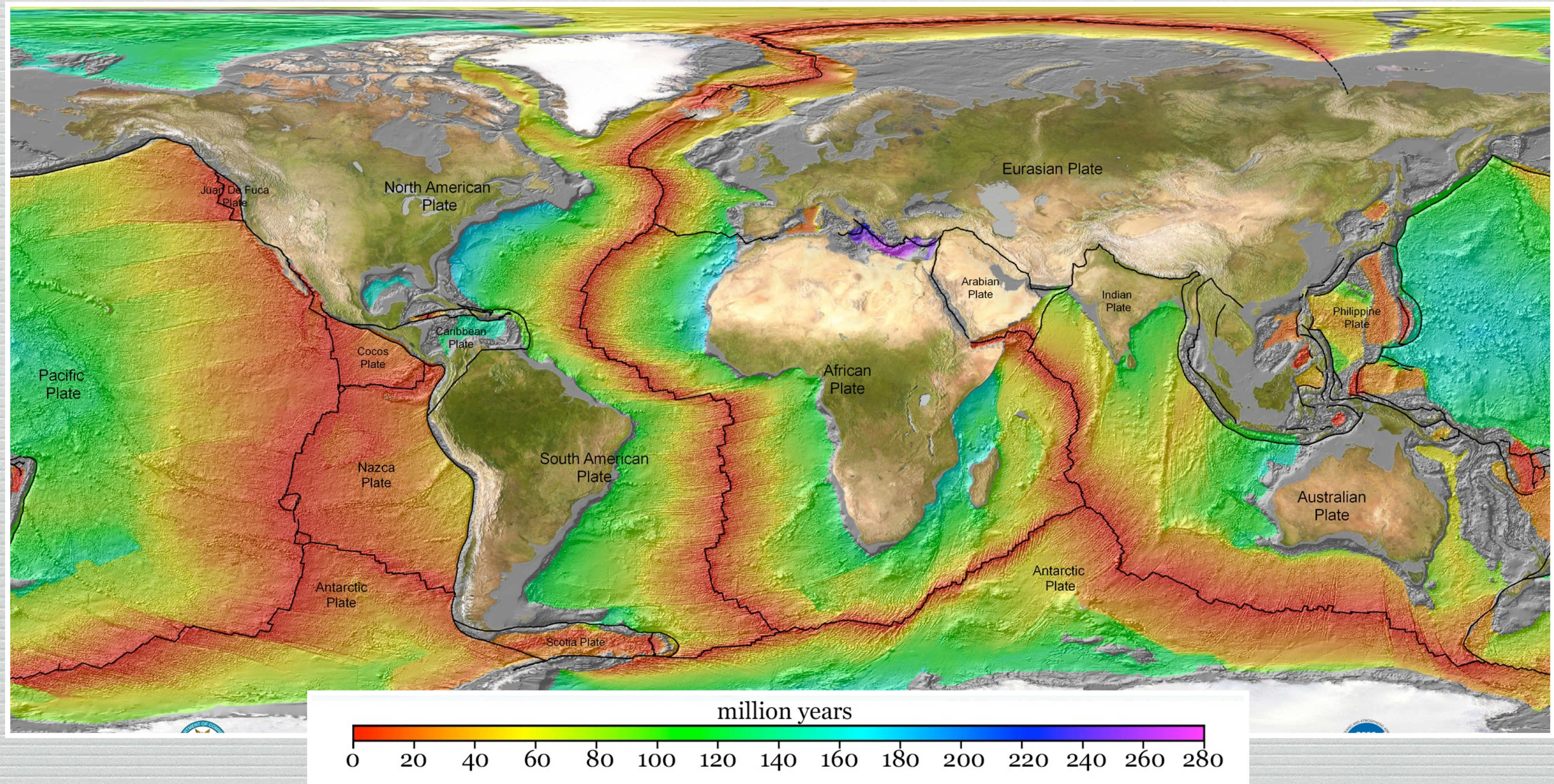
# Crustal Boundaries

- Rift Valley - narrow valley that runs the length of a mid-ocean ridge



# Crustal Boundaries

- Divergent Plate Boundary Evidence:
  1. Rock samples of the deep ocean floor show that basaltic oceanic crust becomes progressively younger as you approach the mid-ocean ridge

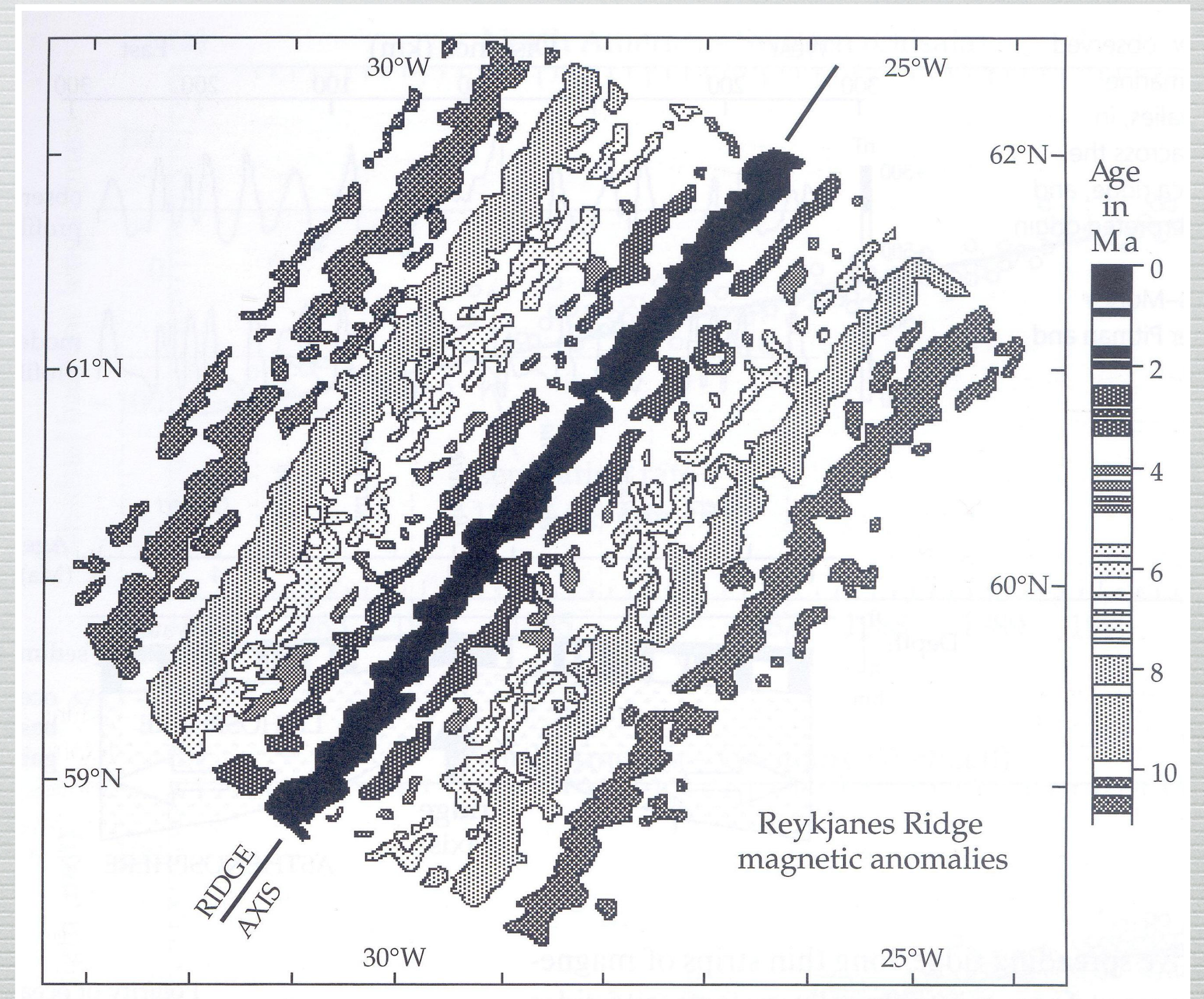
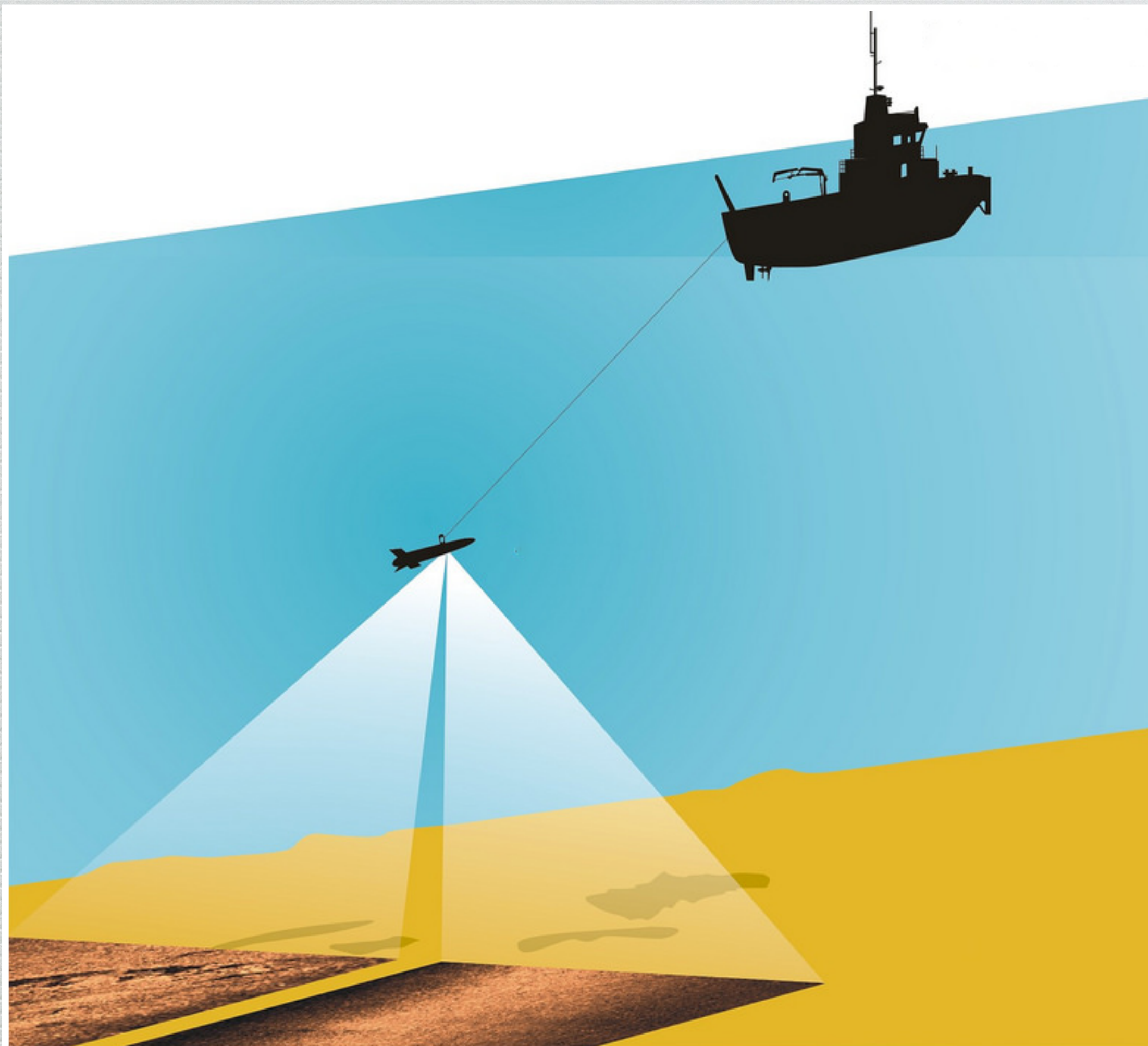


Age of the Seafloor

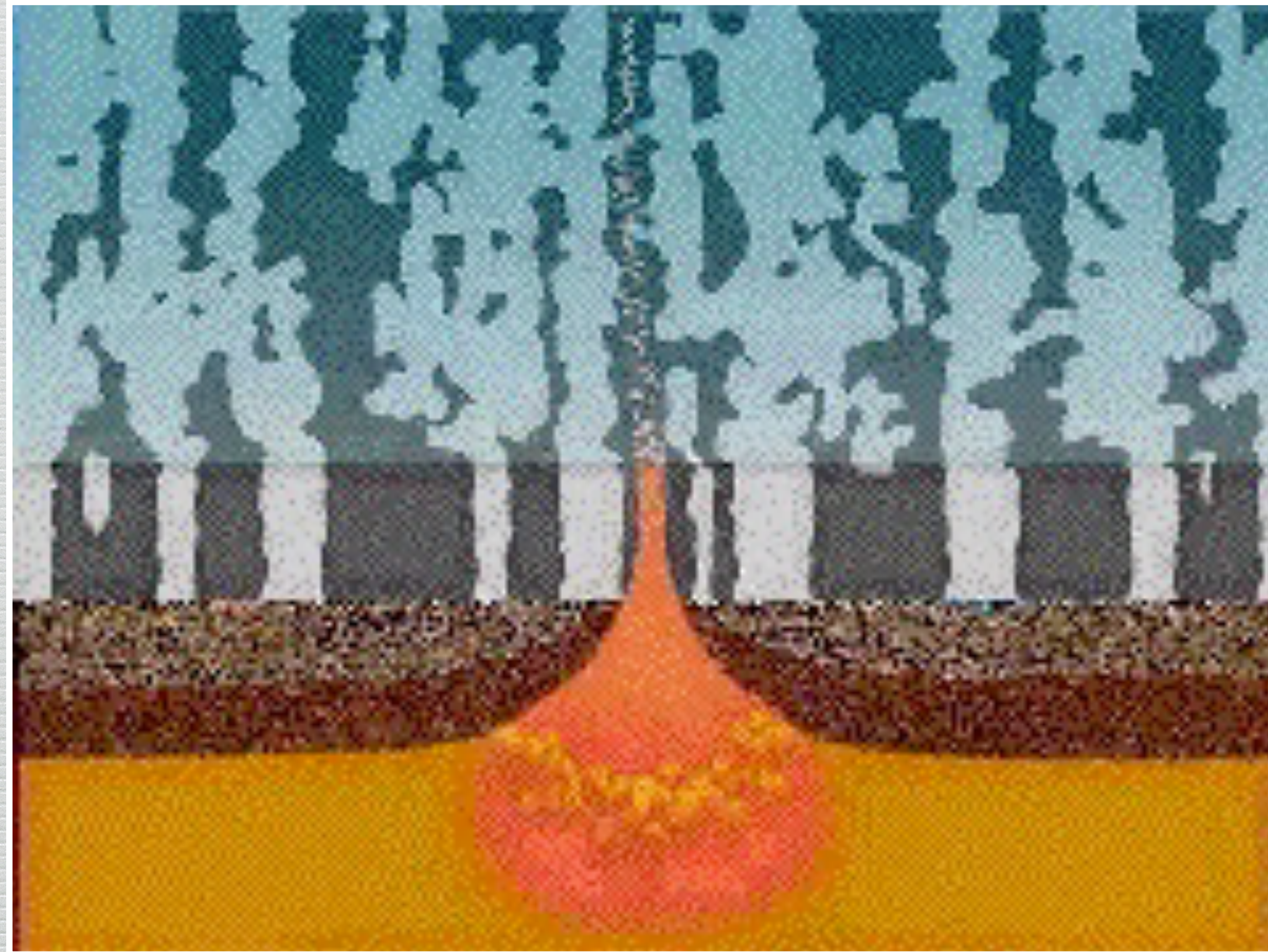
# Crustal Boundaries

- Divergent Plate Boundary Evidence [continued]:
  2. Scientists dragged a magnetometer across the ocean floor and discovered a unique magnetic pattern where stripes of normal and reversed polarity parallel the mid-ocean ridge flipping every 200,000 to 300,000 years [the last one was 781,000 years ago].





Mid-Atlantic Ridge



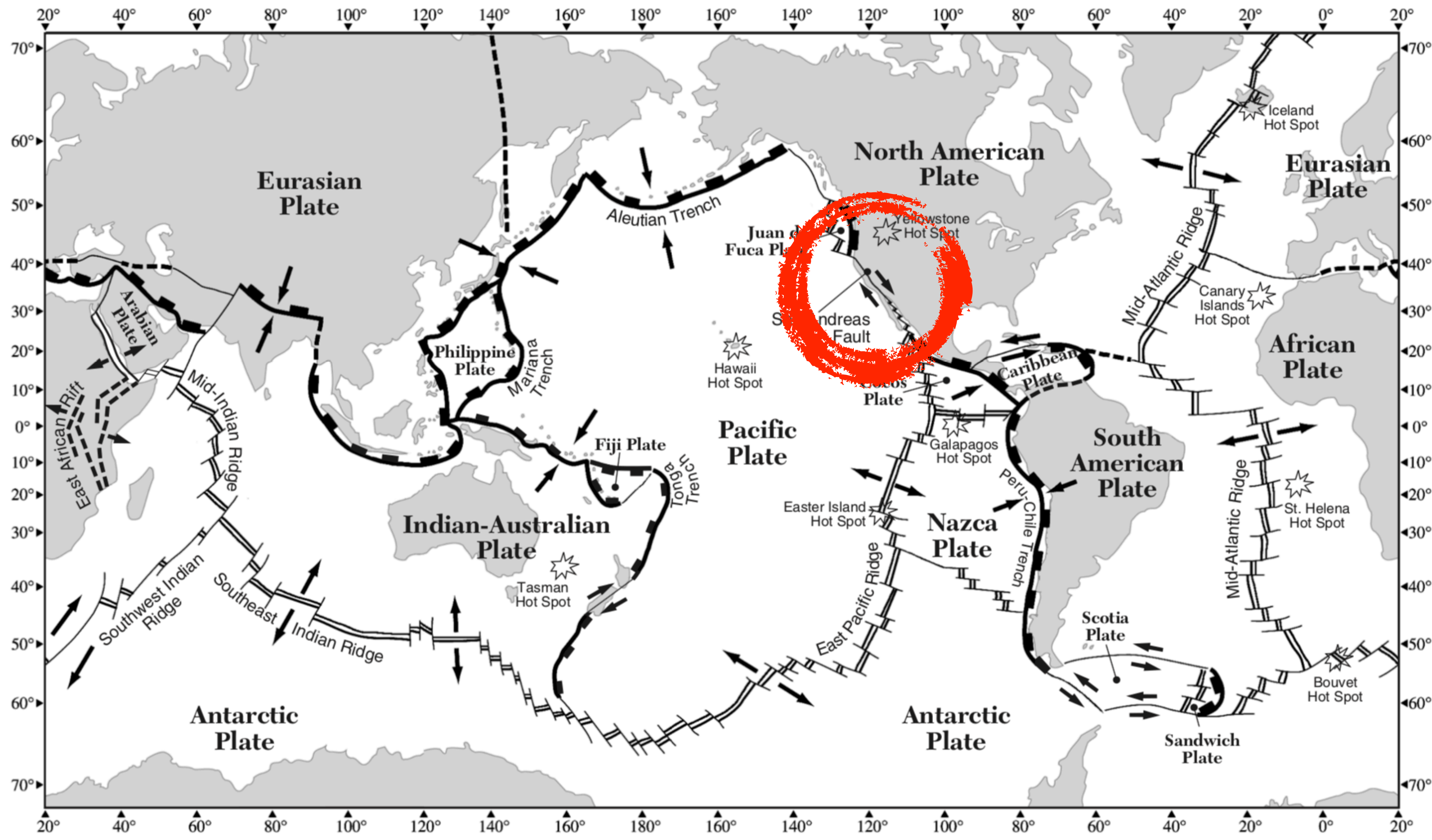
Sea-floor Spreading

# Crustal Boundaries

- Transform Boundary - boundary where two lithospheric plates are sliding past one another
  - Example: the San Andreas Fault is 800 km long and runs throughout California



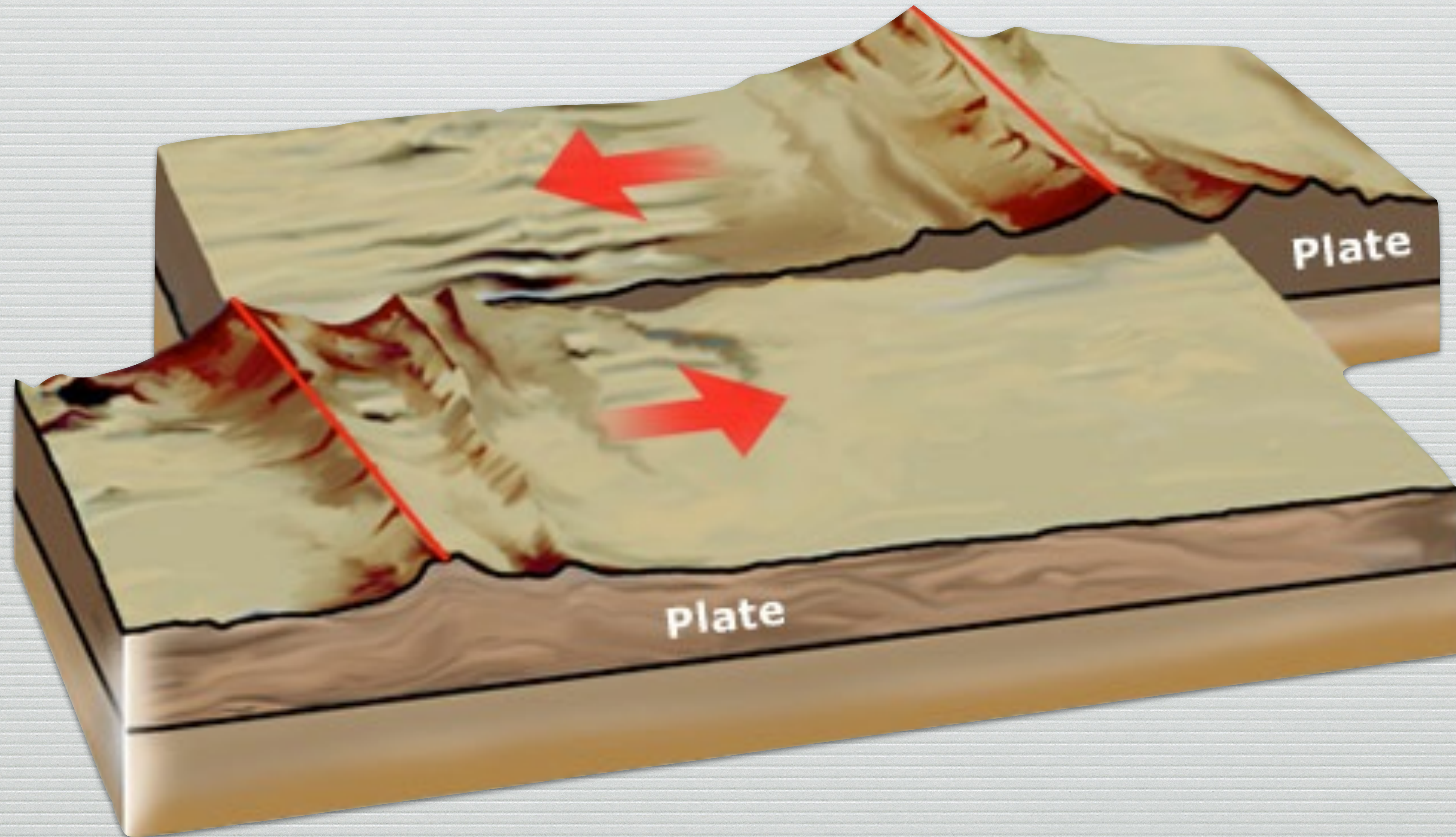
# Tectonic Plates





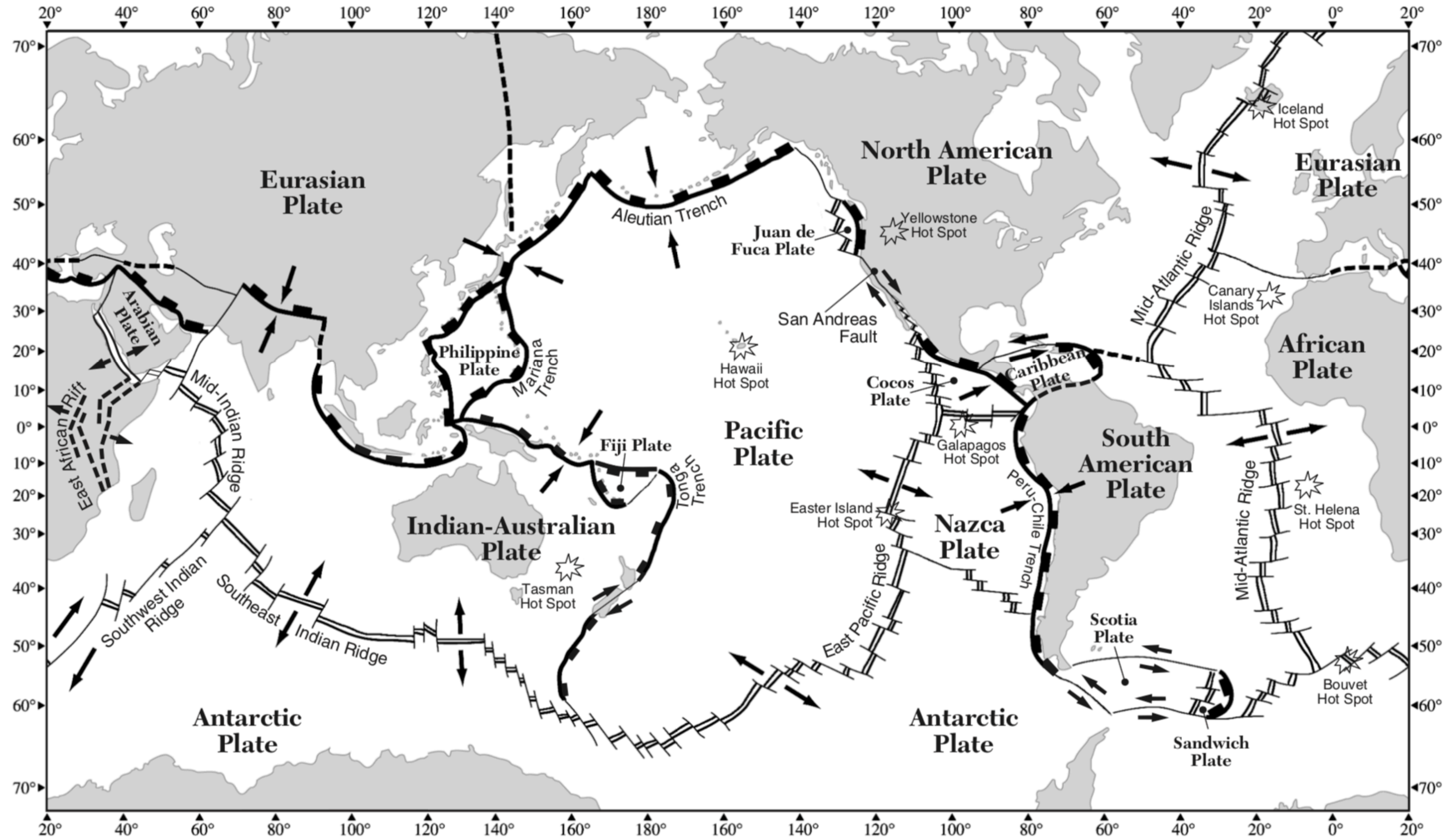


San Andreas Fault, CA



Transform Plate Boundary

# Tectonic Plates



## Key

→  
Relative motion at plate boundary

↔  
Transform plate boundary (transform fault)

↔  
Divergent plate boundary (usually broken by transform faults along mid-ocean ridges)

↔  
Convergent plate boundary (subduction zone)

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Complex or uncertain plate boundary

★  
Mantle hot spot

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