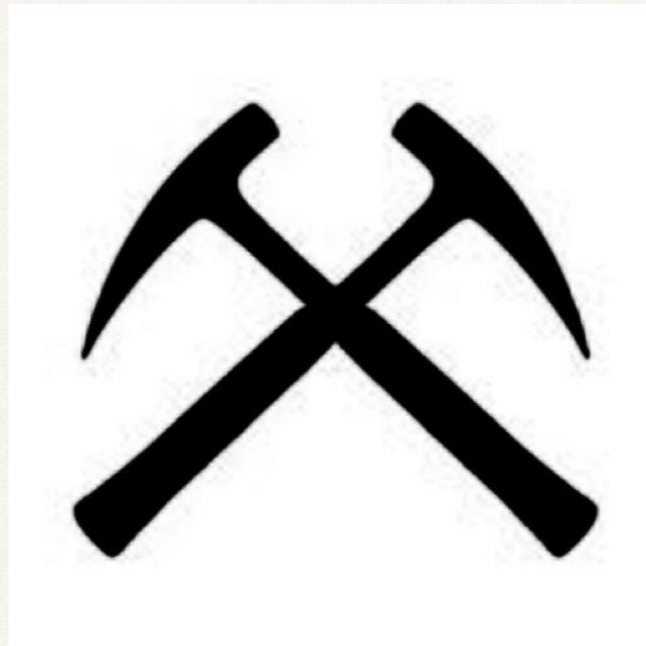


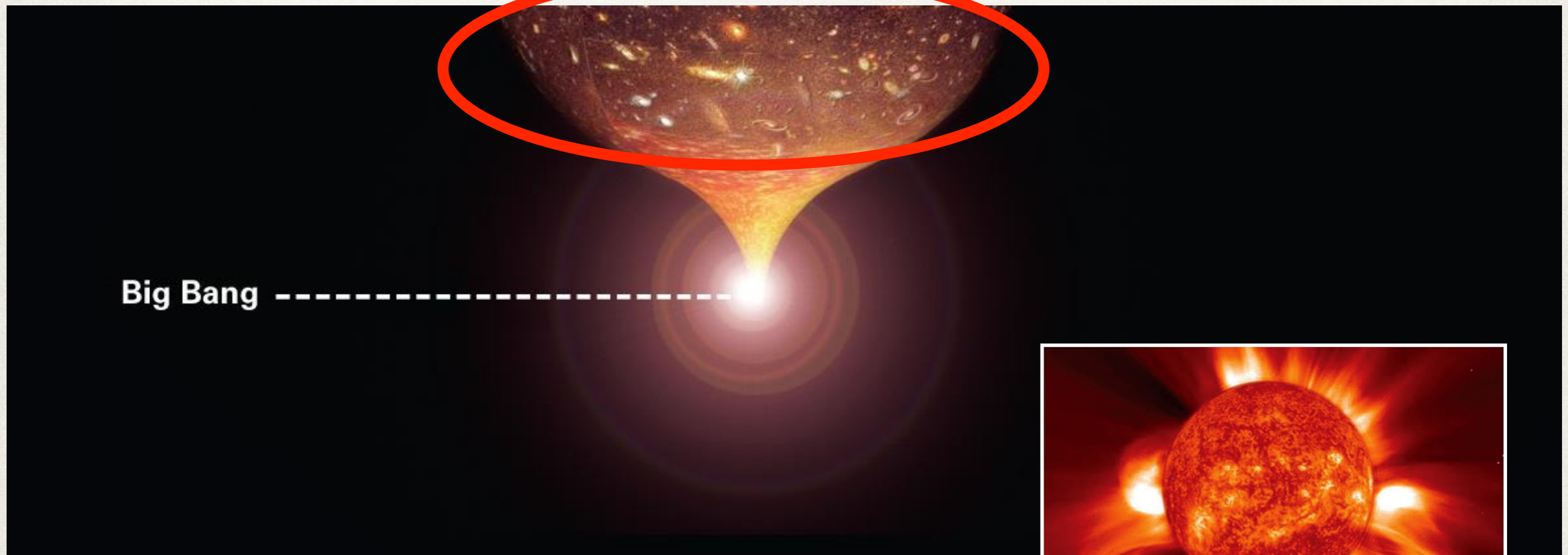
Geology Stuff



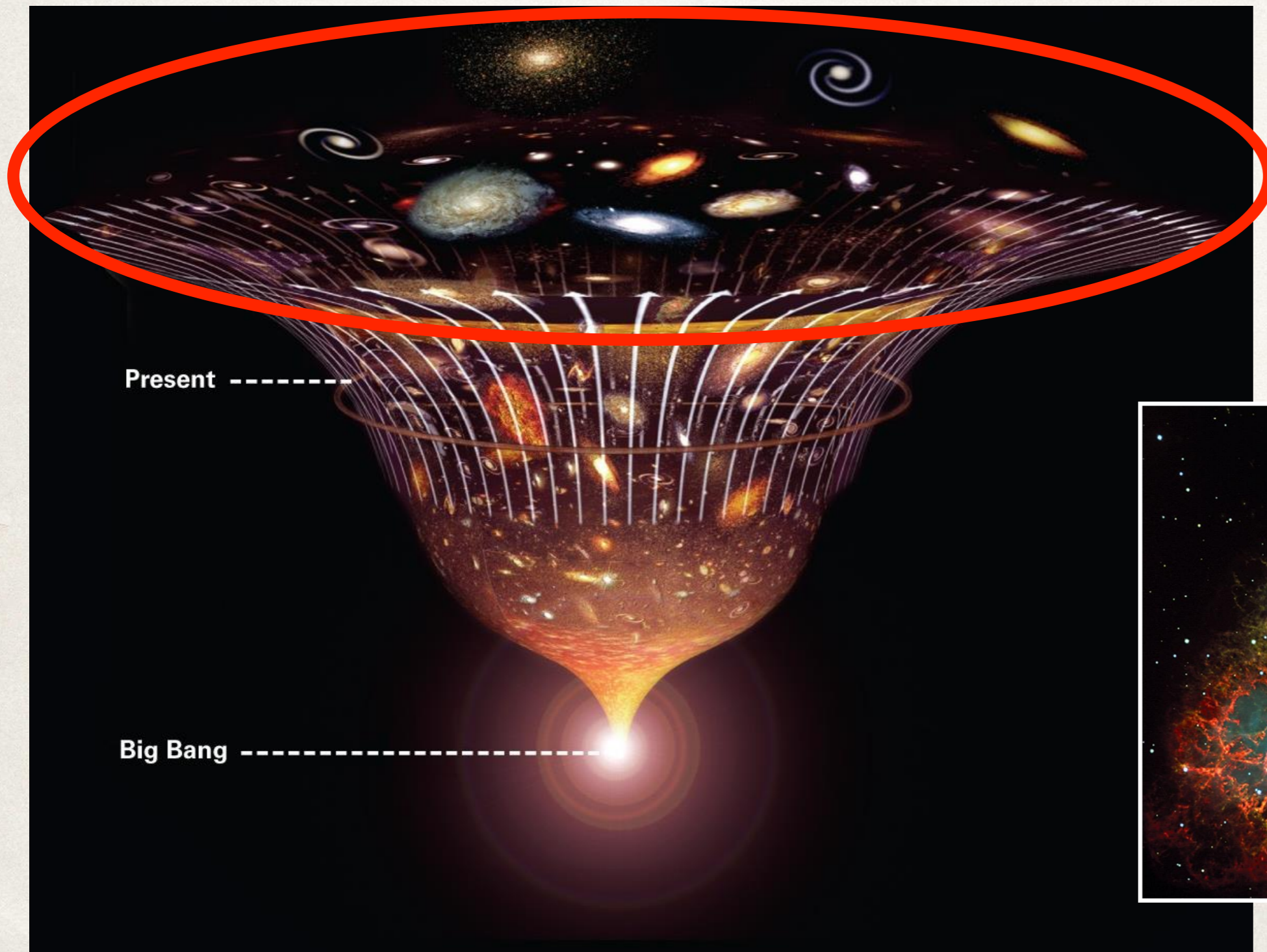
with
Prof. Robles

Stellar Nucleosynthesis

Heavier Elements up to Iron

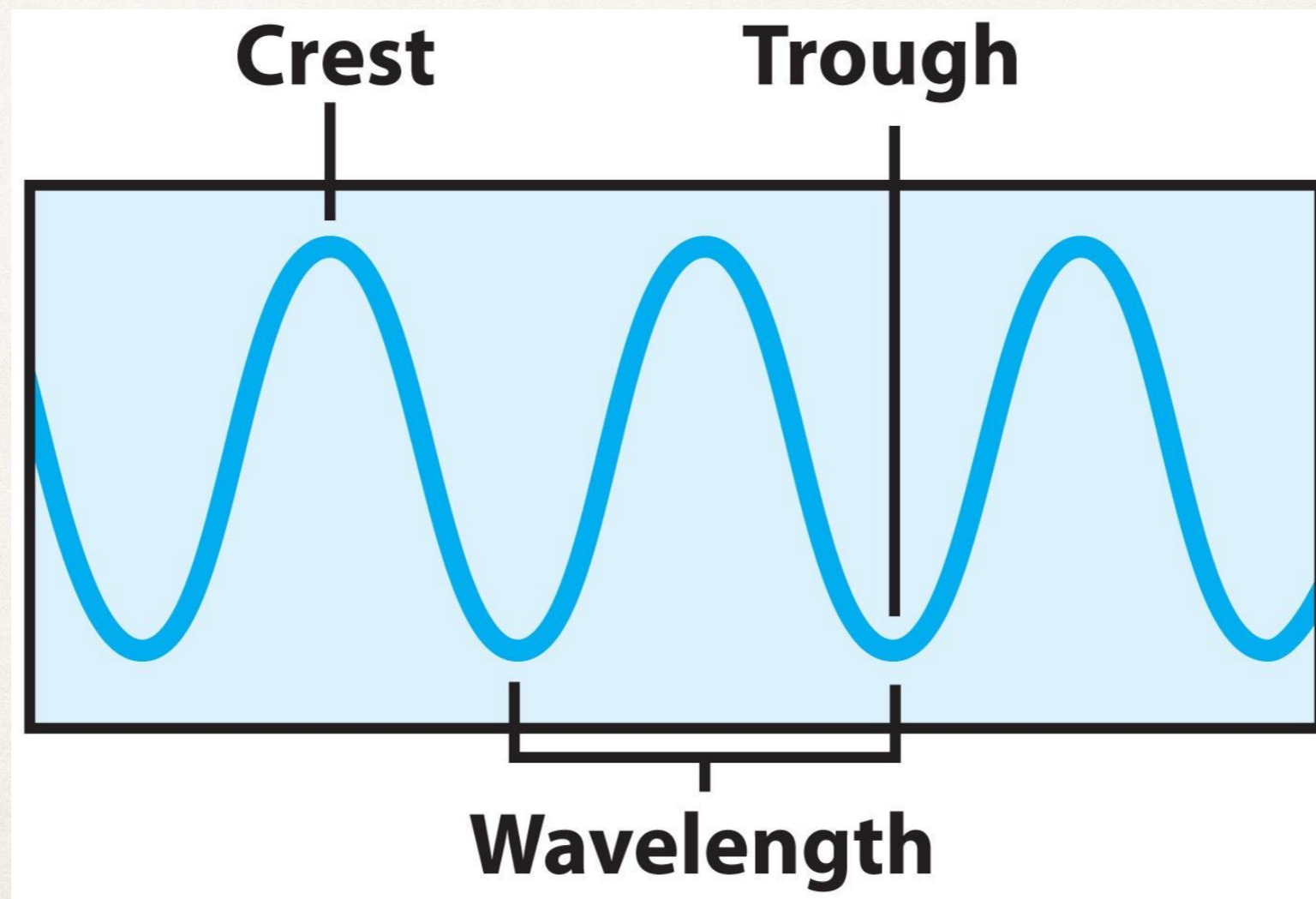


What about the fate of the elements As the period of expansion



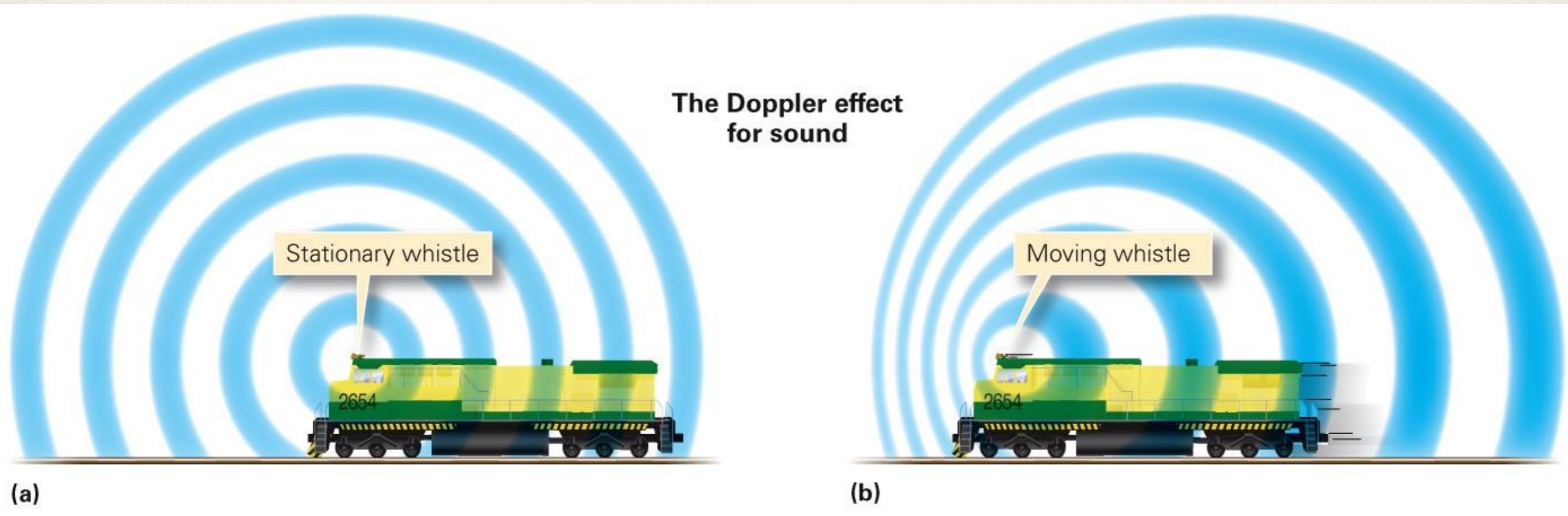
Waves and the Doppler Effect

- ✦ Discoveries in the 1920s related to the Doppler effect led to ideas about the formation of the Universe.



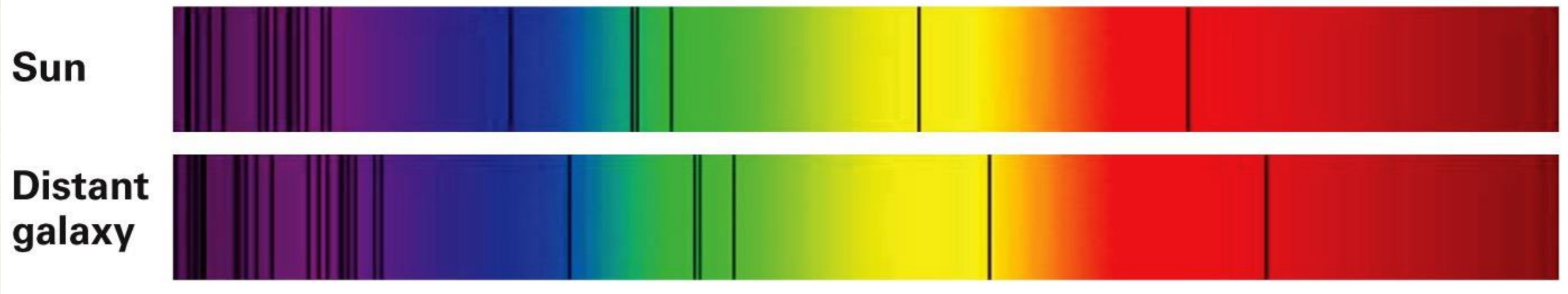
✿ The Doppler effect

✿ We've all experienced this with sound.

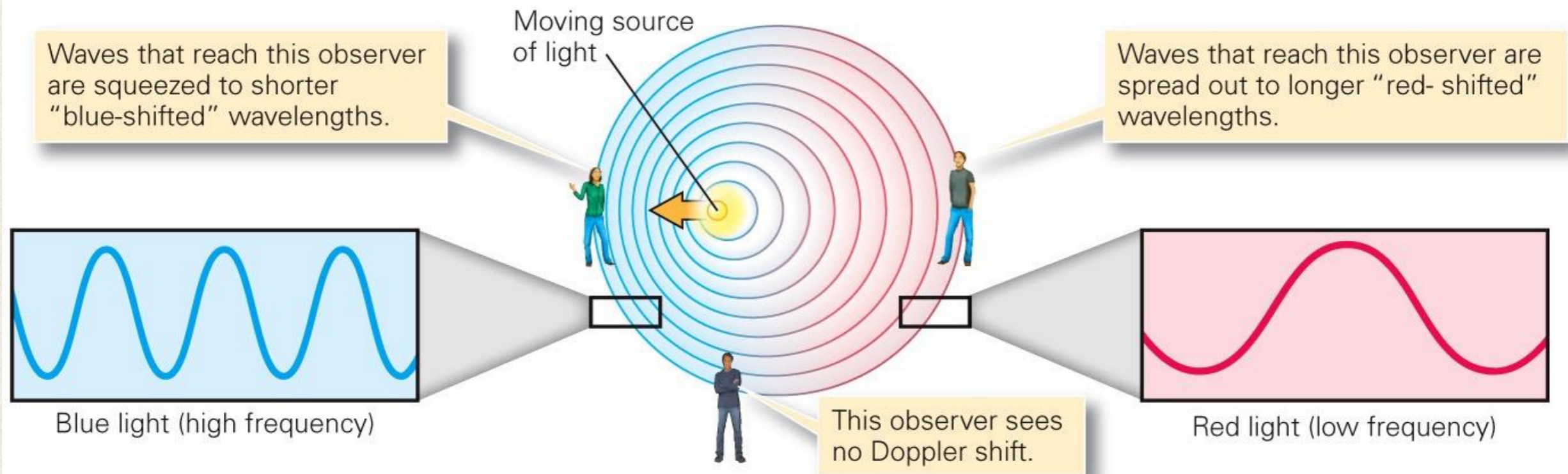


✿ The Doppler effect

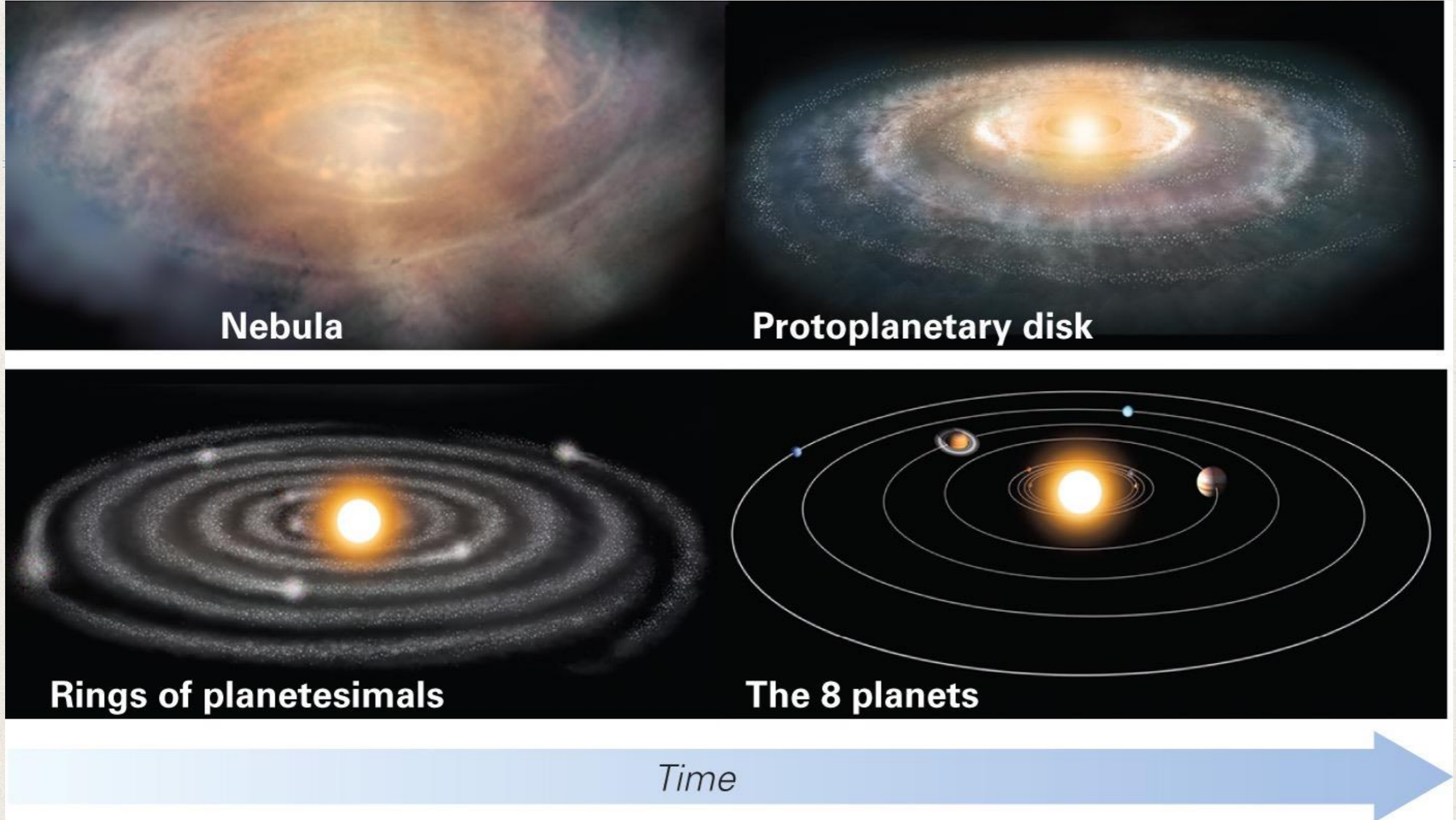
✿ With Light



The Doppler effect for light



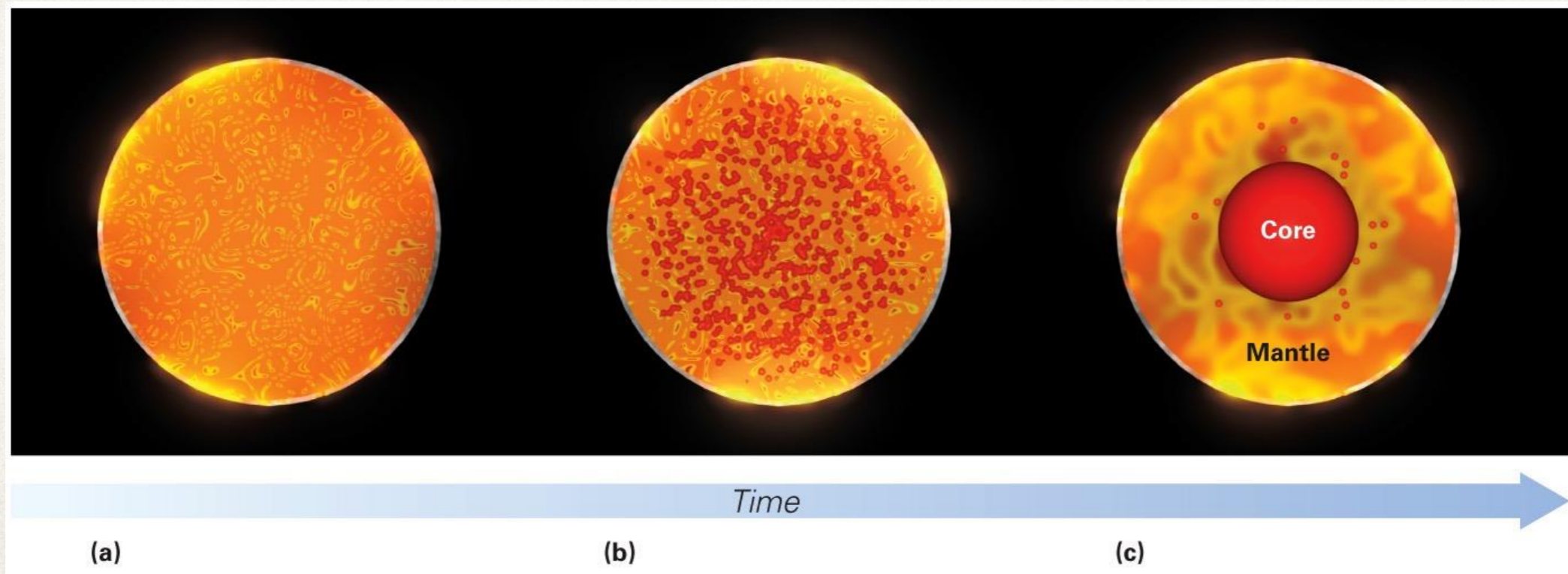
The Formation Solar Systems



The Solar Nebular Theory

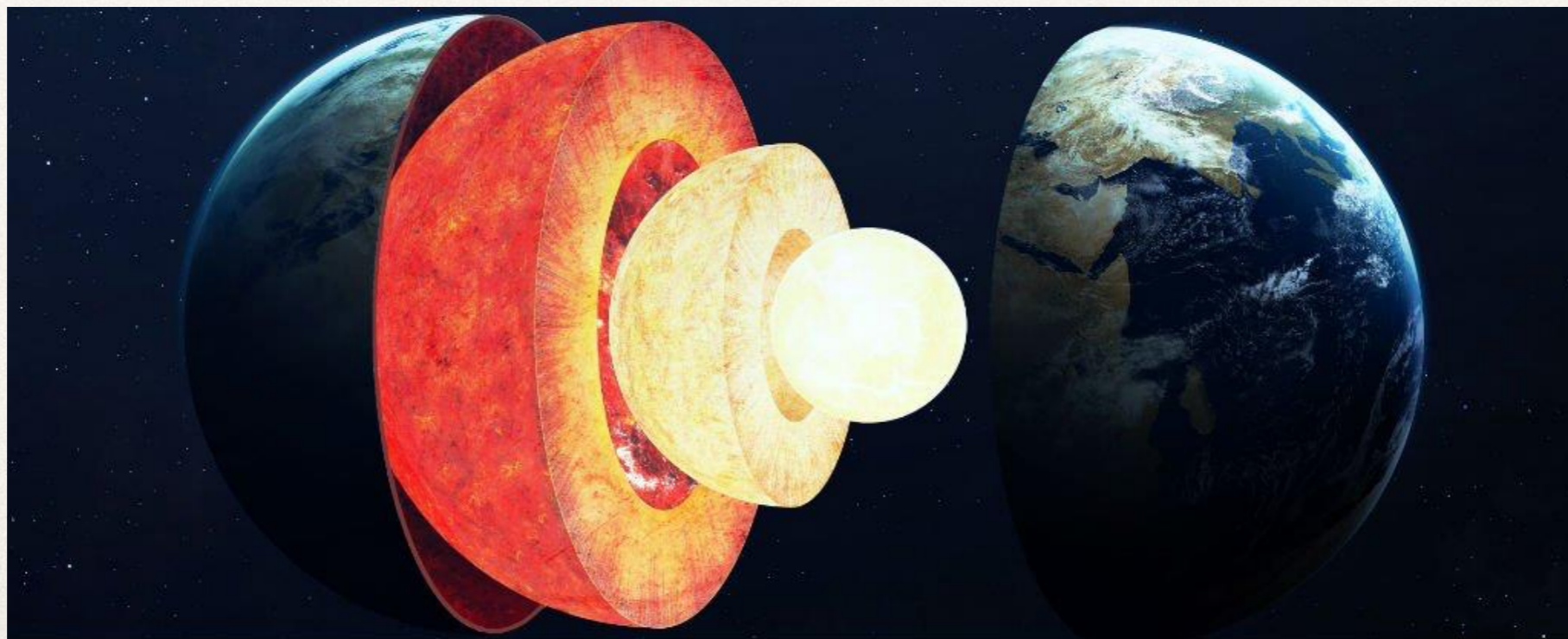
Differentiation of Earth

- ❖ Planetesimals clump into a lumpy protoplanet.
- ❖ The interior heats, softens, and forms a sphere.
- ❖ The interior differentiates into
 - ❖ A nickel-iron core, and
 - ❖ A stony (silicate) mantle.

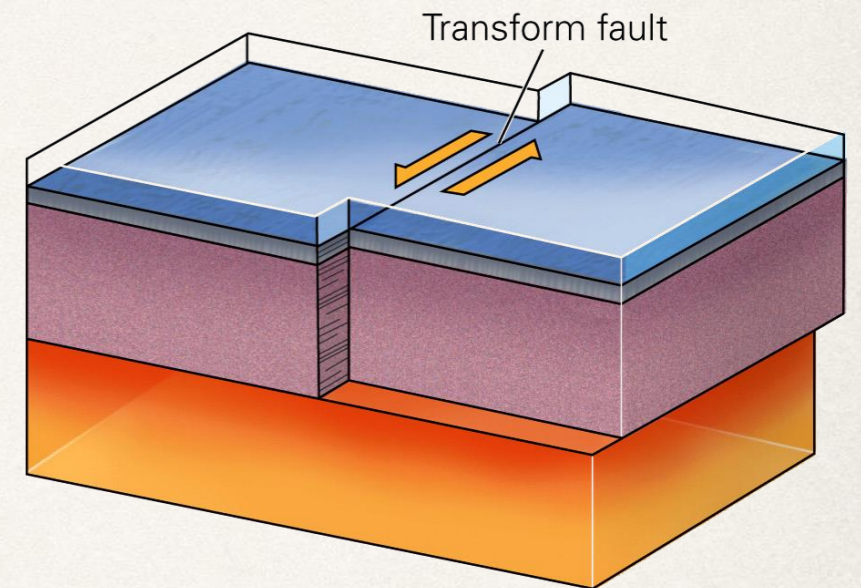
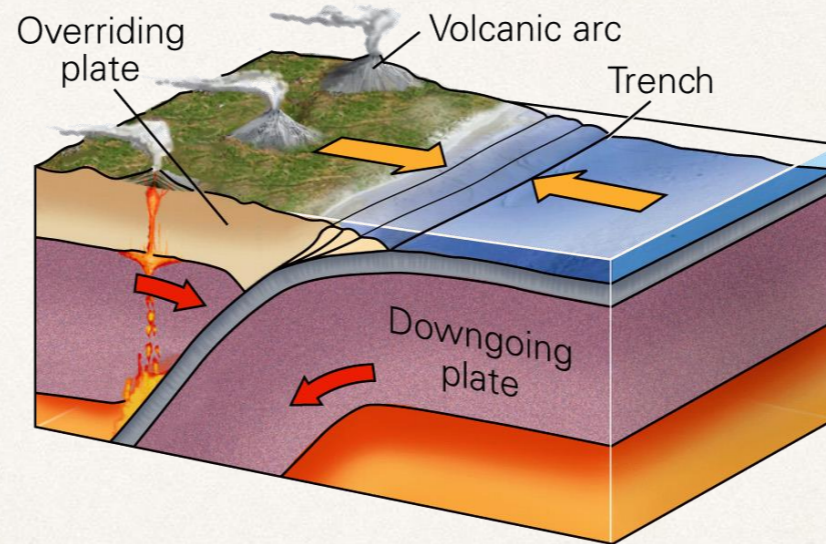
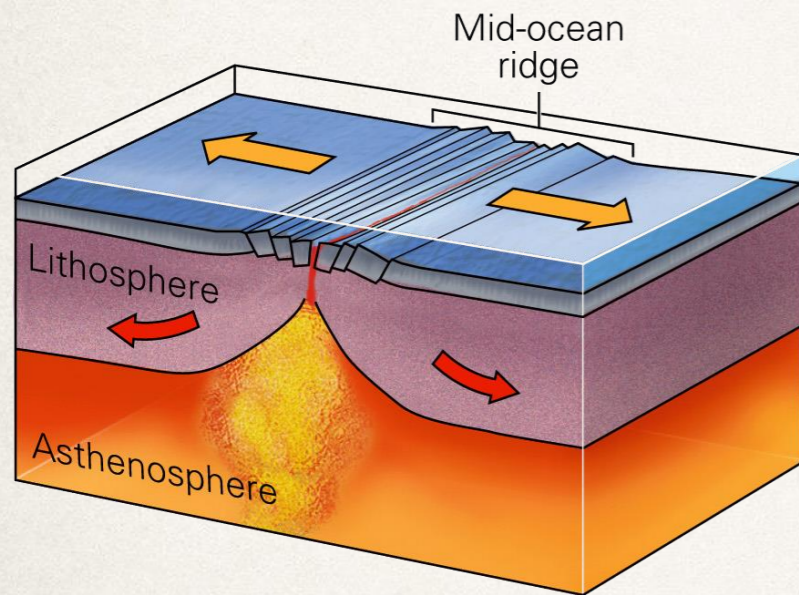


So how does the interior of our planet remain so hot?

- ❖ The interior of our planet is as hot as the surface of the sun.
- ❖ Left over energy from the Early Bombardment
- ❖ Radioactive decay



The Three Types of Plate Boundaries



Divergent plates move away from each other.

Convergent plates move toward each other.

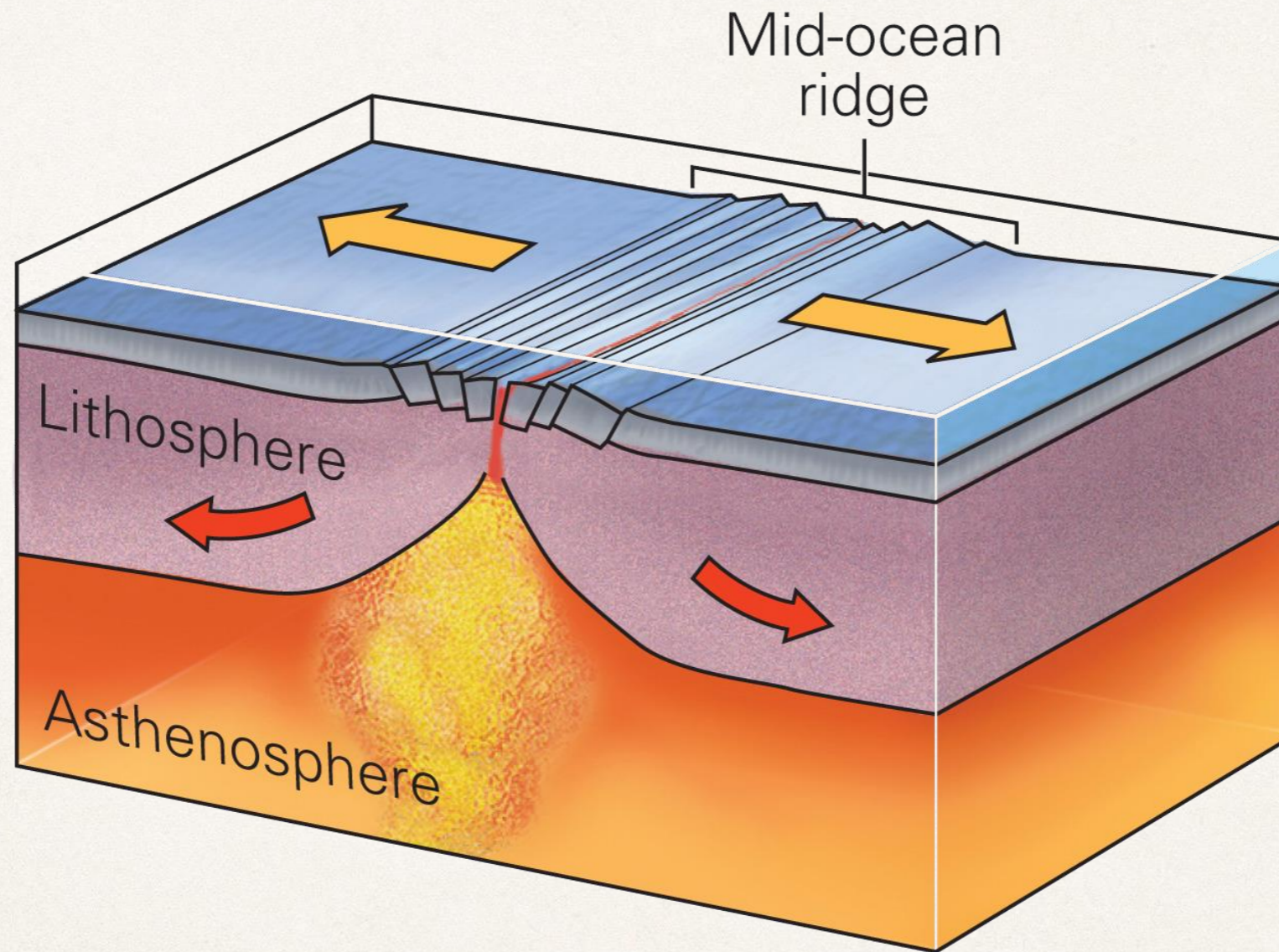
Transform plates move sideways past each other.

Tensional Stress

Compressional Stress

Sheer Stress

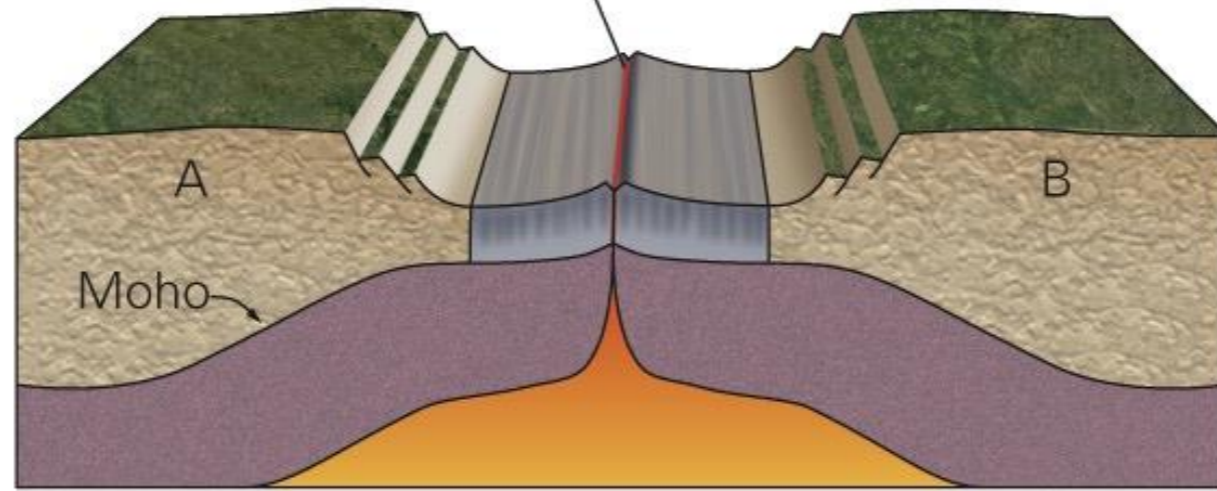
A Divergent-Plate Boundary



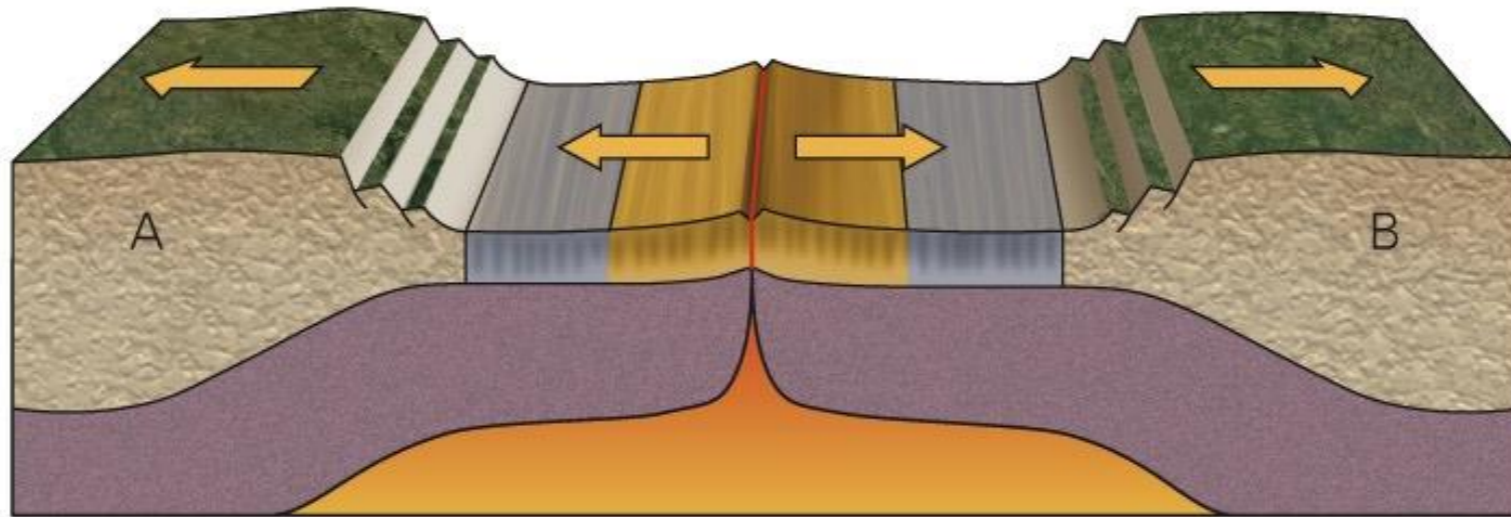
Time 1

Mid-ocean ridge

Not to scale



Time 2

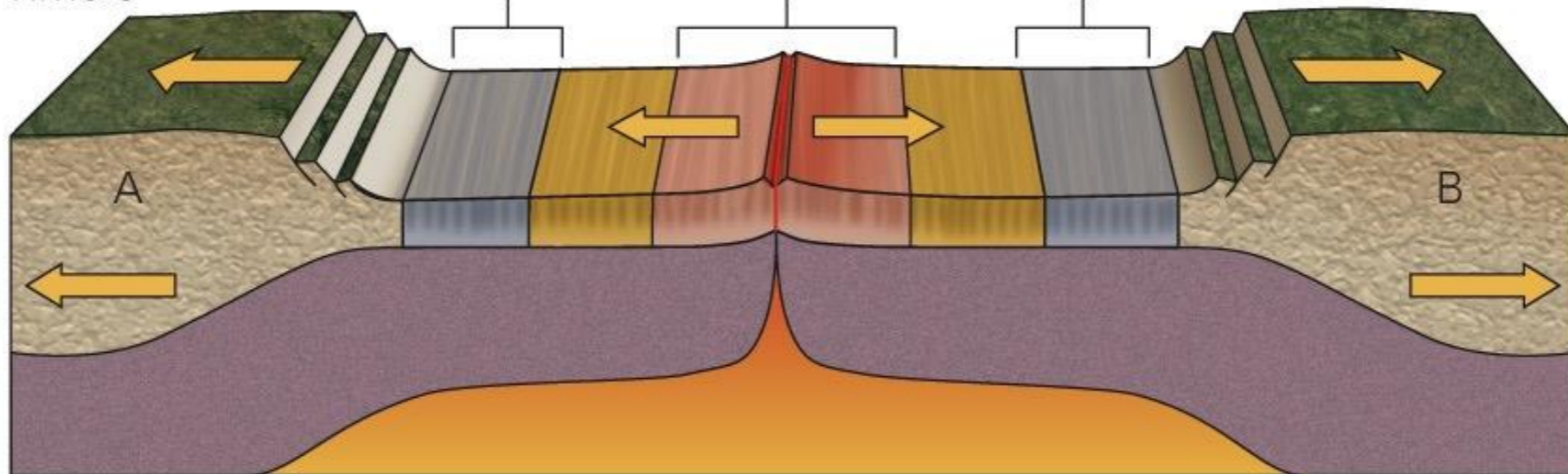


Time 3

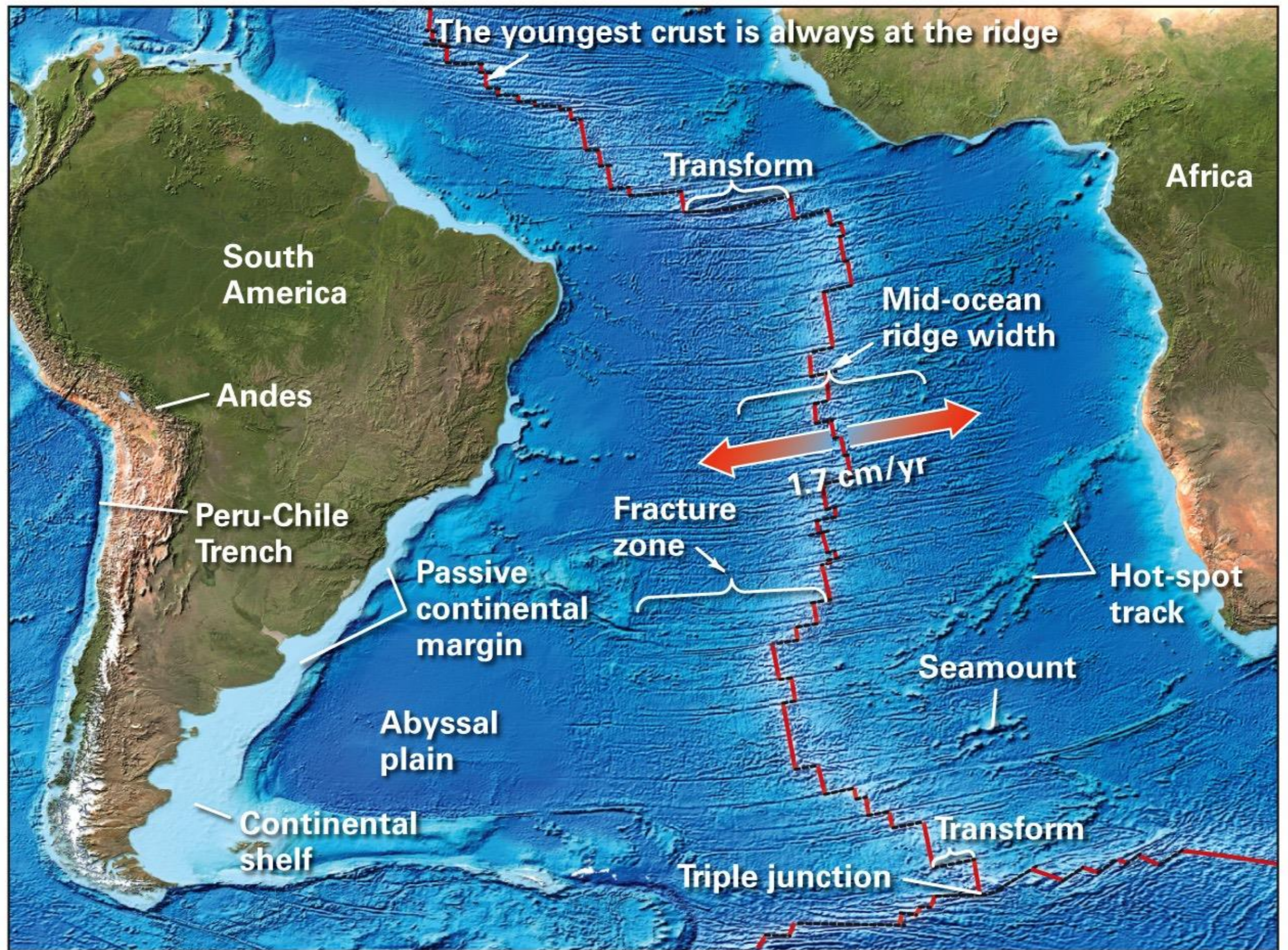
Oldest ocean floor

Youngest ocean floor

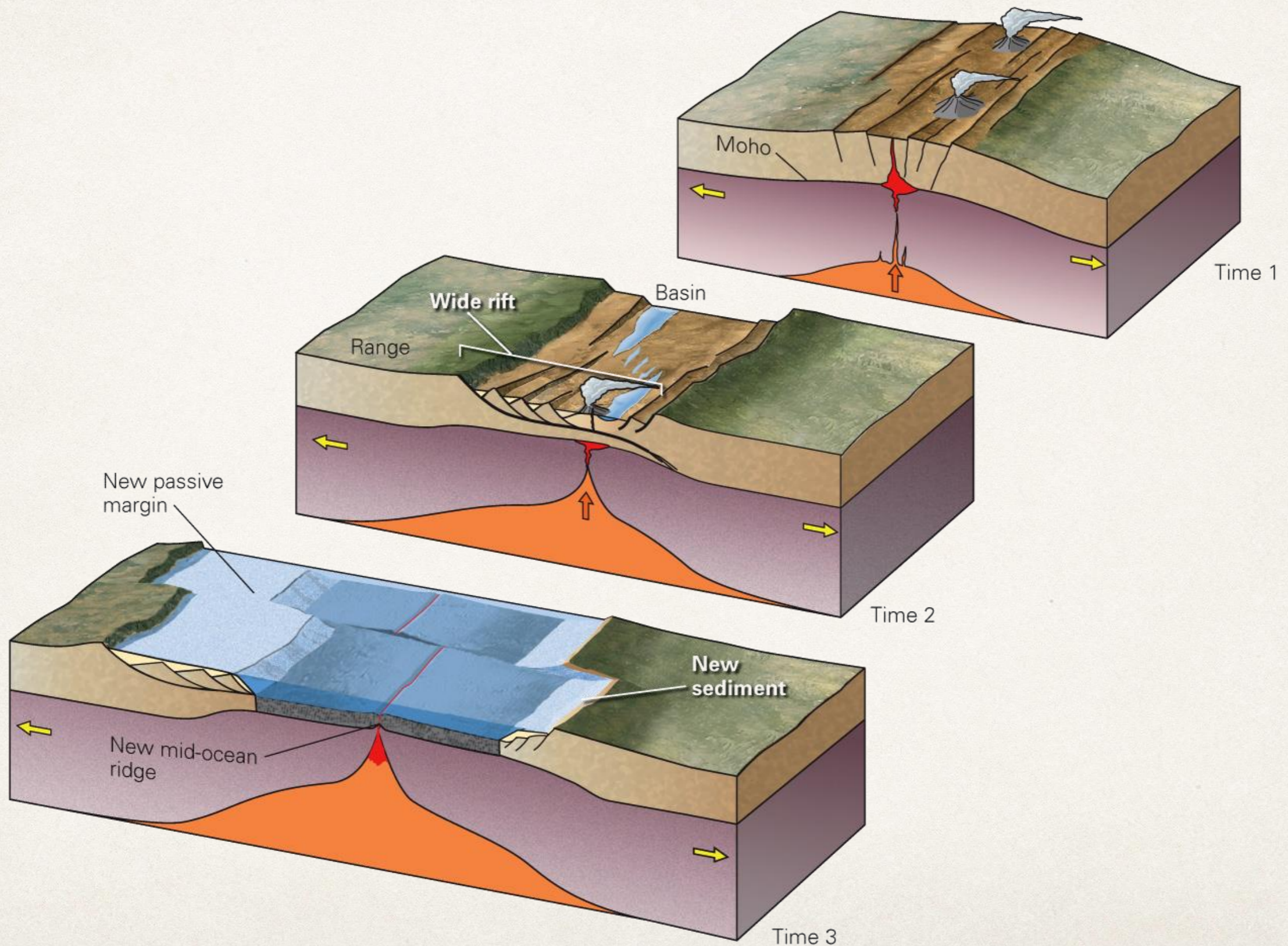
Oldest ocean floor



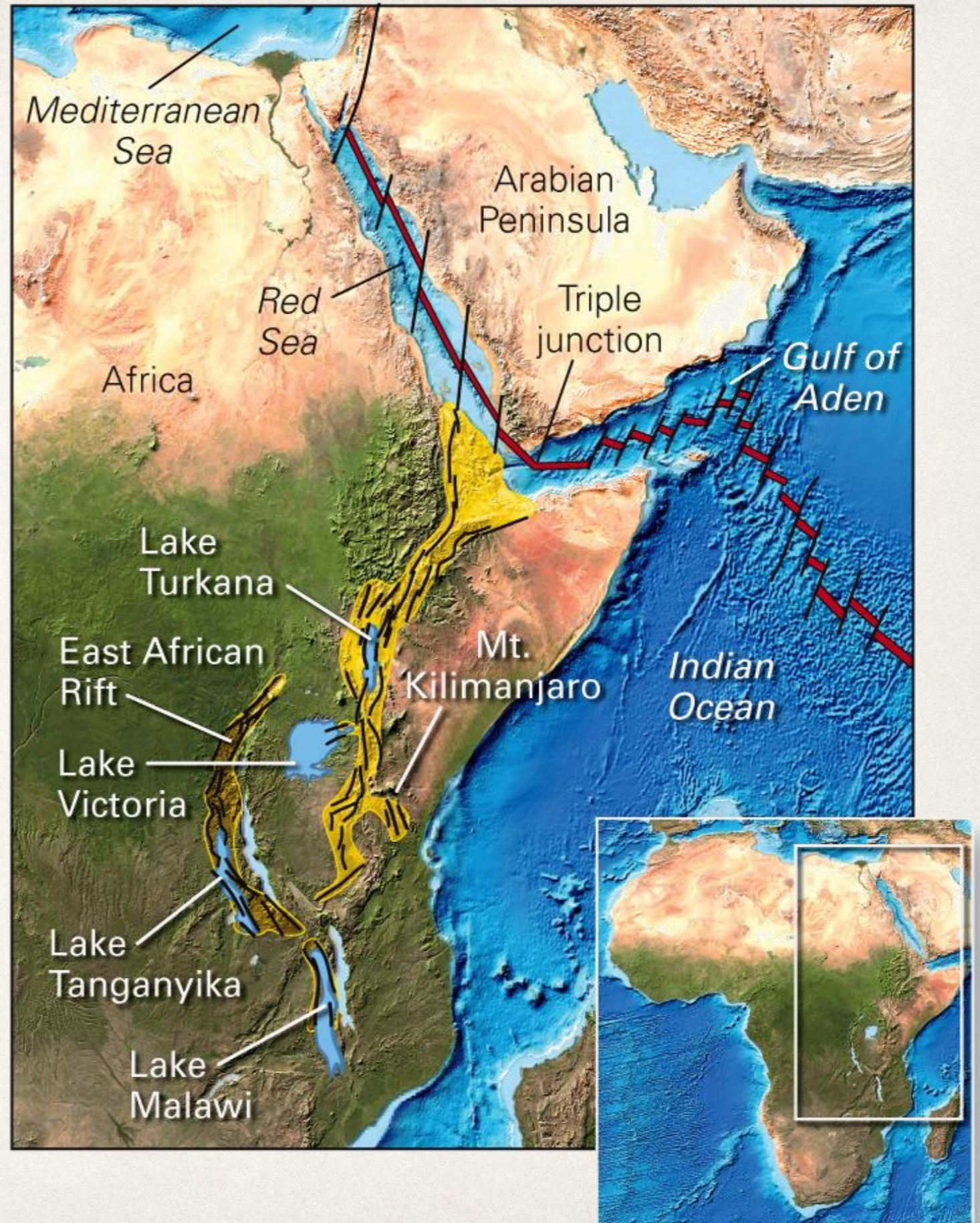
Mid-Ocean Ridge



The Process of Rifting

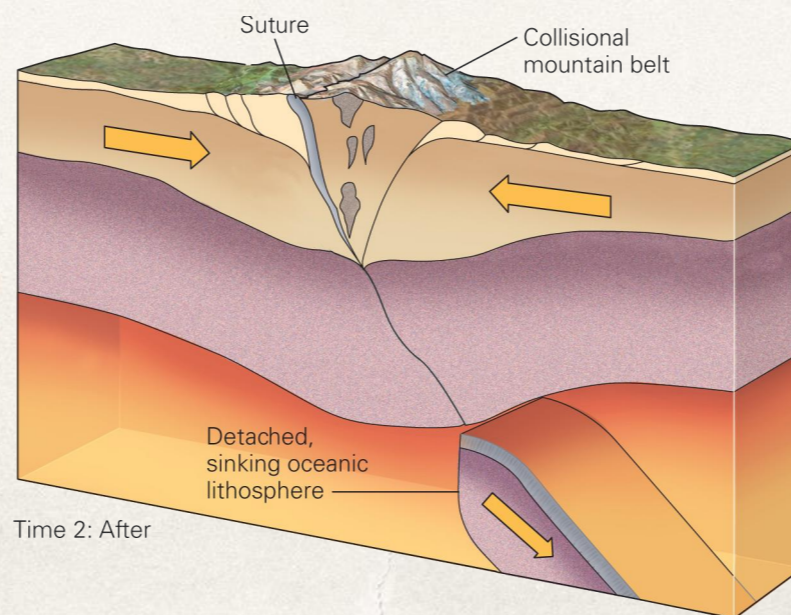
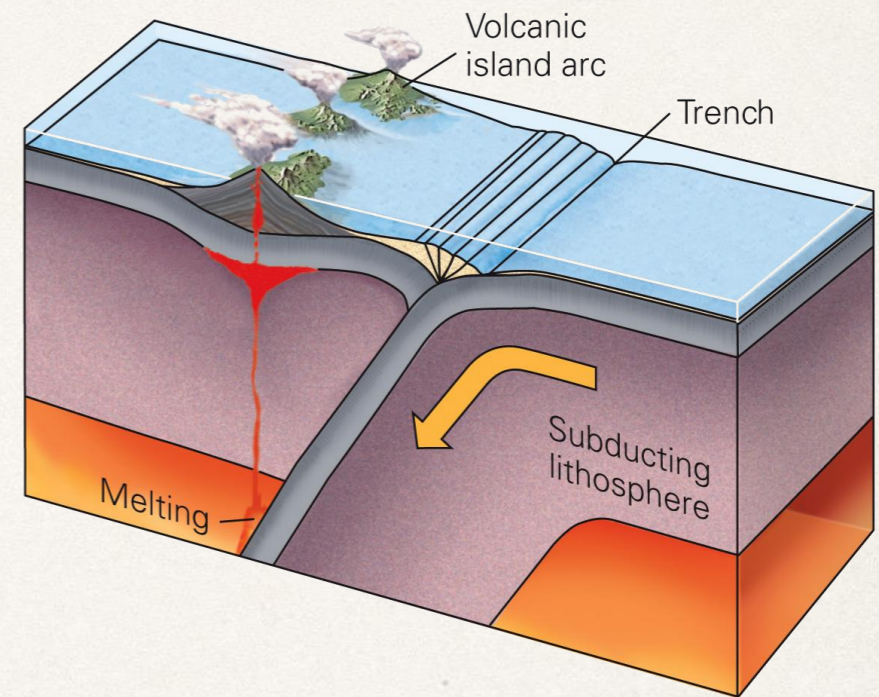
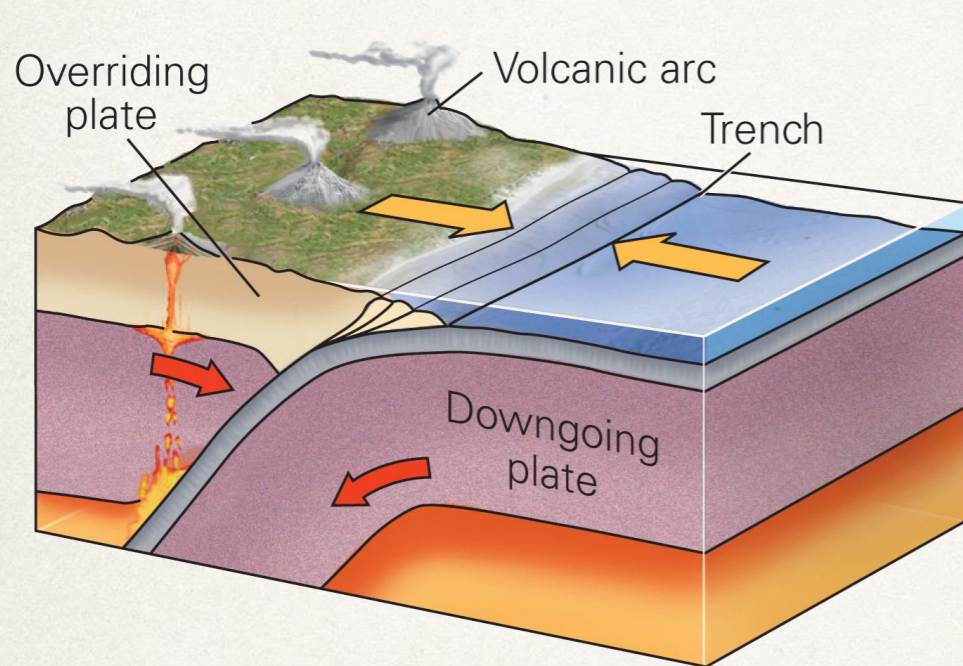


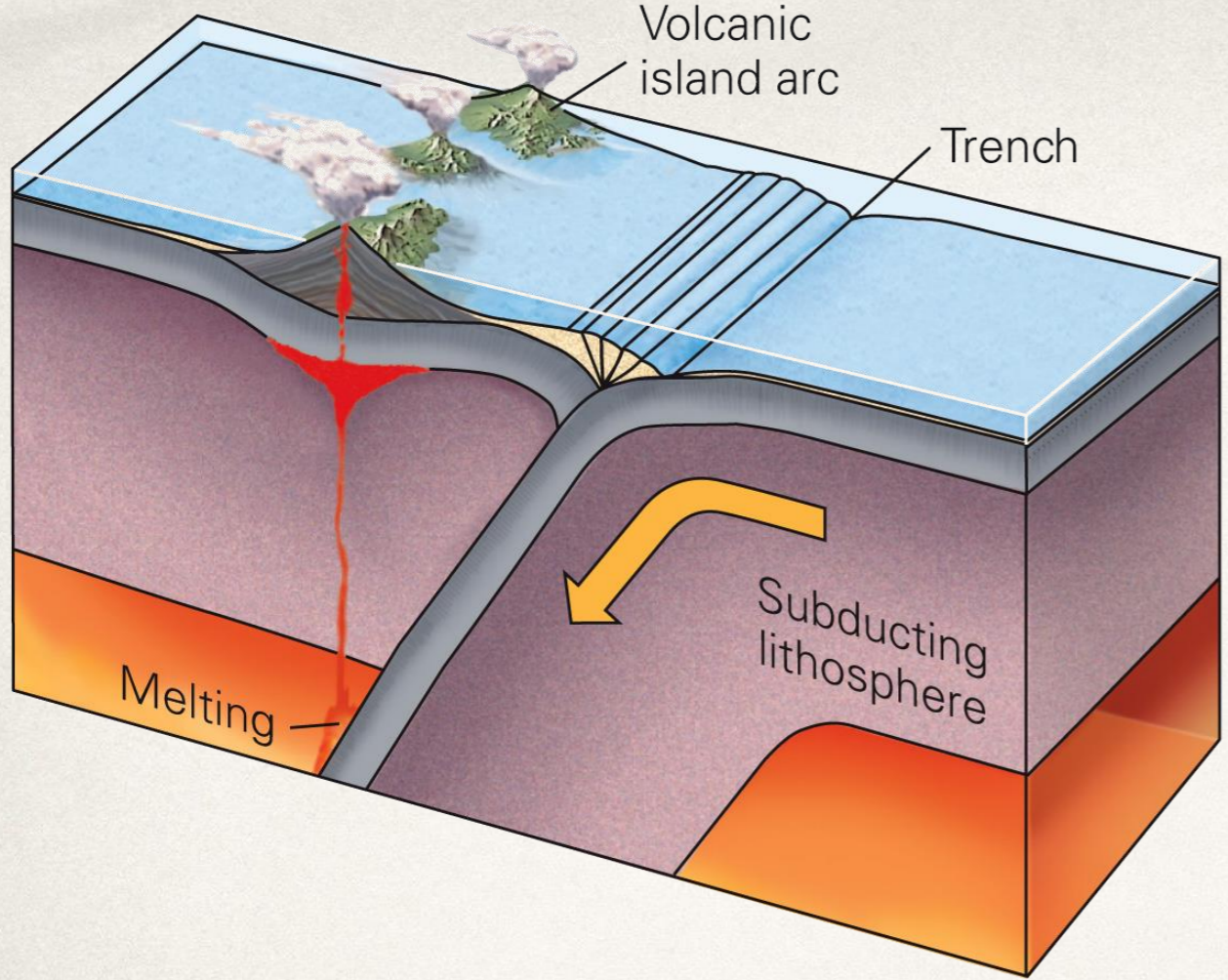
The East African Rift is an active rift. The Red Sea started as a rift, but it evolved into a narrow ocean basin; the rift axis became a mid-ocean ridge.



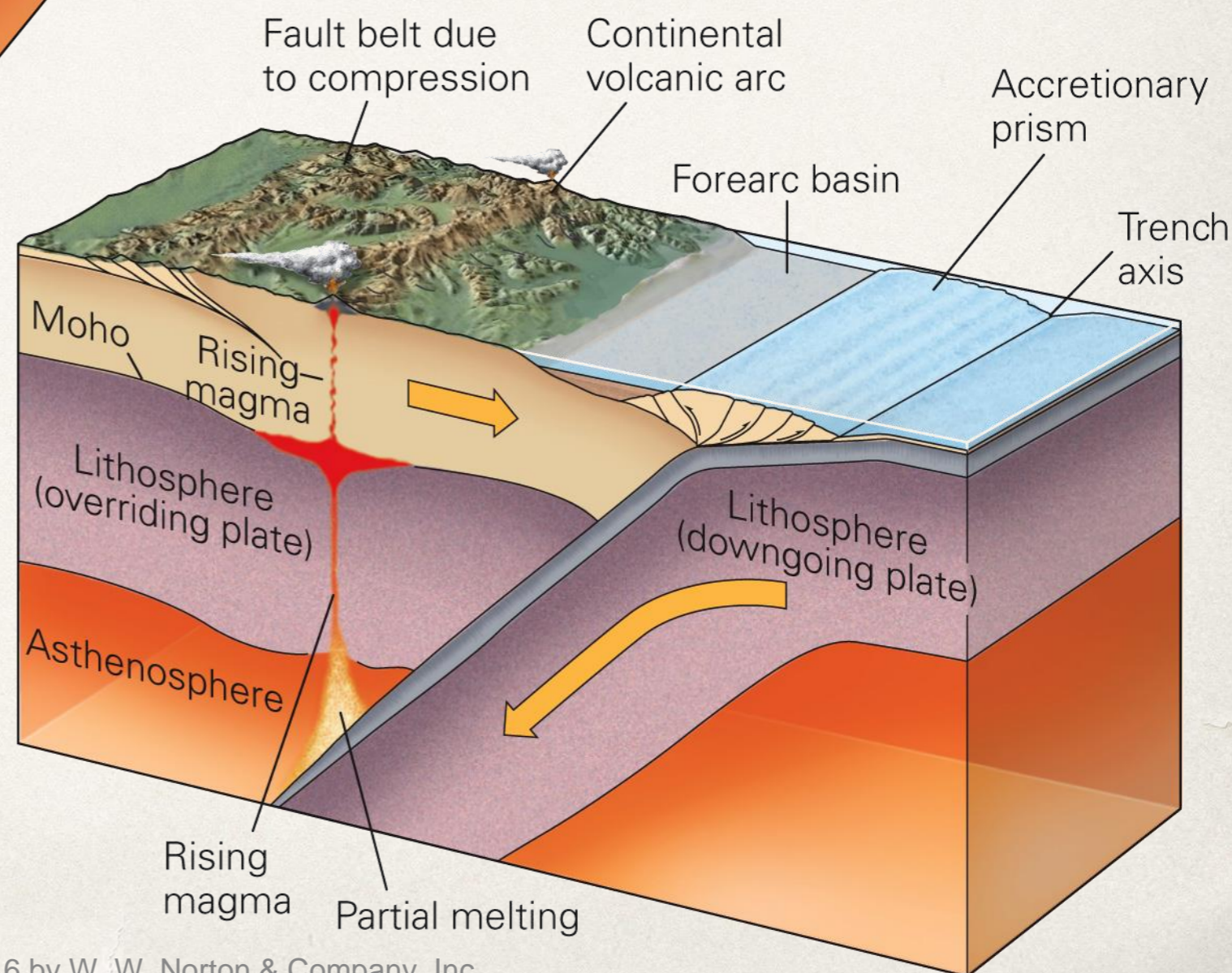
A Convergent-Plate Boundary

There are 3 Types of Convergent Plate Boundaries



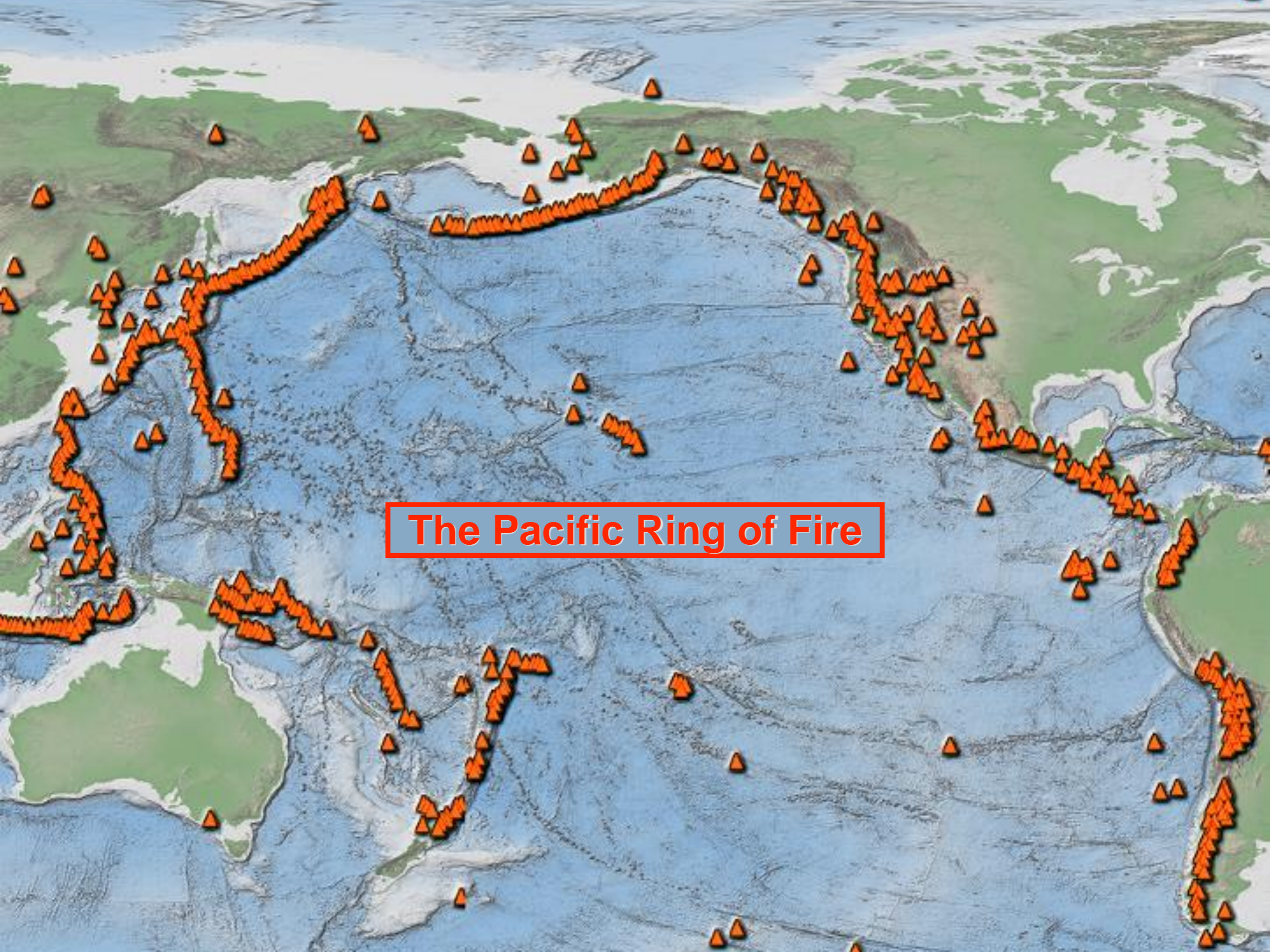


Ocean to Ocean
Convergence



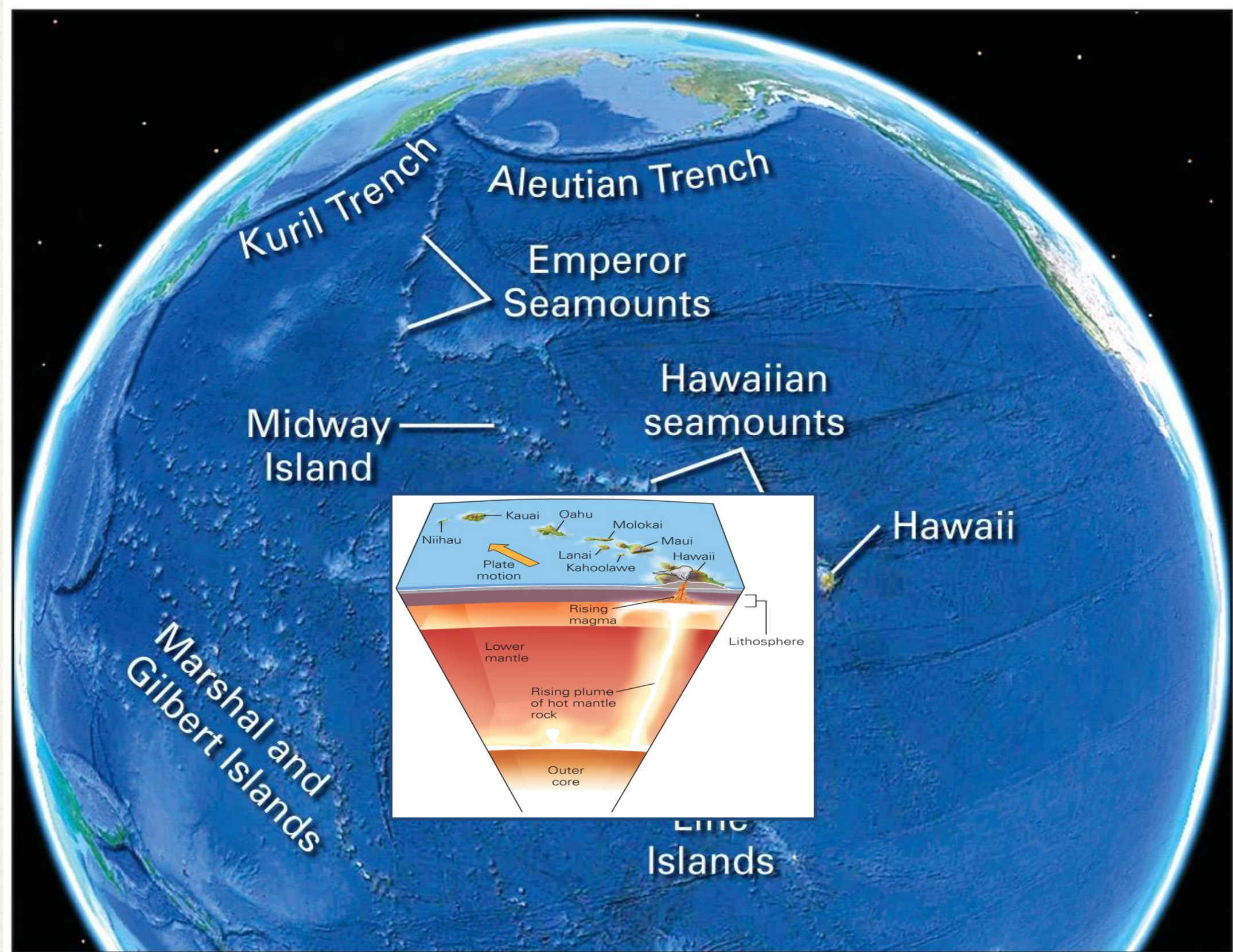
Ocean to Continent
Convergence



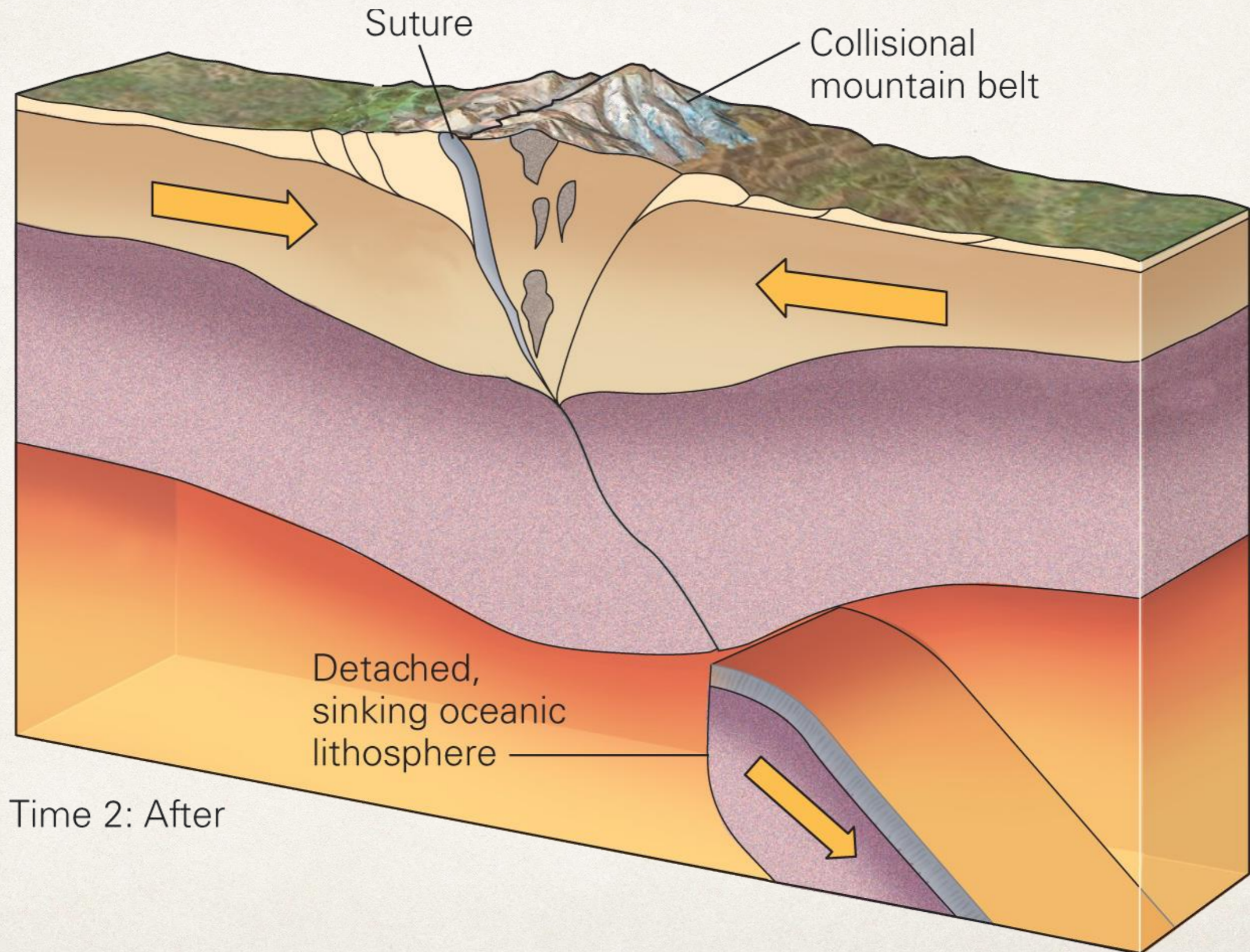


The Pacific Ring of Fire

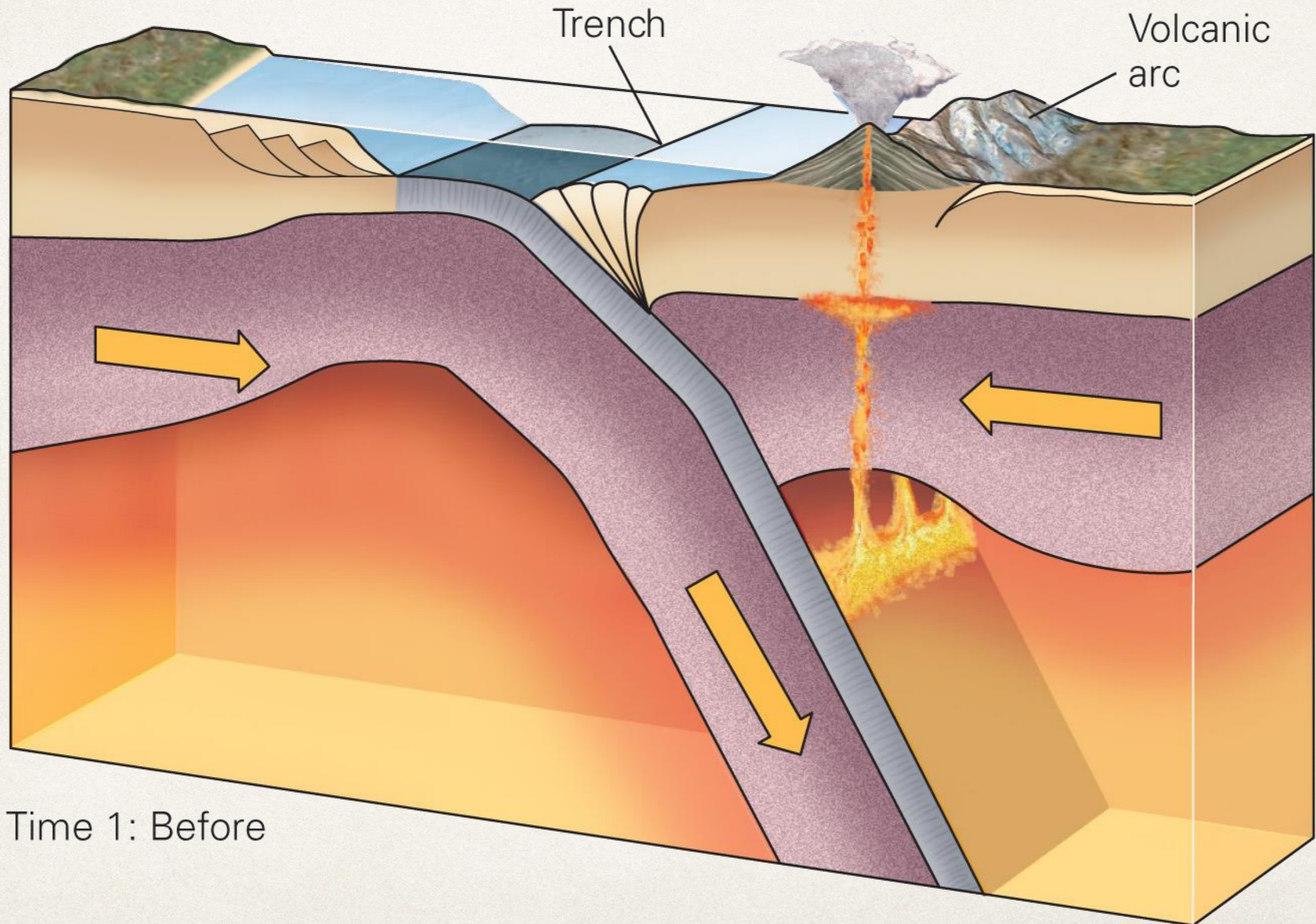
Sooooo . . . What about Hawaii?



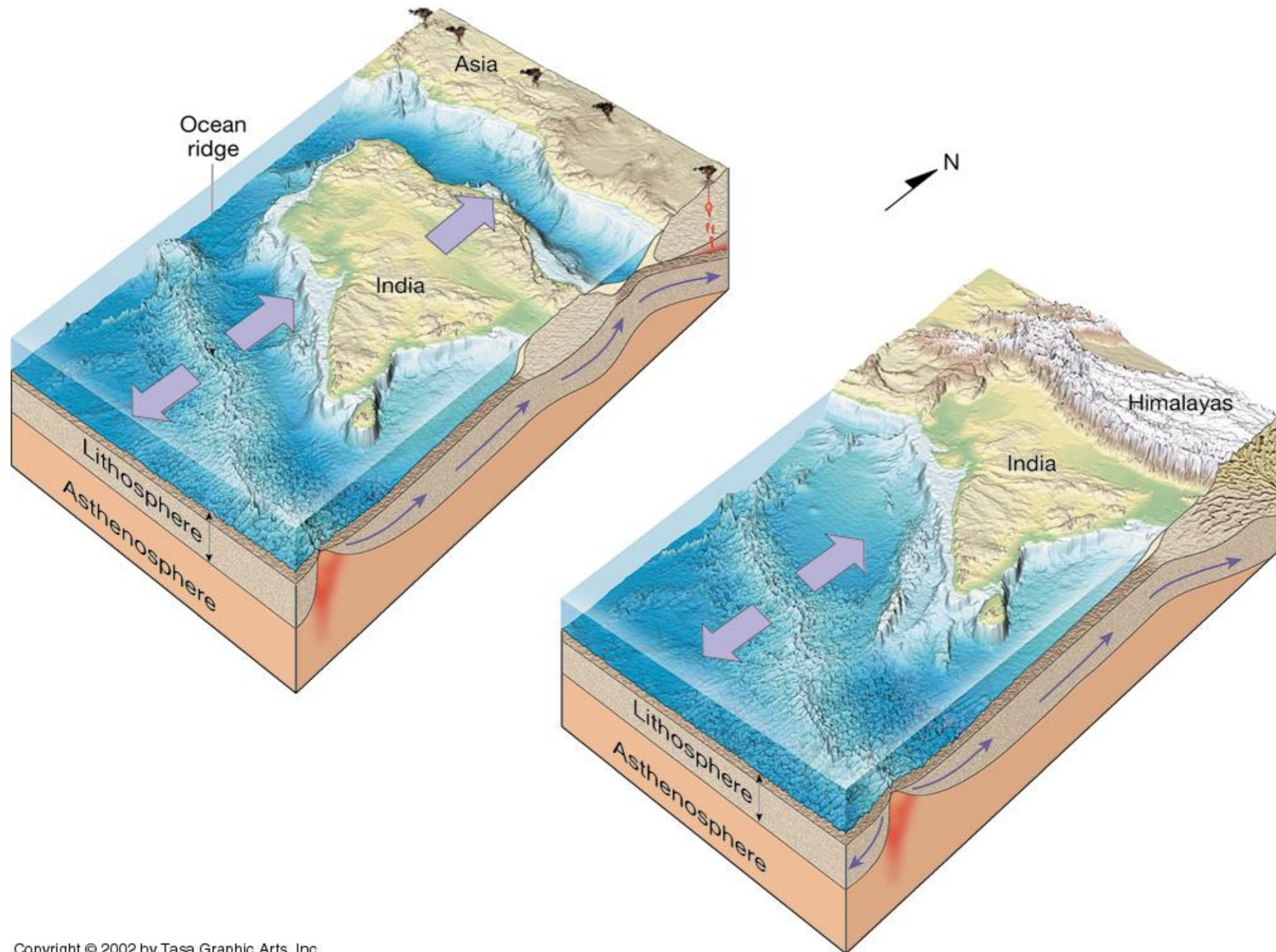
Continental Collision



Continental Collision



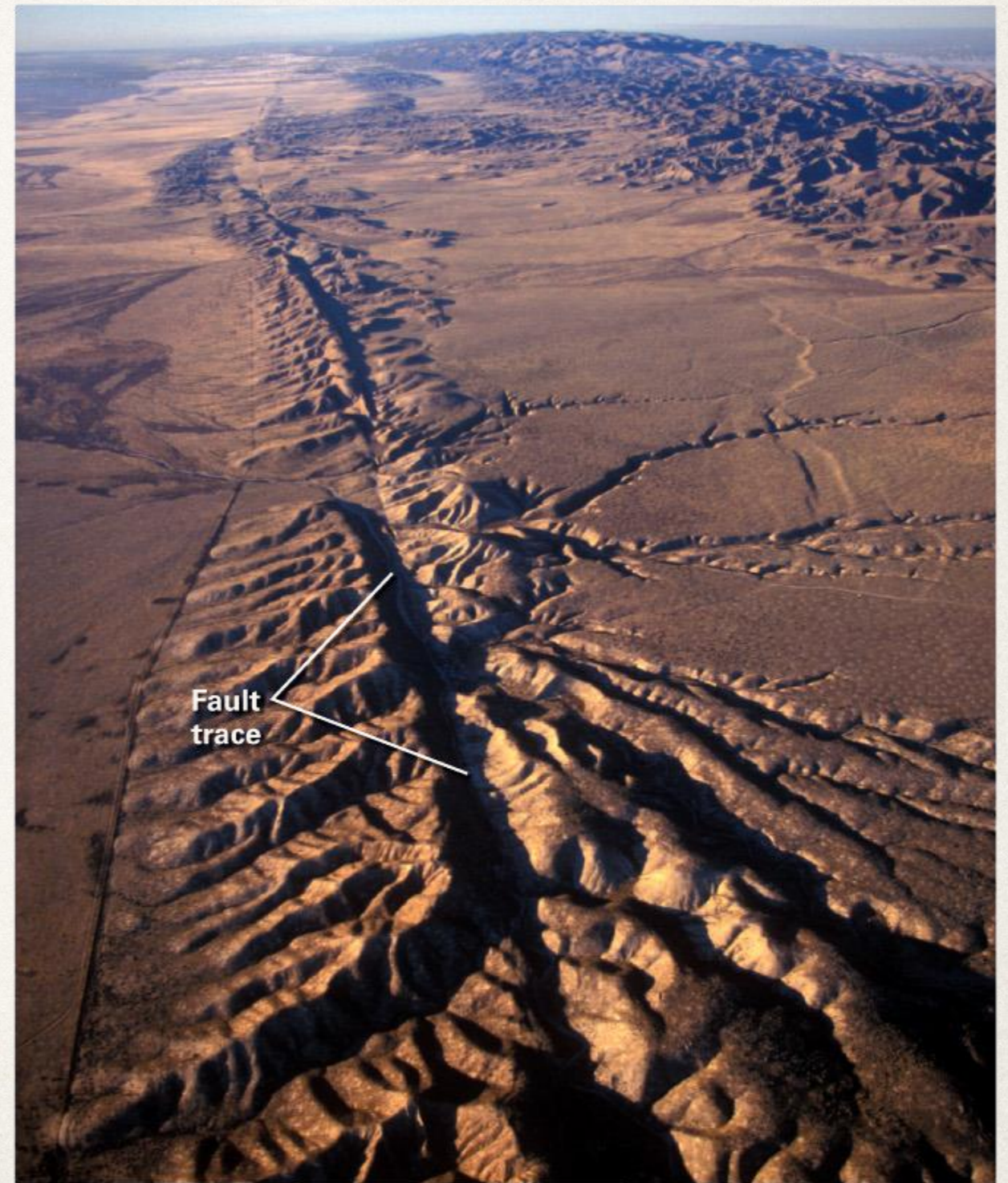
Continent-Continent collision



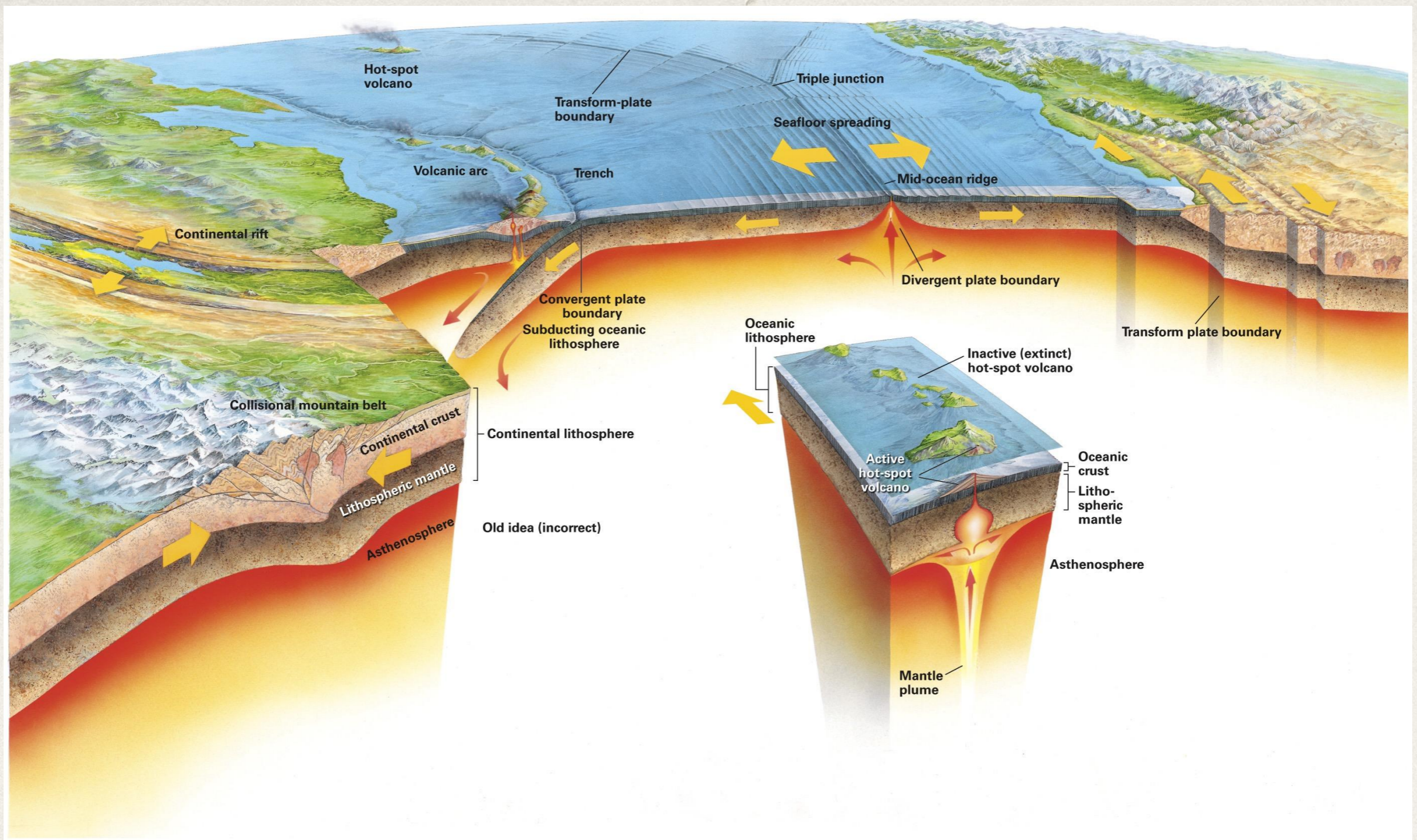
Last Type of Plate Boundary: Transform Boundaries



(a)

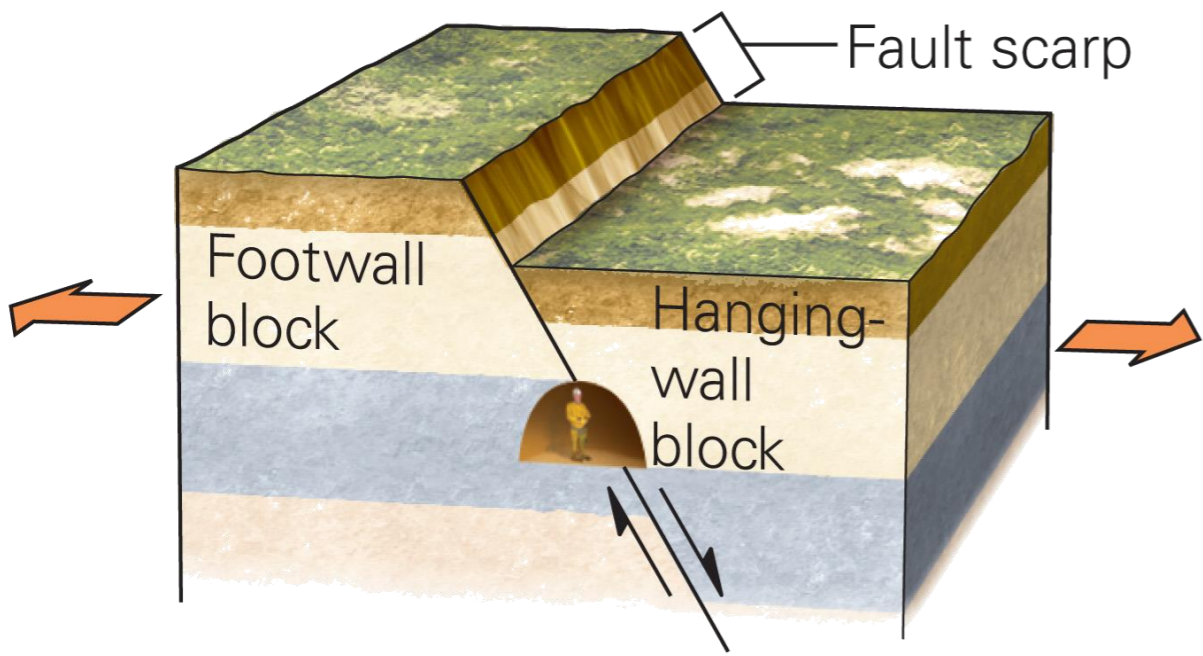


(b)

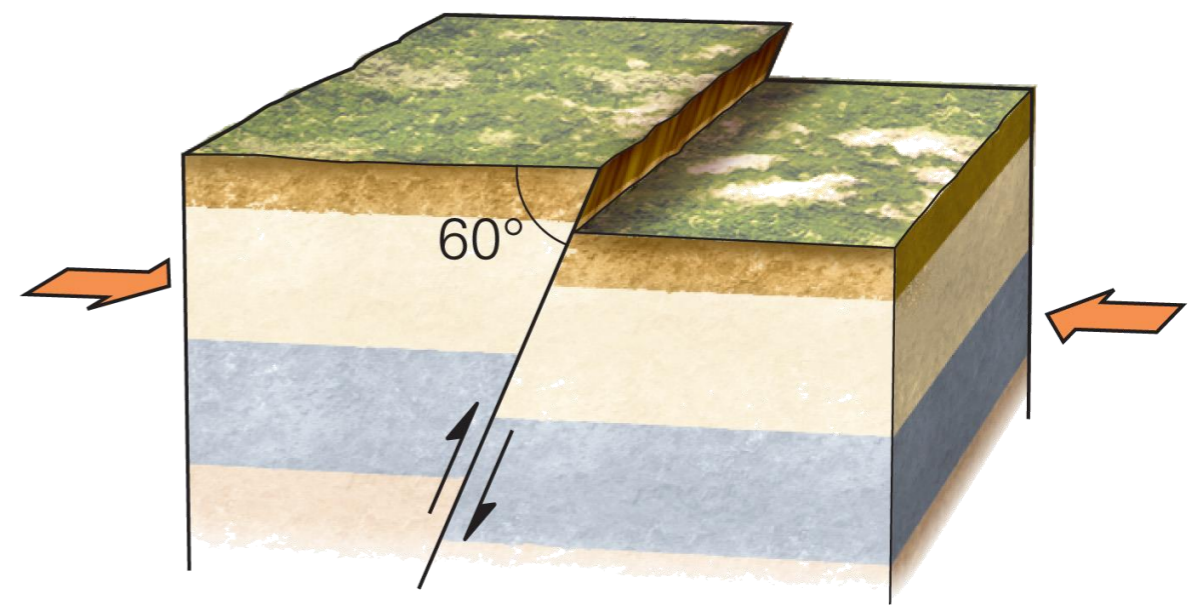


This diagram summarizes plate-tectonic interactions on Earth, including divergent-plate, convergent-plate, and transform-plate boundaries, as well as the mantle plume hot spots not tied to plate motion.

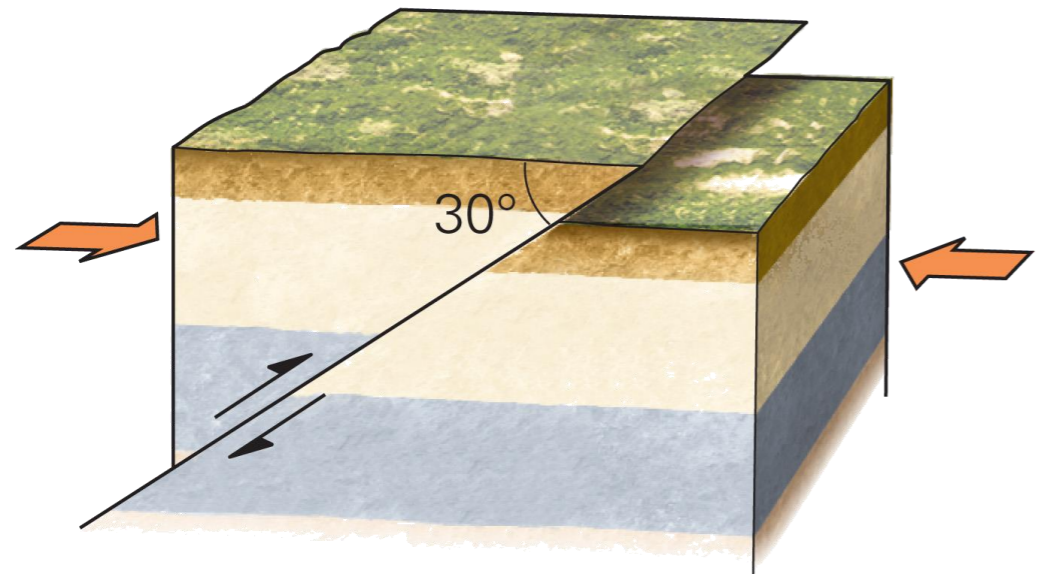
Normal Fault



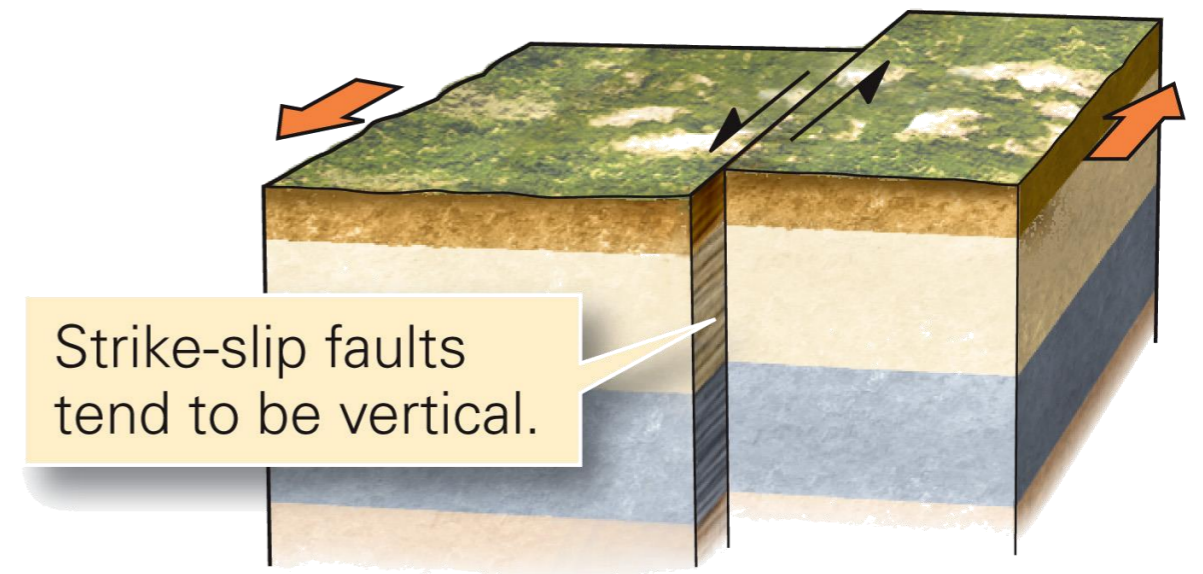
Reverse Fault



Reverse Thrust Fault



Strike-Slip



Kodiak Alaska 7.9 (January 23)

