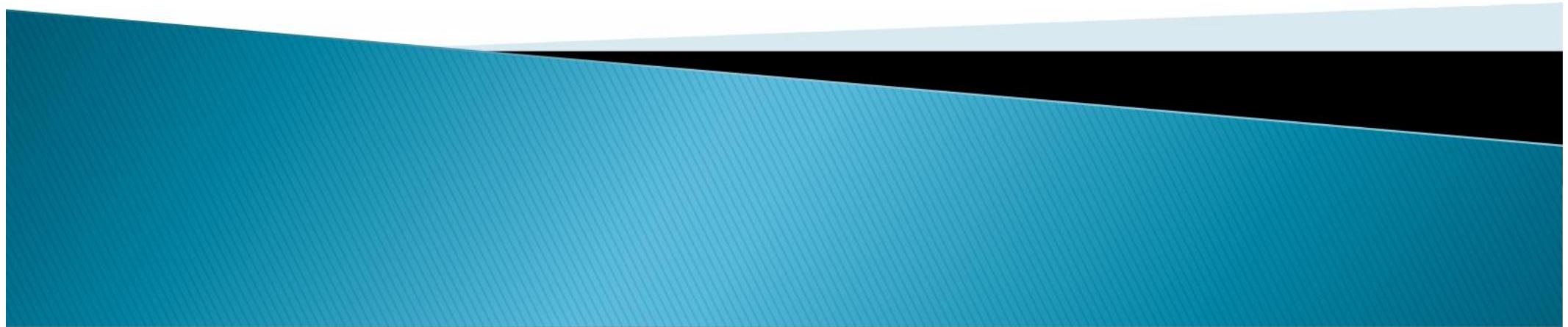
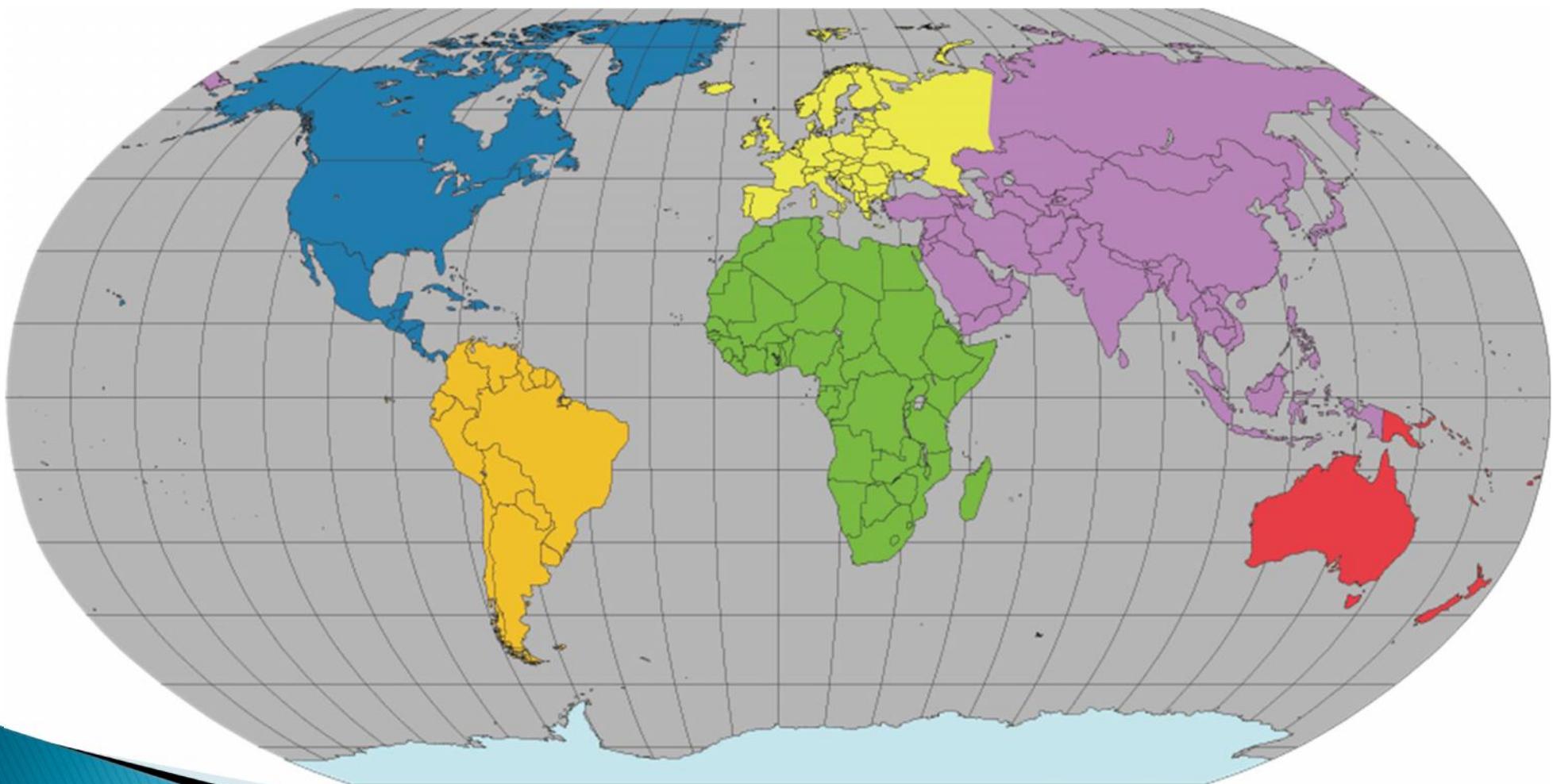


PLATE TECTONICS

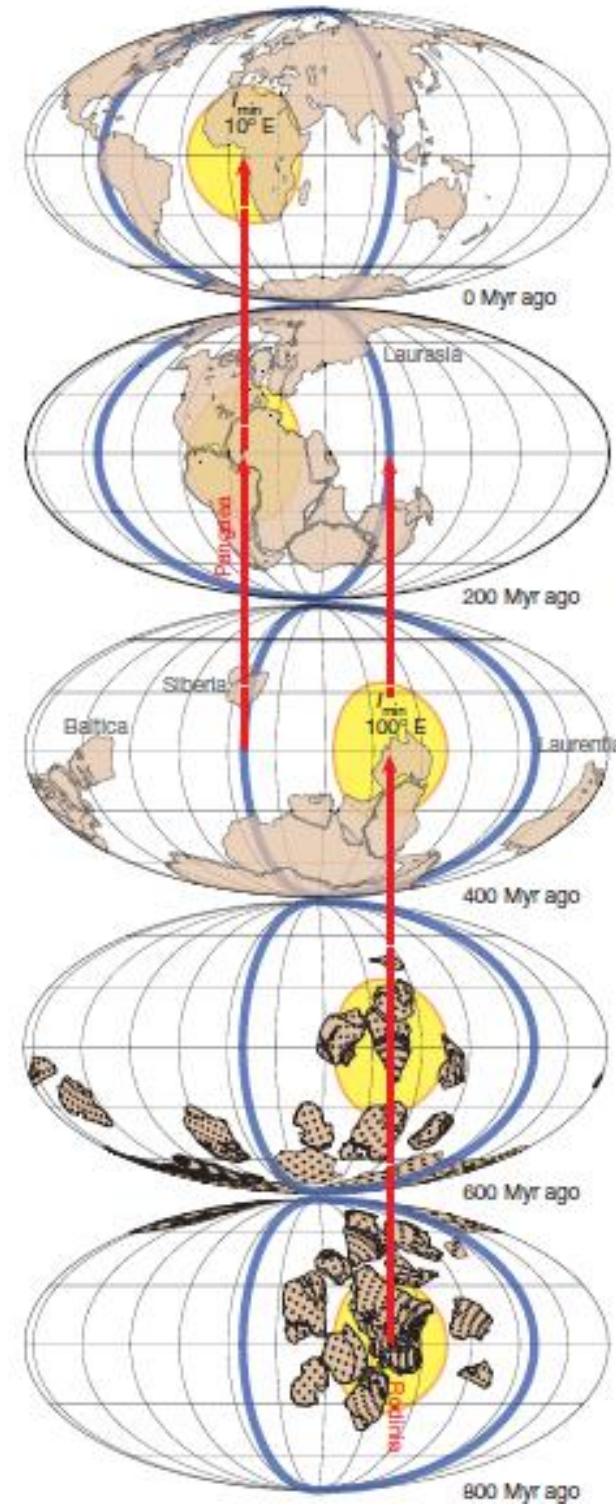
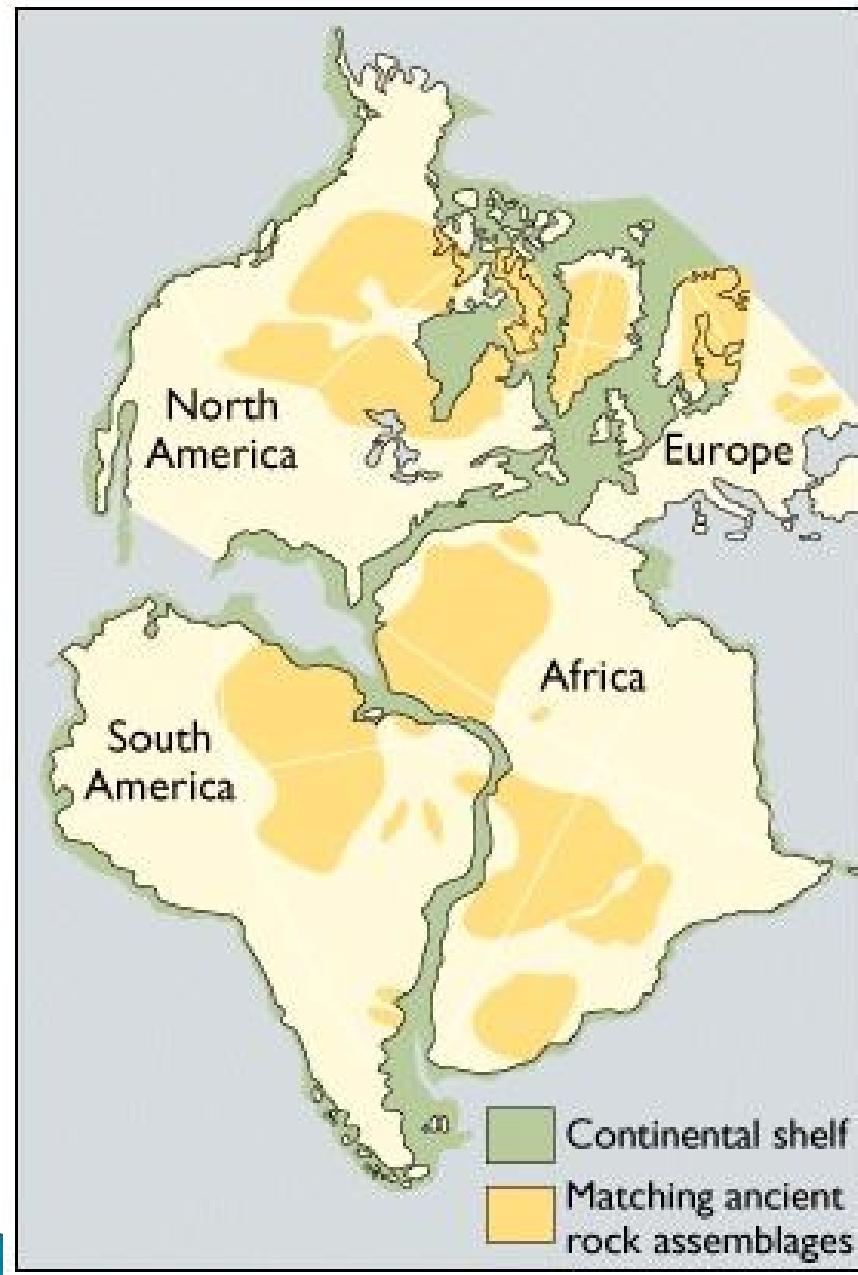


EARTH – TODAY

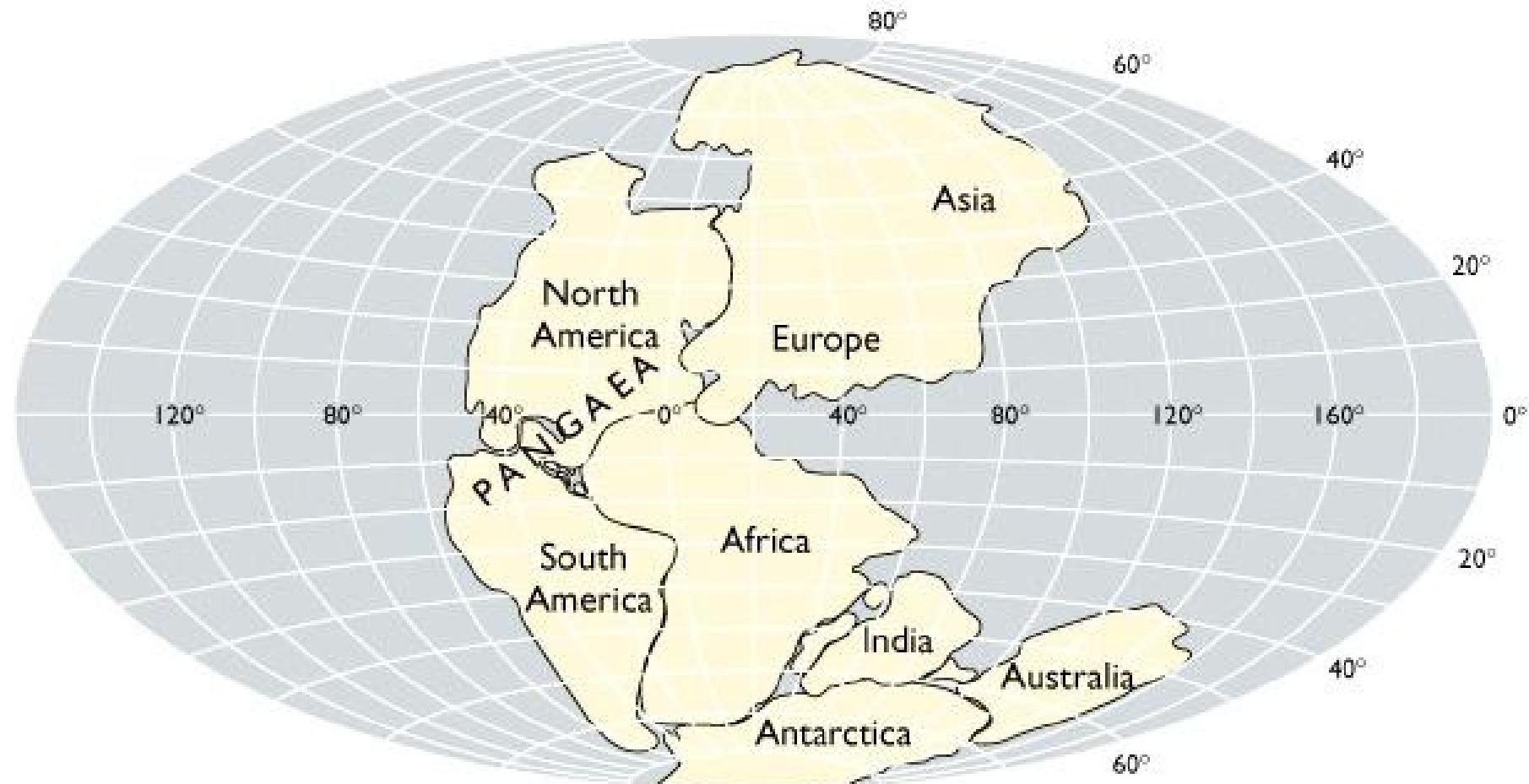


EARTH - JIGSAW





PANGAEA



From about 300-200 million years ago (late Paleozoic Era until the very late Triassic), the continent we now know as North America was contiguous with Africa, South America, and Europe. They all existed as a single continent called Pangea.

WELL, WELL,
WELL... WE
WERE
COUSINS!!

AFRICA



SOUTH AMERICA



Fossil remains of
Cynognathus, a
Triassic land reptile
approximately
3 m long.

INDIA



Fossil evidence
of the Triassic
land reptile
Lystrosaurus.

ANTARCTICA



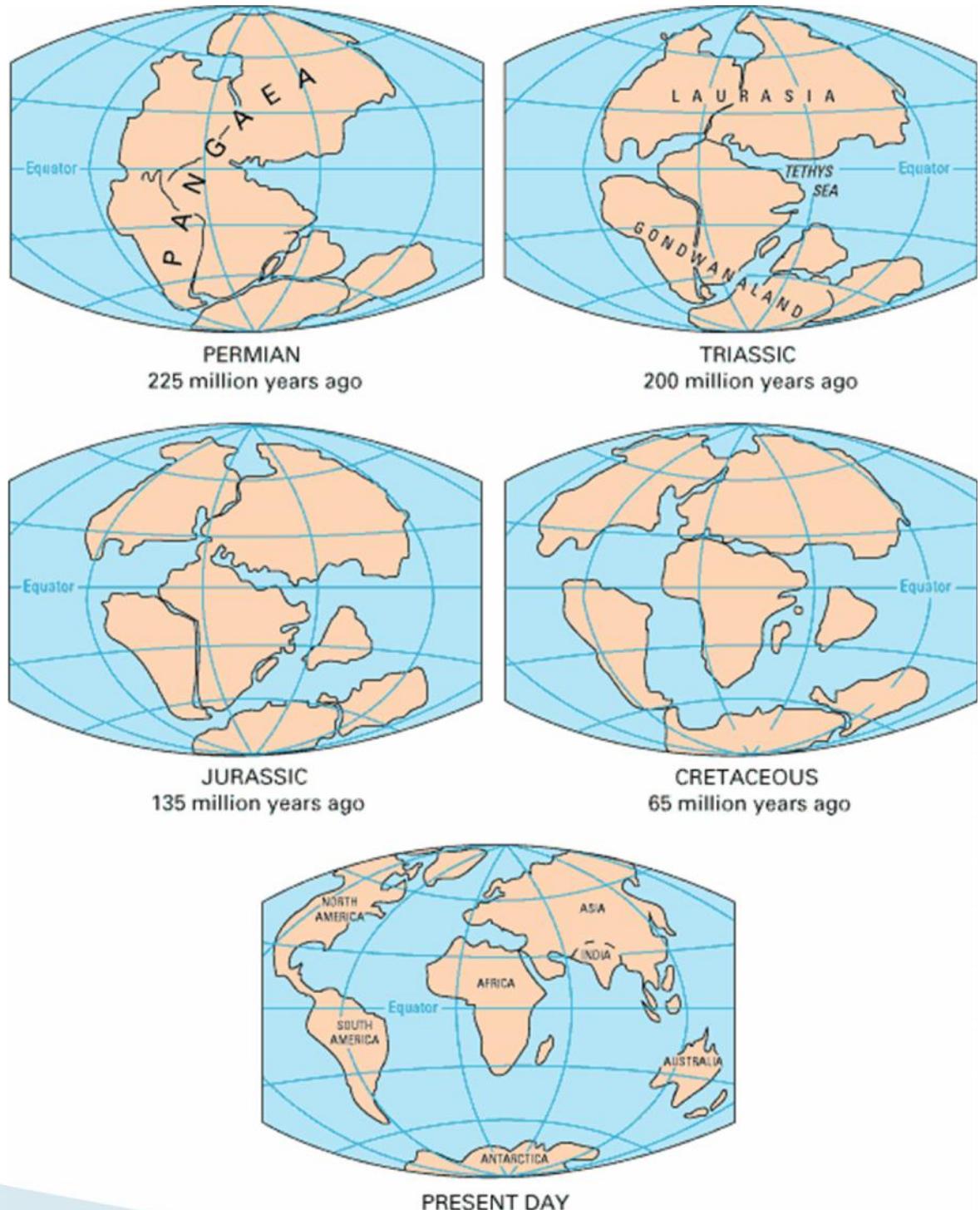
AUSTRALIA

Fossils of the fern
Glossopteris, found
in all of the southern
continents, show that
they were once joined.

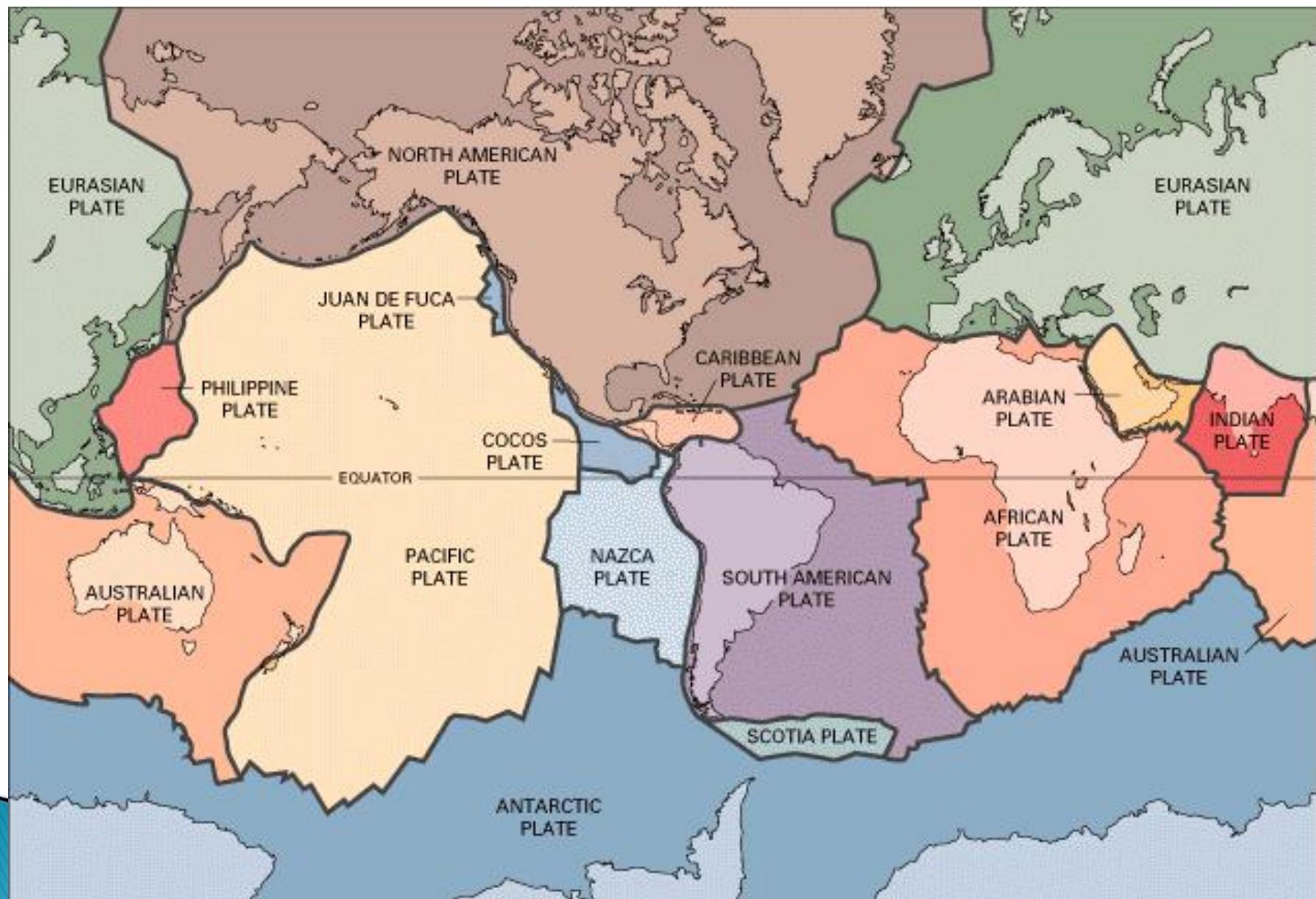


Fossil remains of the
freshwater reptile
Mesosaurus.

OOPS... PANGAEA BREAKS UP



12 TECTONIC PLATES



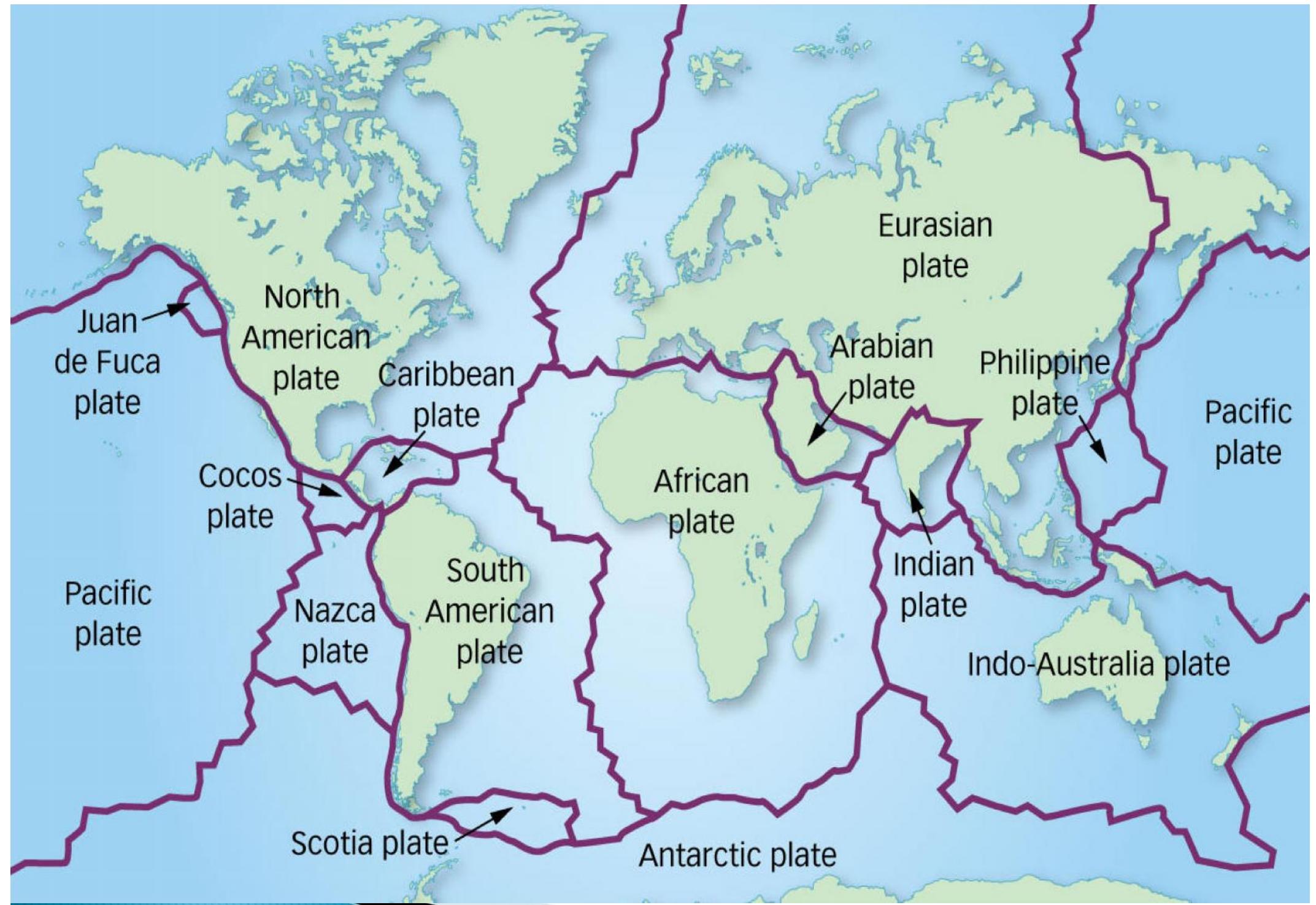
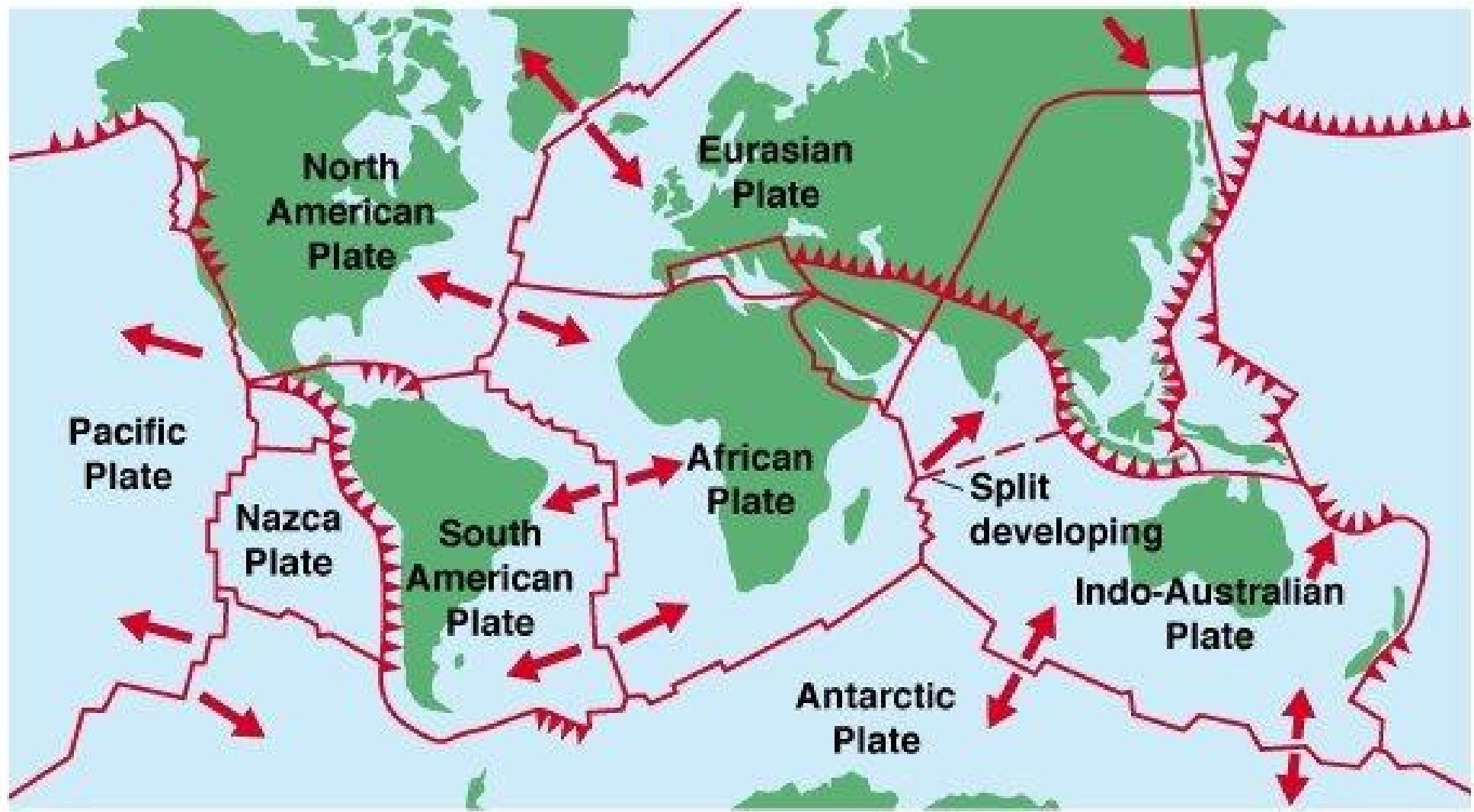
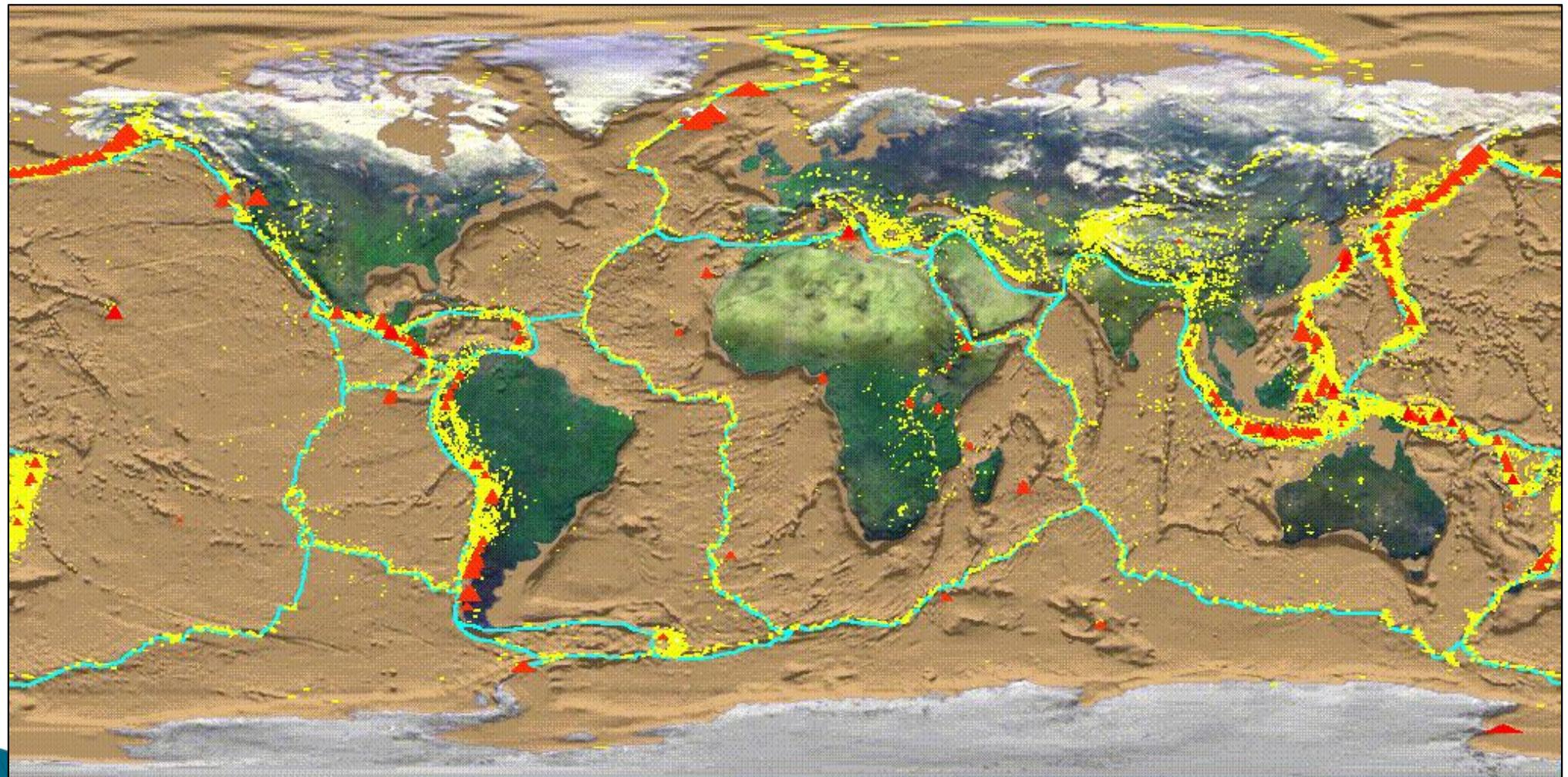


Plate movements

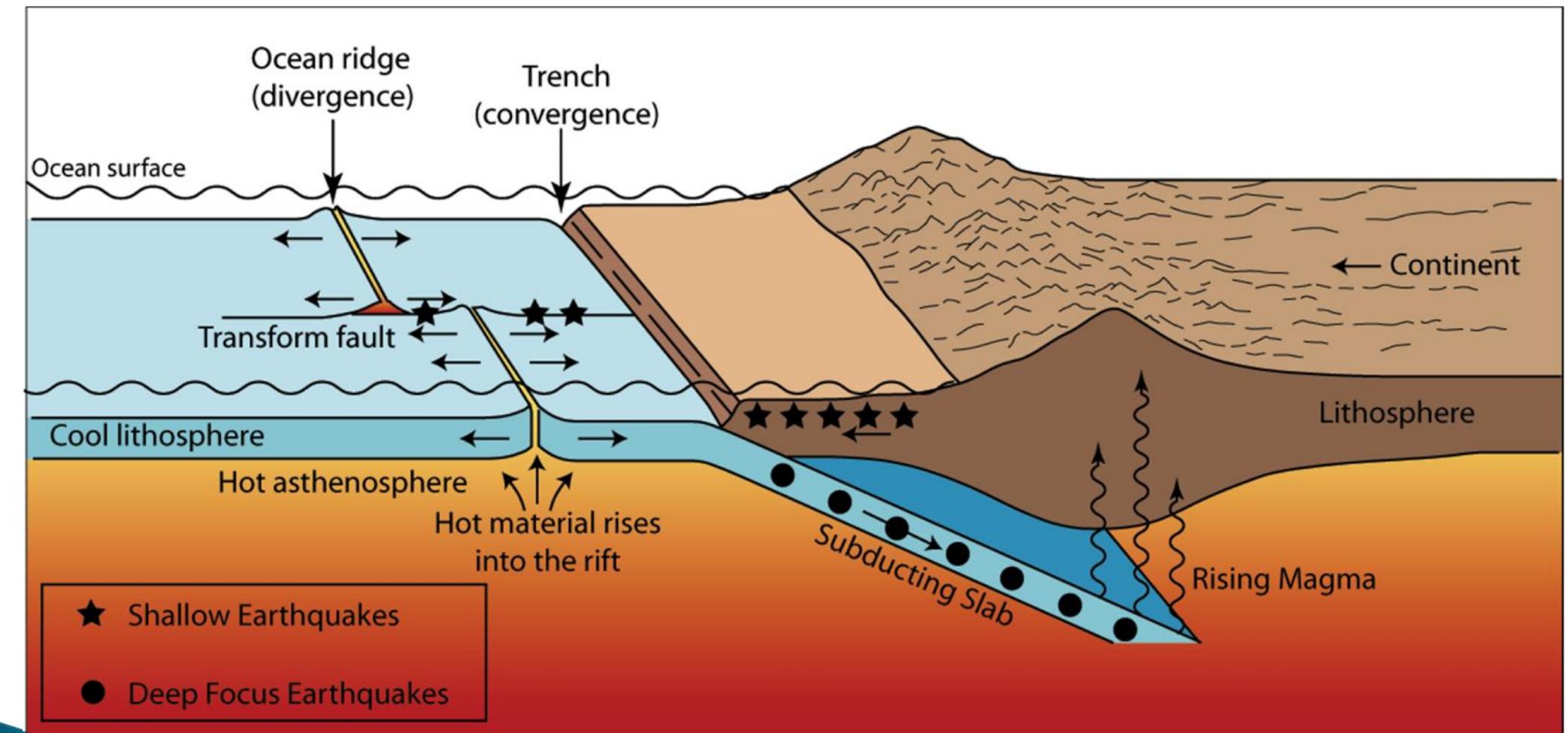


Evidence for plate tectonics – Seismicity

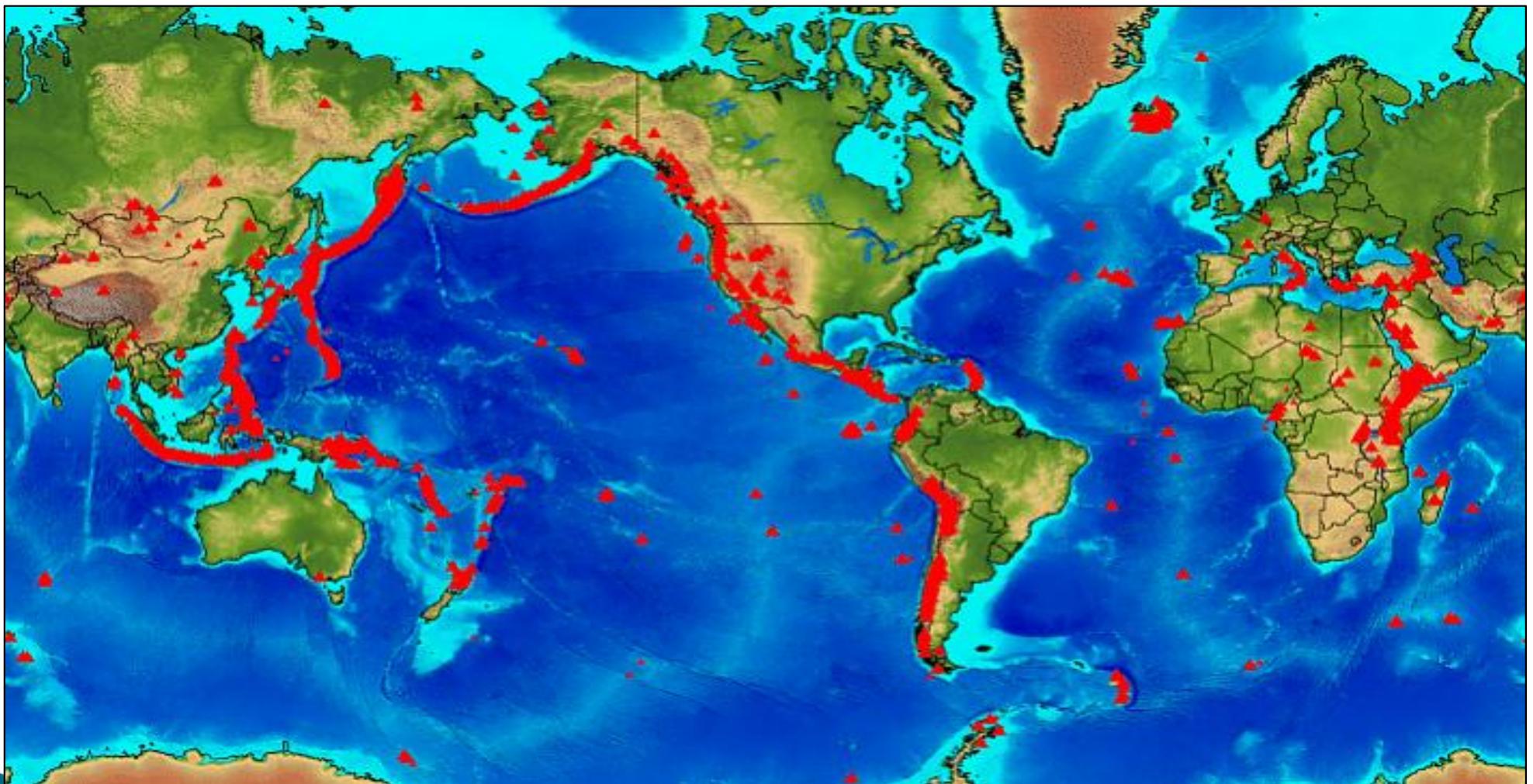


Earthquake distribution matches plate boundaries

Where do earthquakes form?

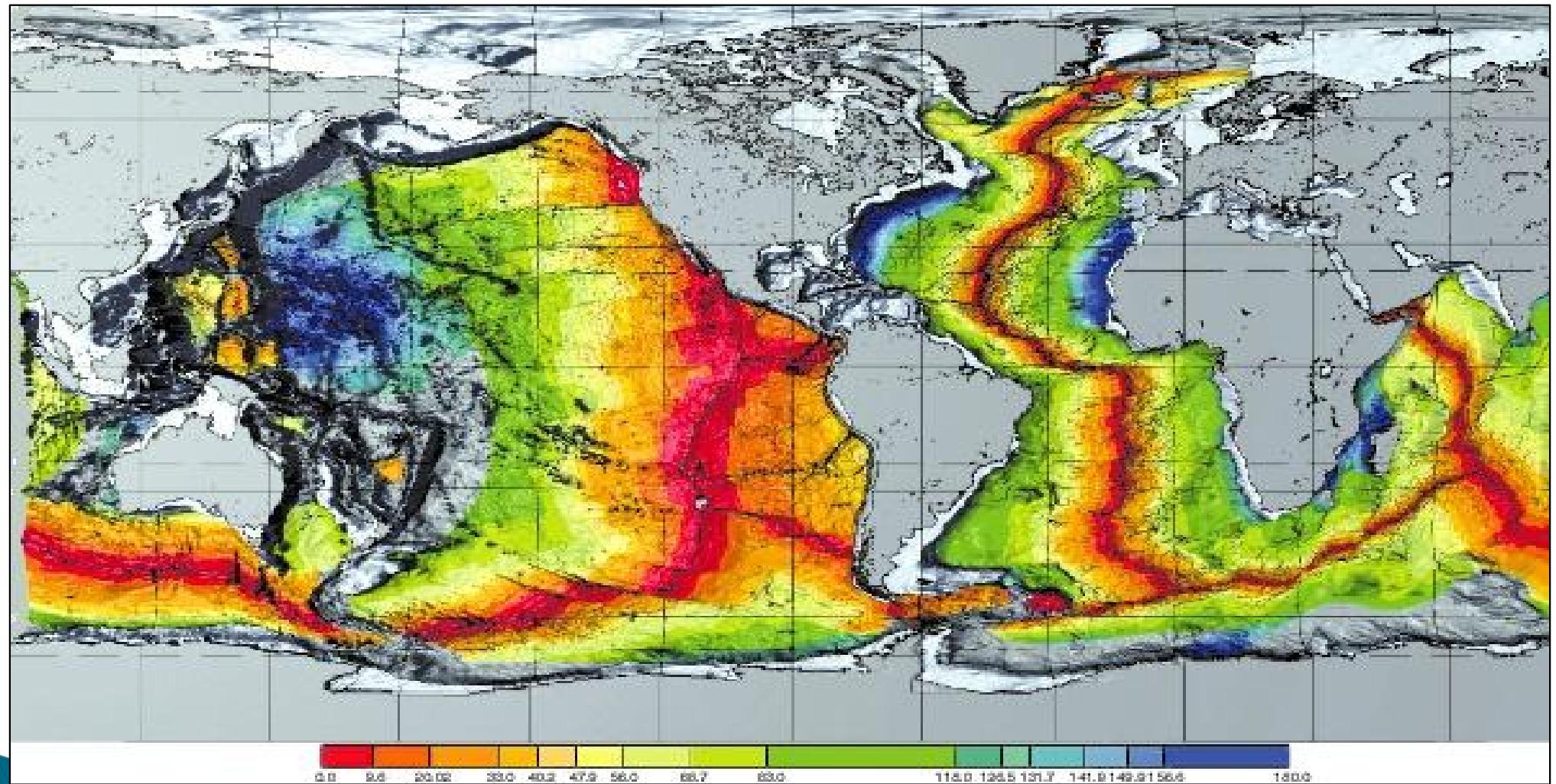


Evidence for plate tectonics – Volcanism



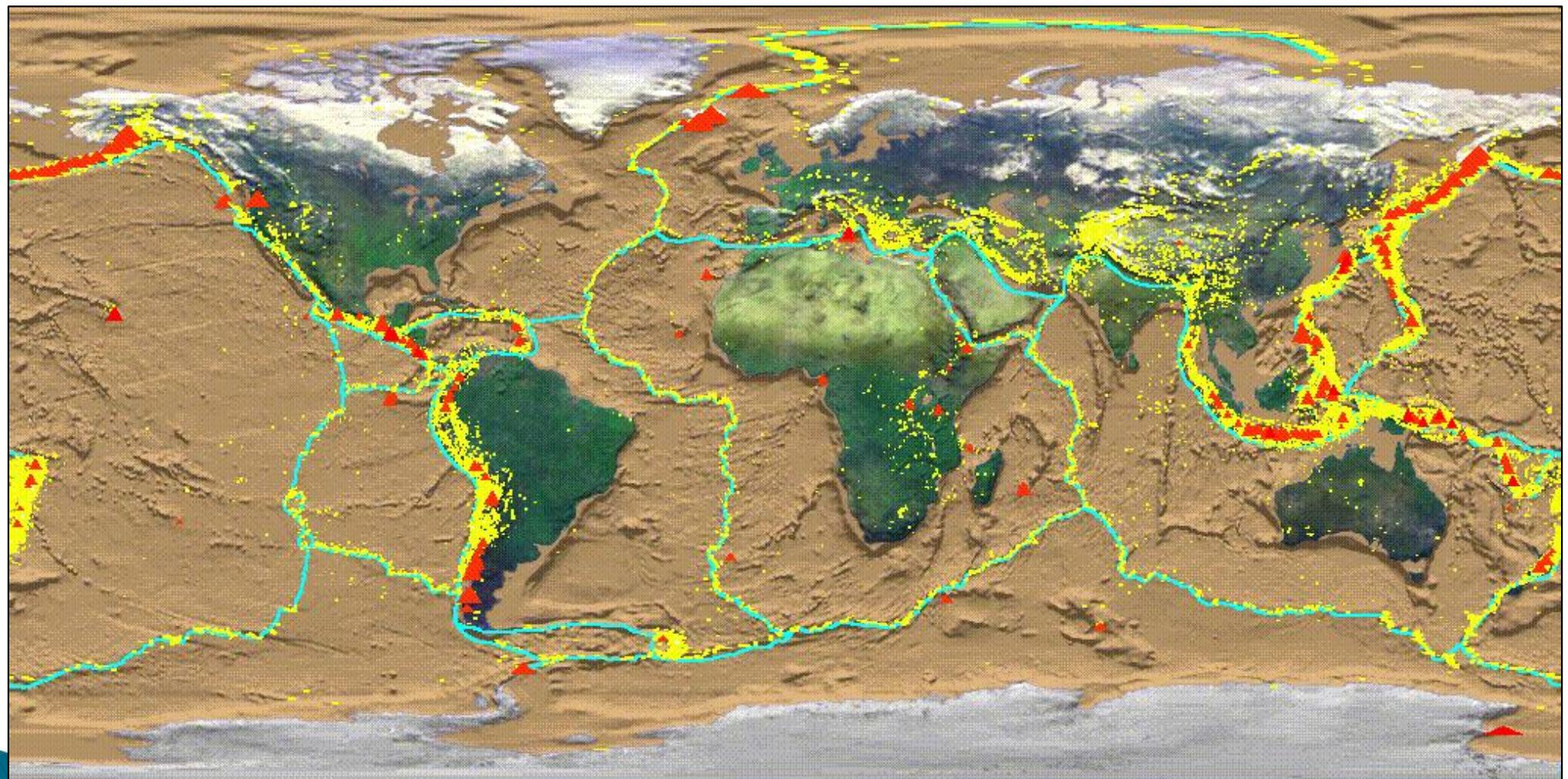
Volcanoes match some plate boundaries; some are hot spots

Evidence for plate tectonics – Age of seafloors



- Youngest sea floor is at mid-ocean ridge

Evidence for plate tectonics – Seismicity

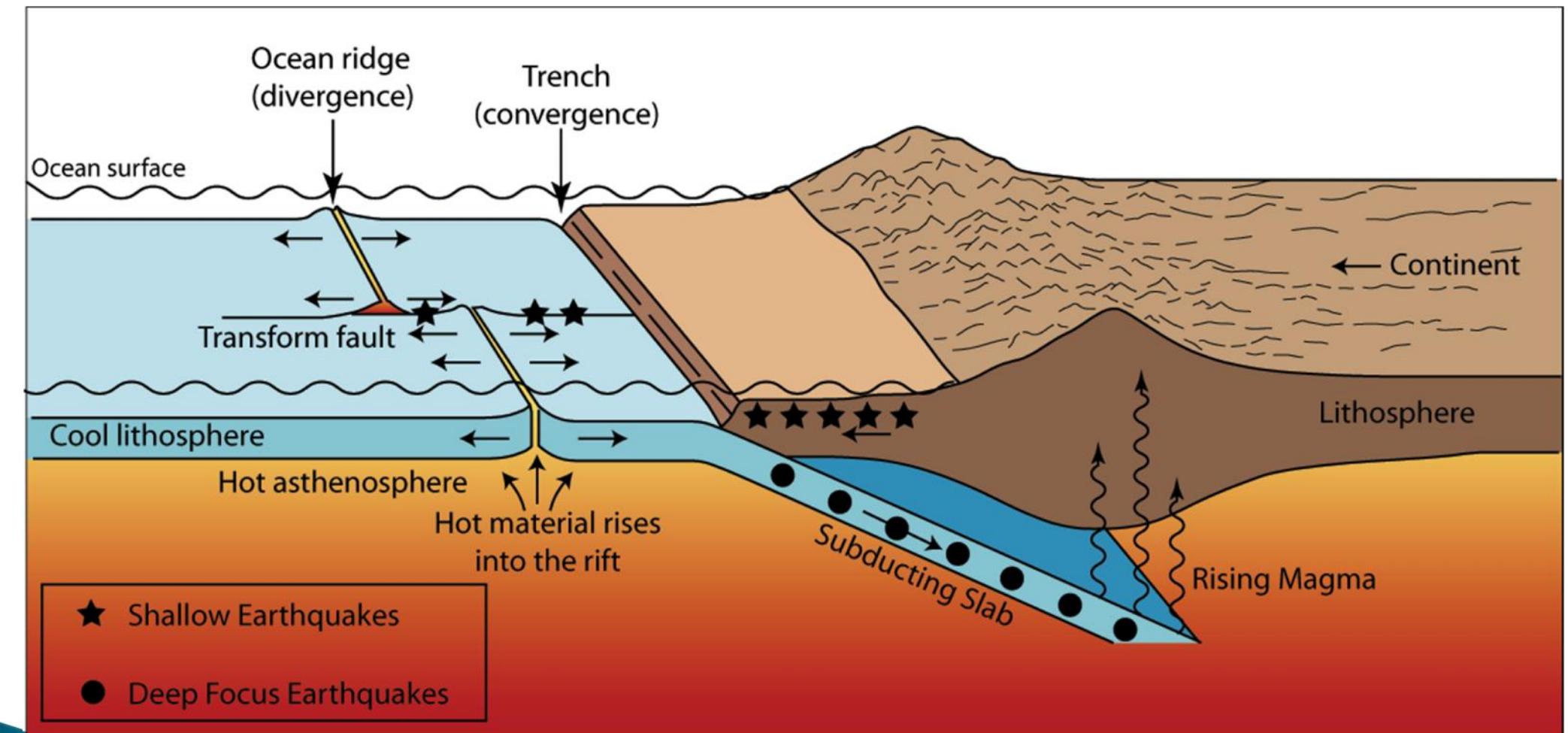


Earthquake distribution matches plate boundaries

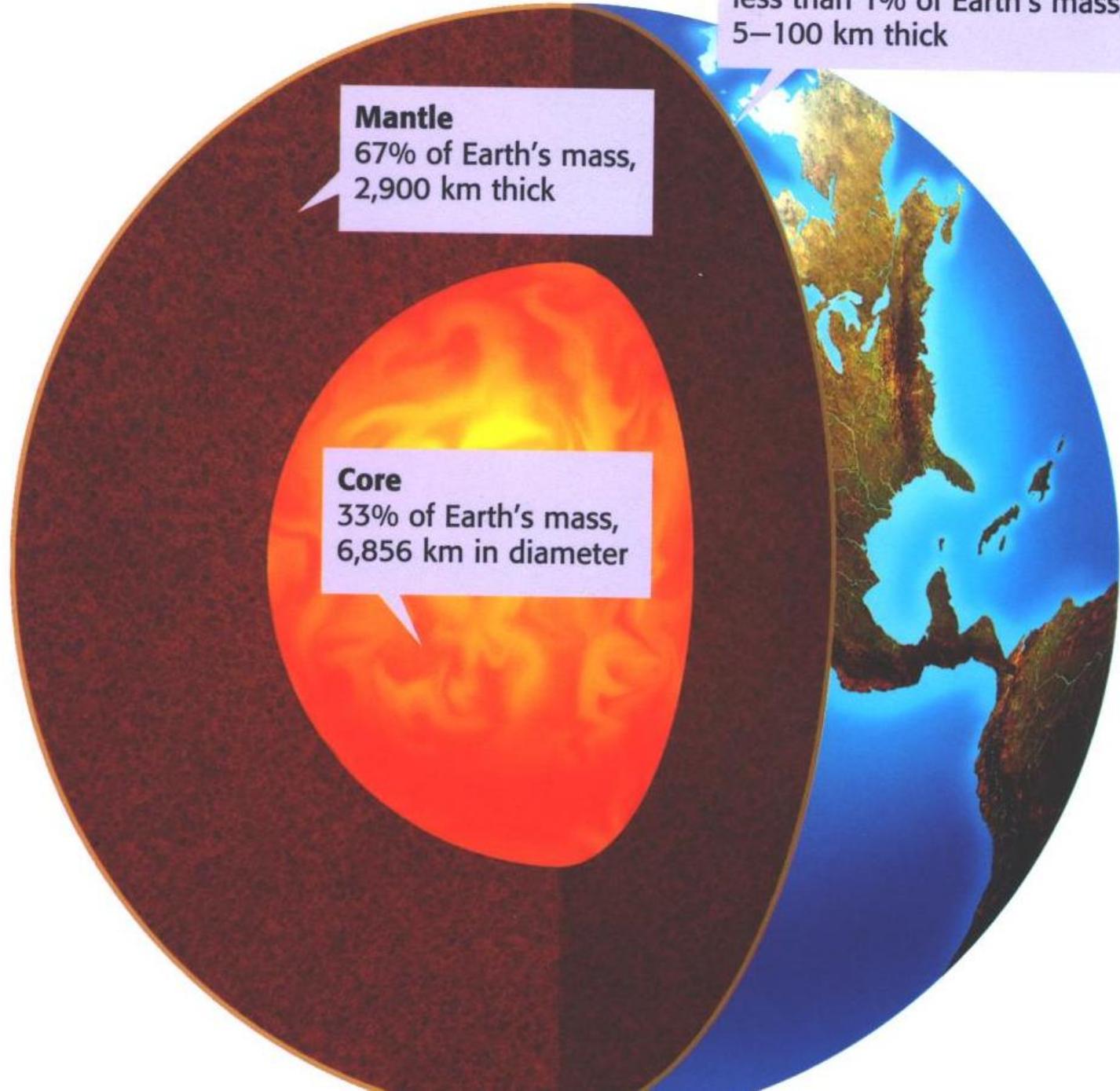
Plate Tectonics:

- ▶ The Earth's crust is divided into 12 major plates which move in various directions.
- ▶ 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.

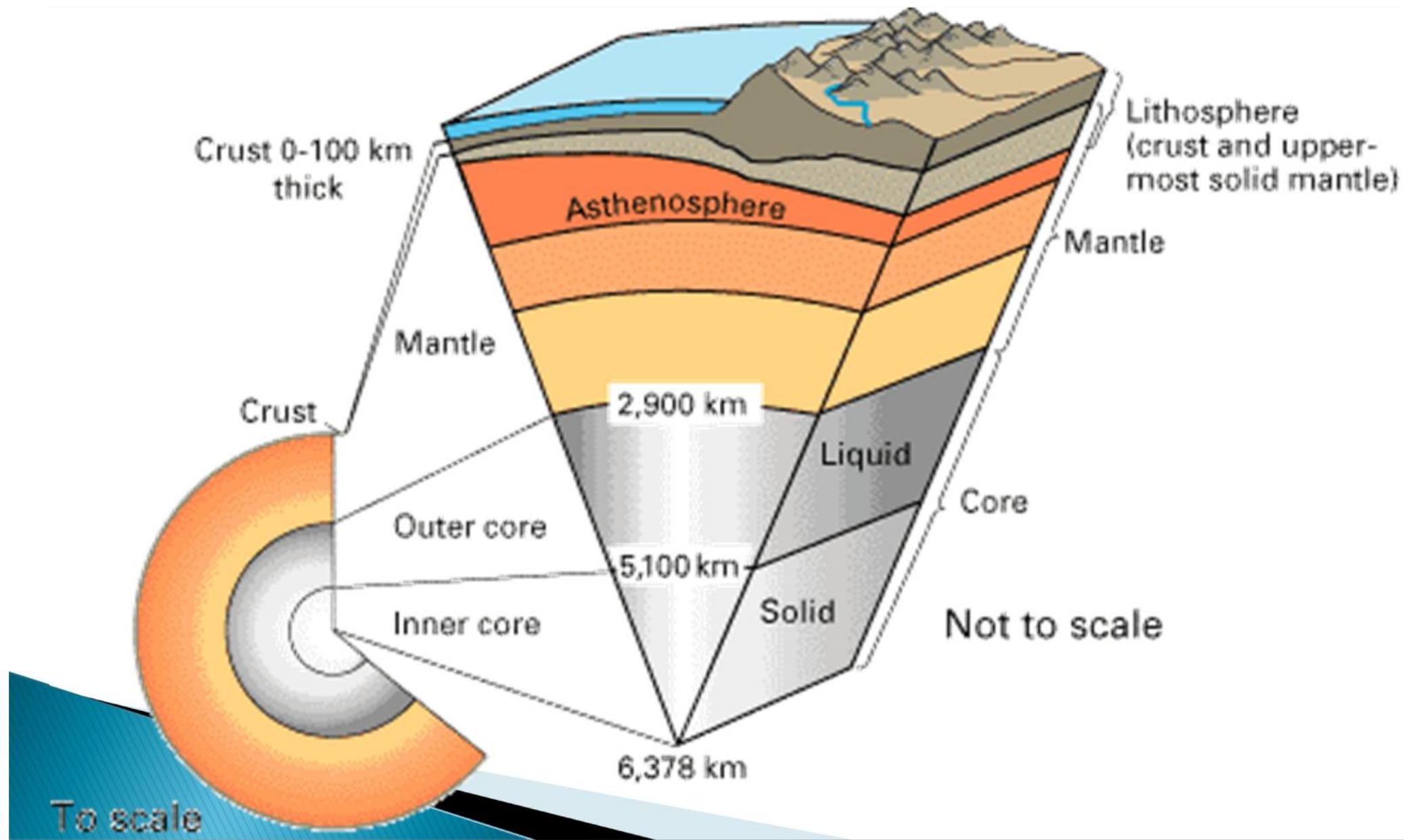
Where do earthquakes form?



Interior of the Earth

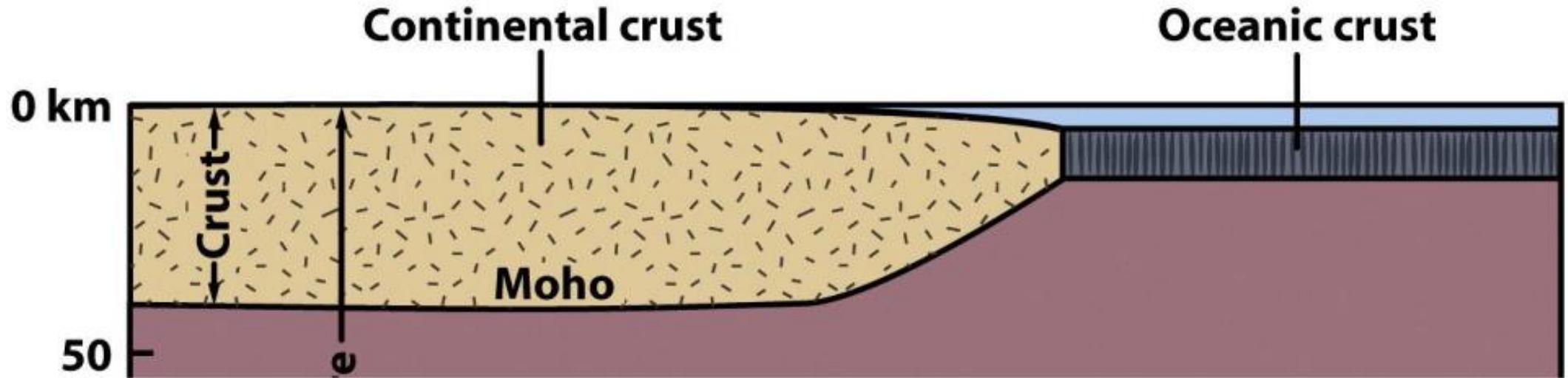
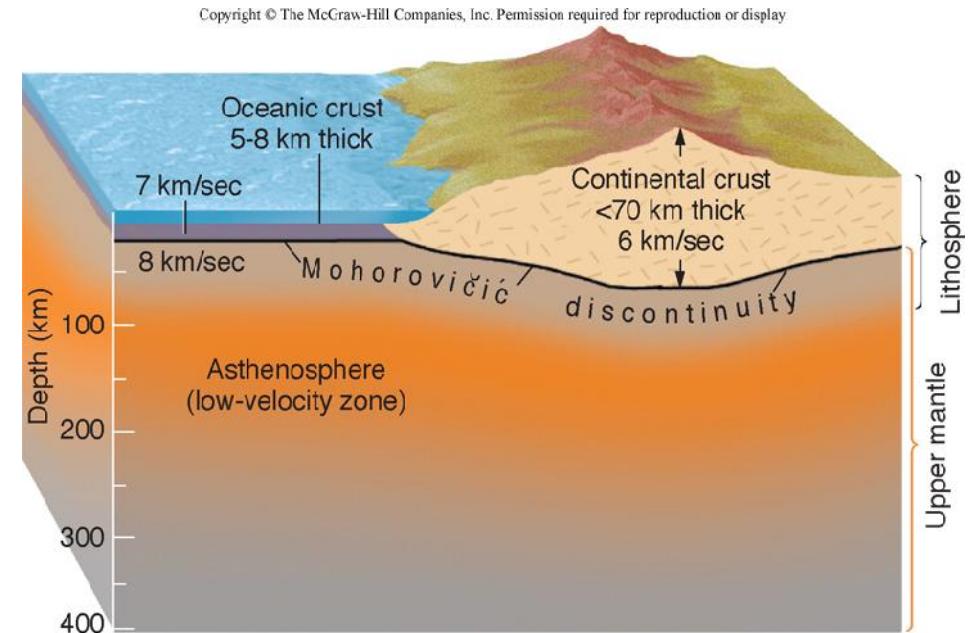


Layers of the earth



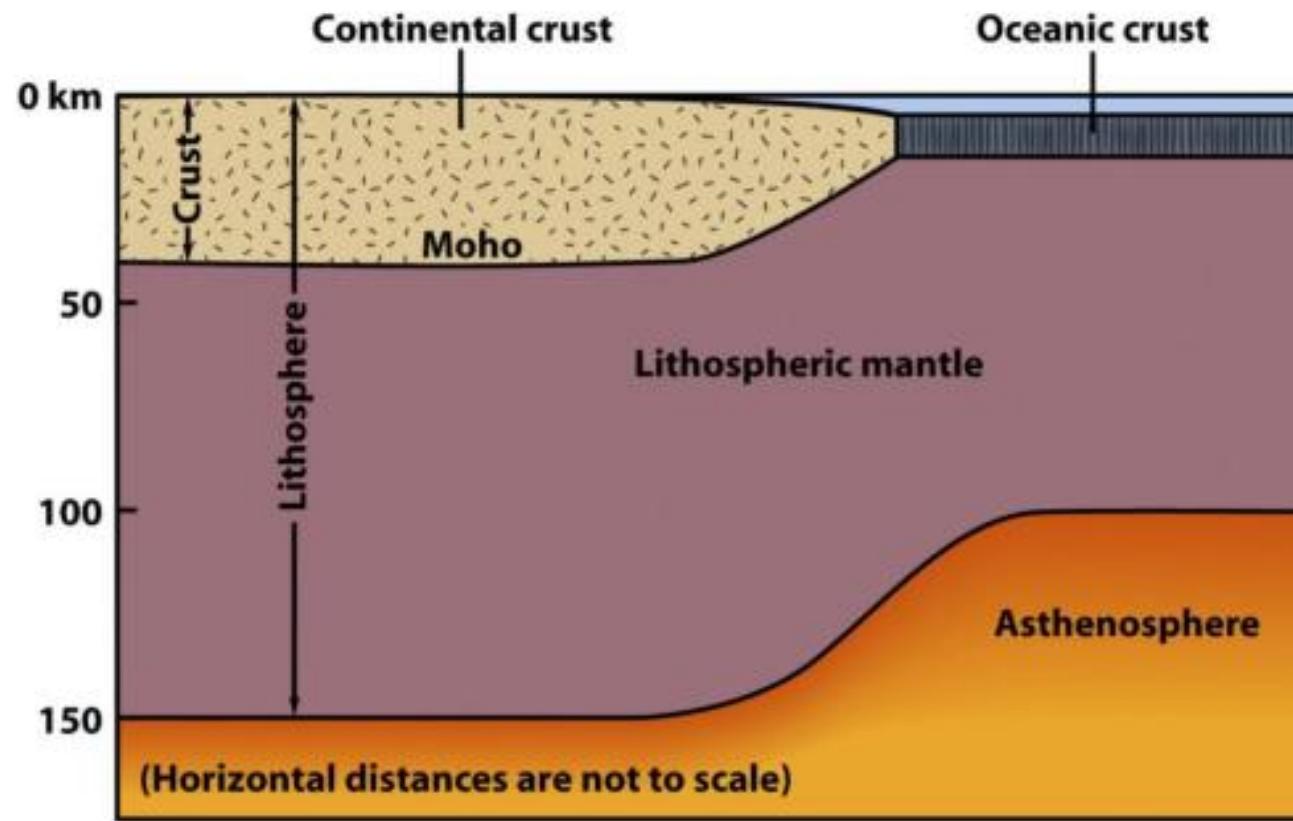
Crust

- ❑ Thinnest layer (5–100 km)
- ❑ Two types of crust
 - ❑ *Continental*
 - ❑ *Oceanic*
- ▶ The Mohorovičić discontinuity or “Moho”



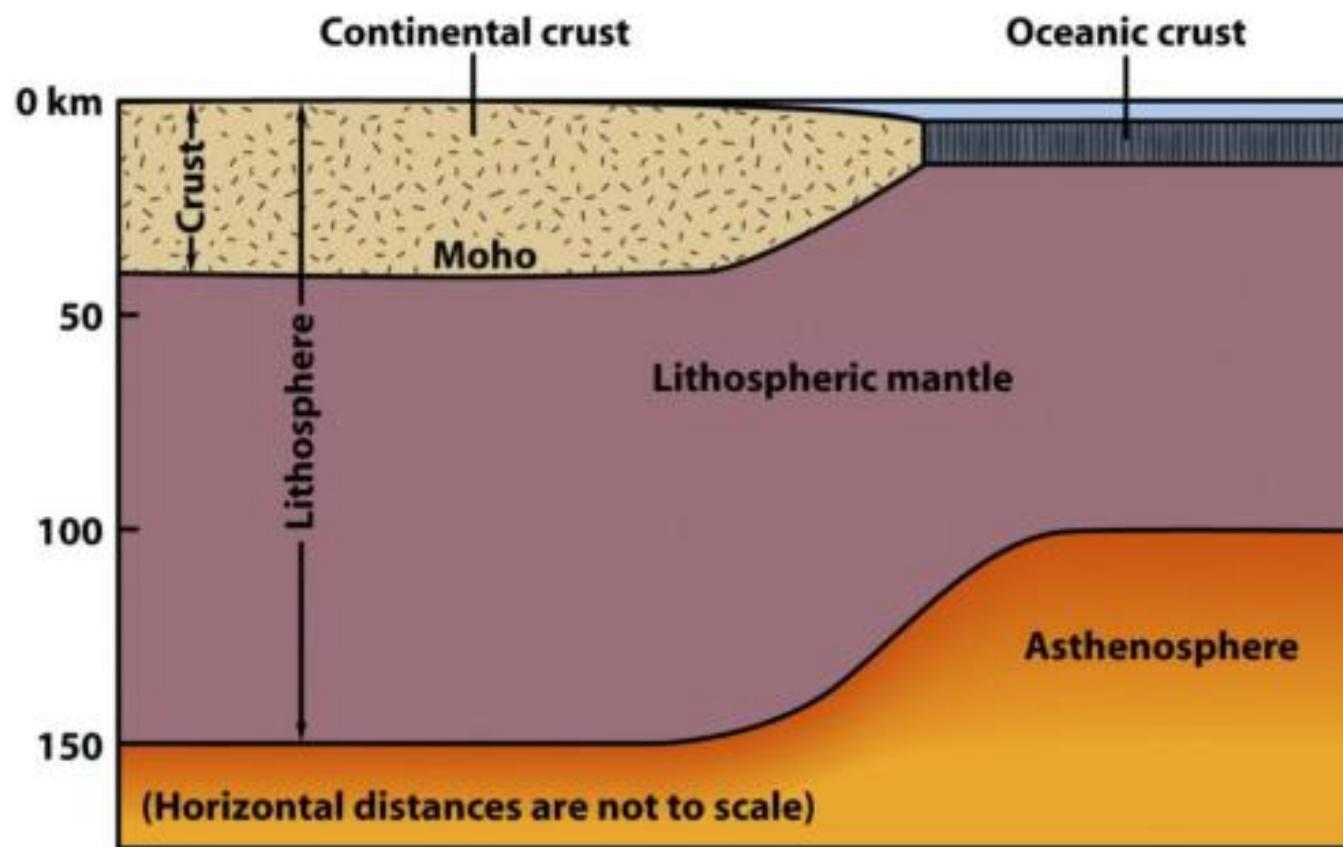
Continental crust

- ▶ Avg. rock density about 2.7 g/c.c.
- ▶ Avg. thickness 35–40 km.
- ▶ Felsic composition. Avg. rock type = Granite



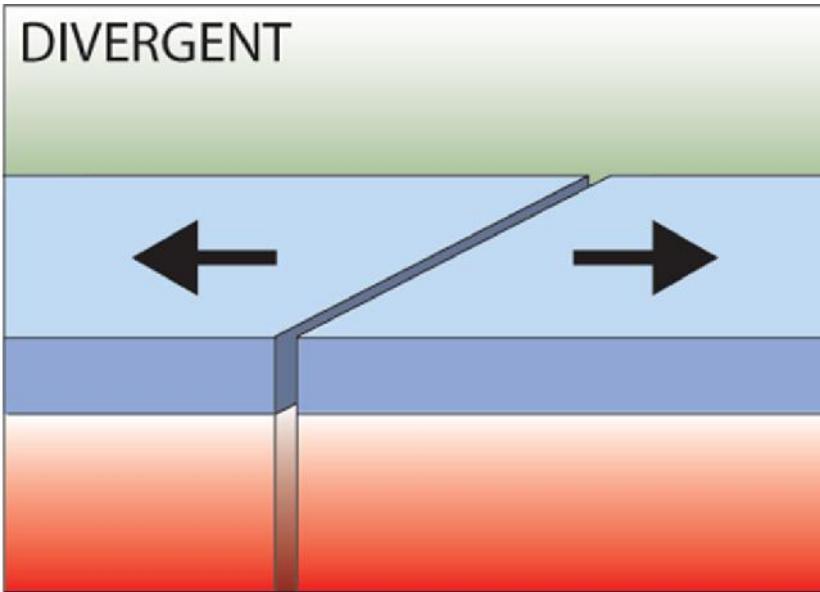
Oceanic crust

- ▶ Avg. rock density about 3 g/c.c.
- ▶ Avg. thickness 7–10 km.
- ▶ Mafic composition. Avg. rock type = Basalt

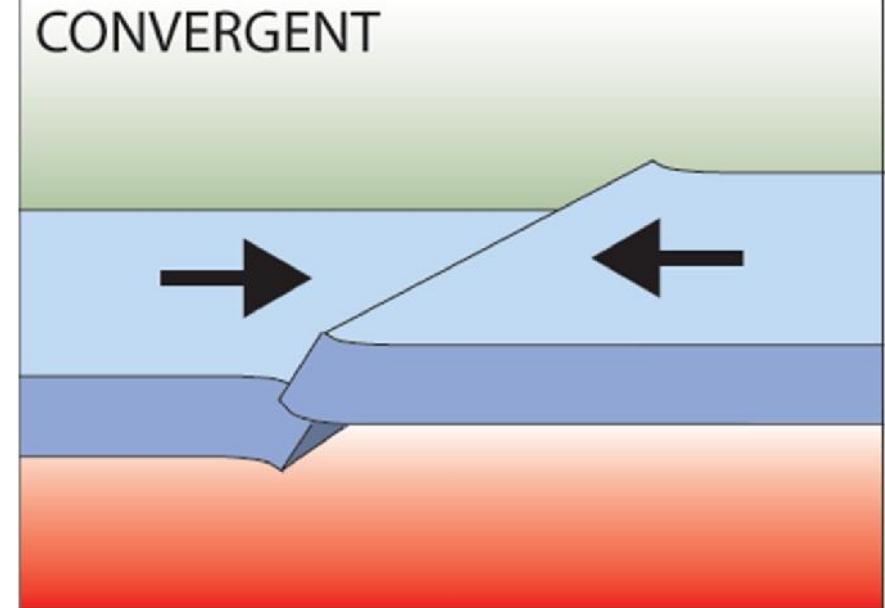


TYPES OF PLATE BOUNDARIES

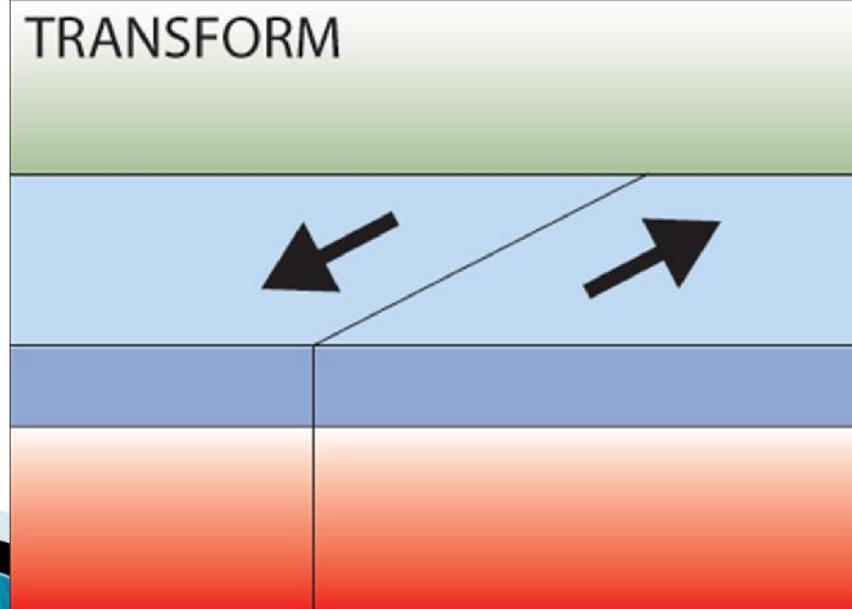
DIVERGENT

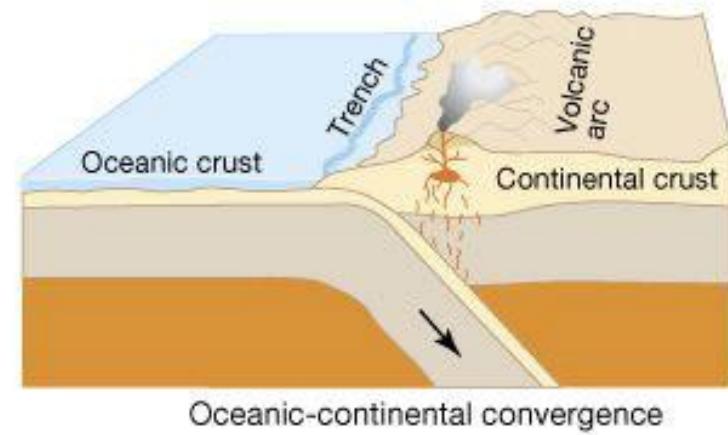
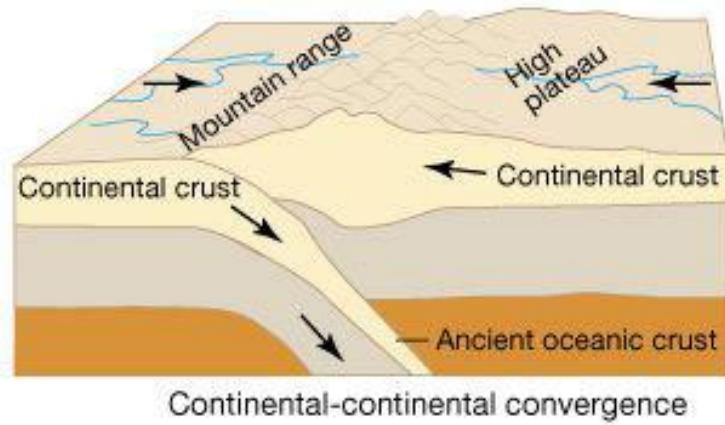
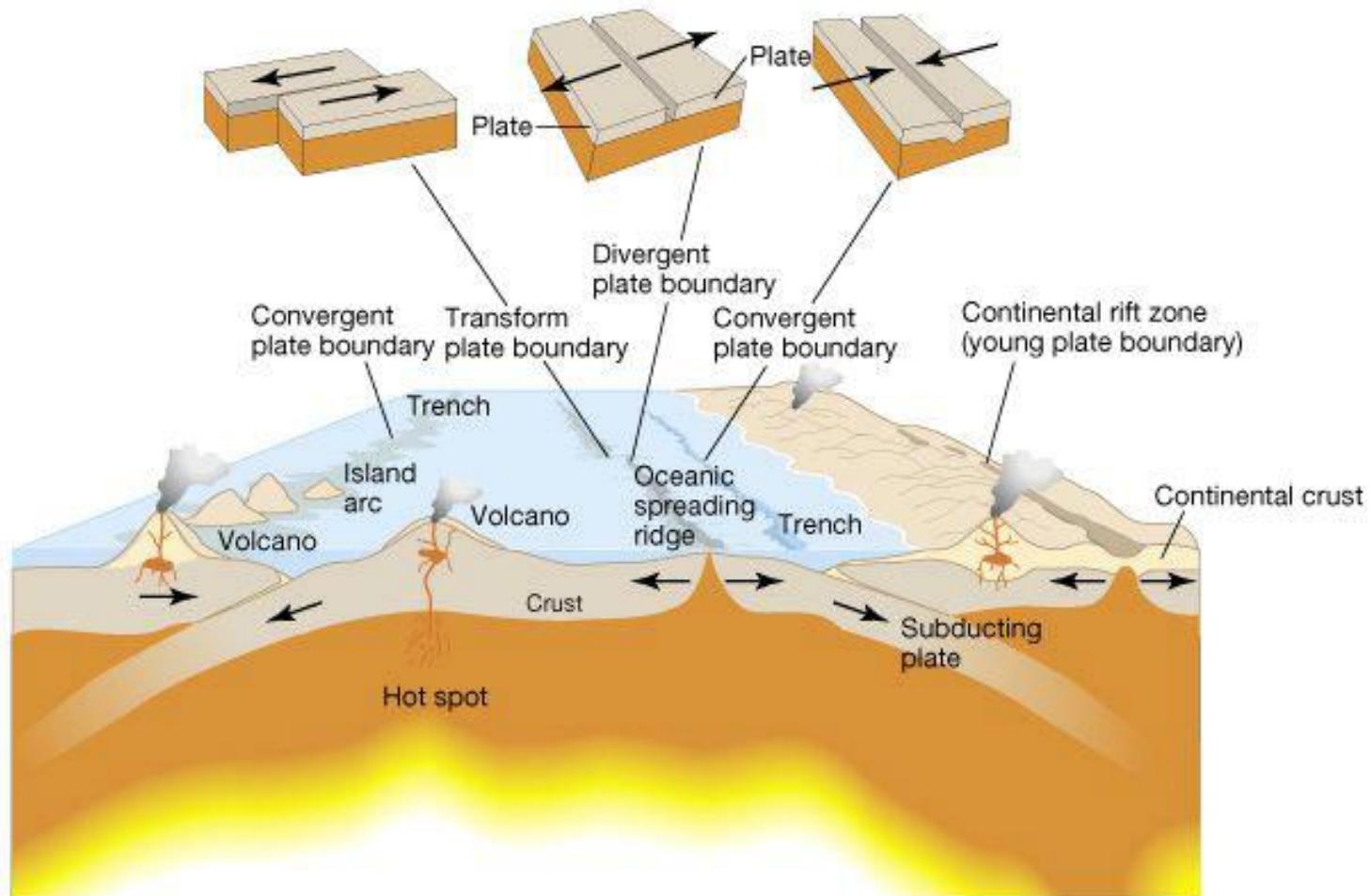


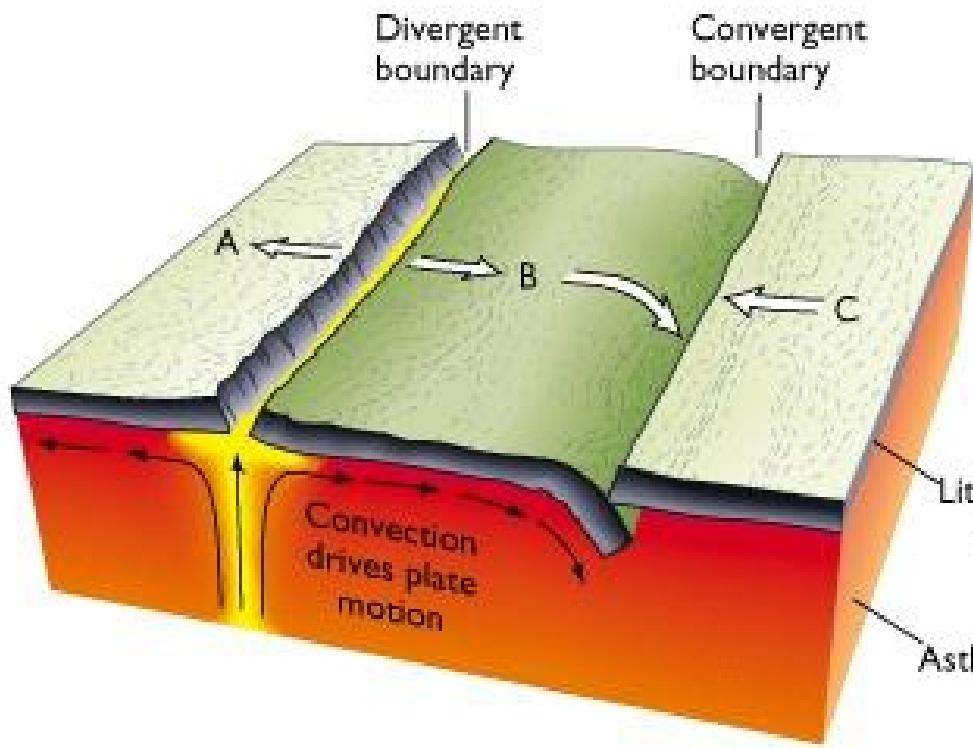
CONVERGENT



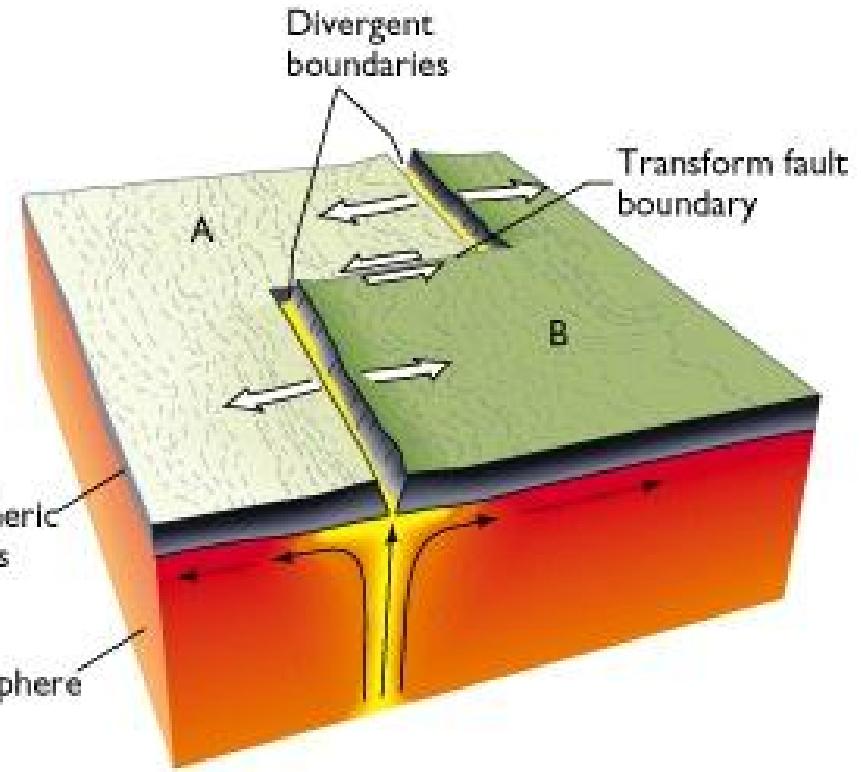
TRANSFORM





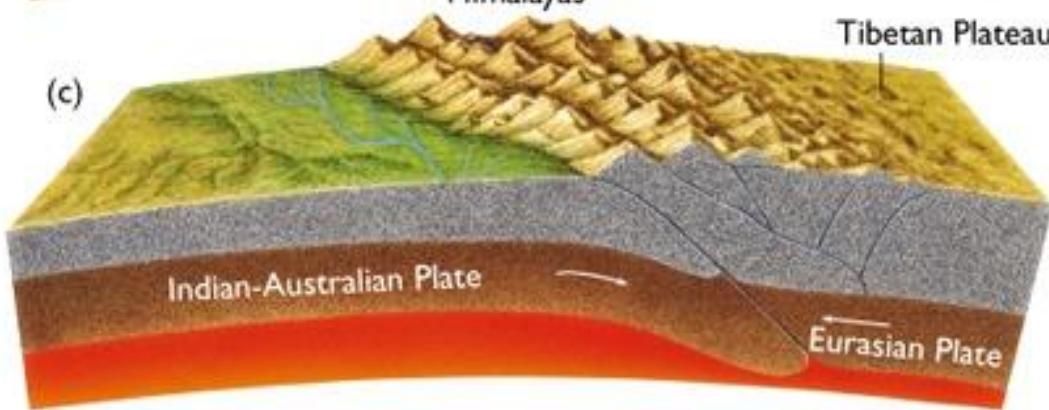
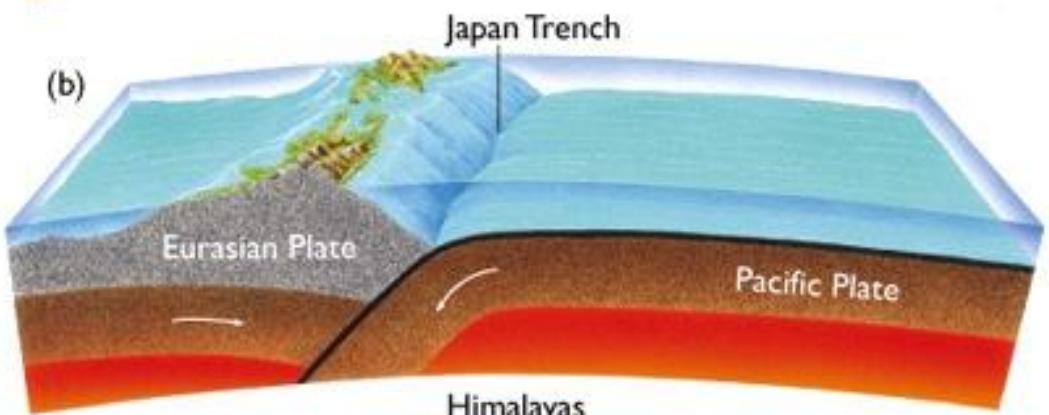
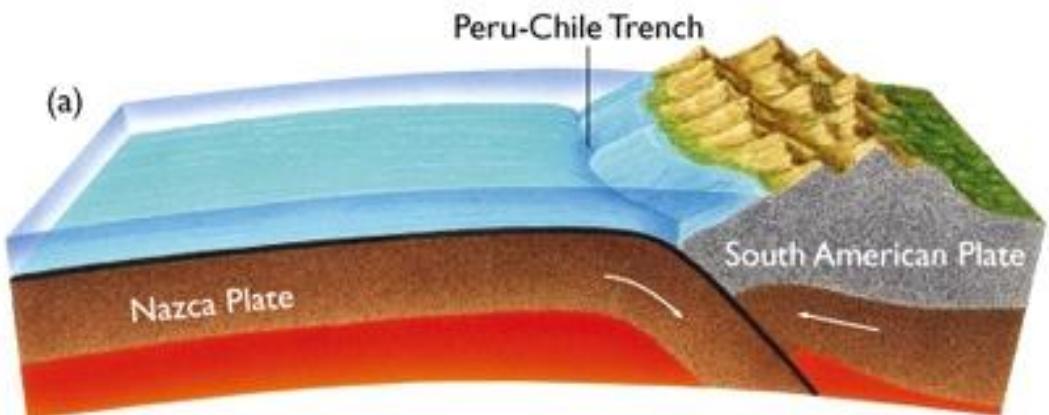


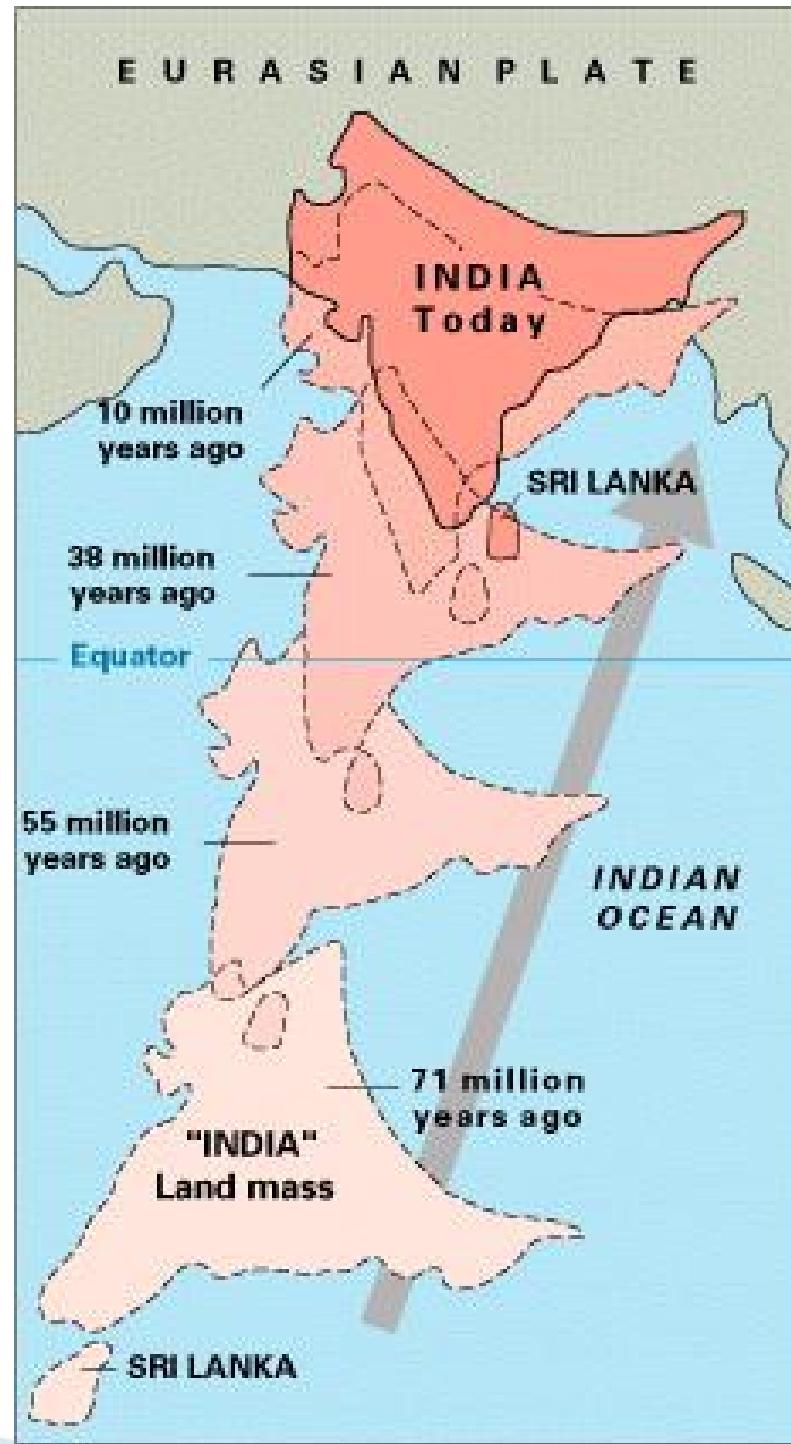
(a)



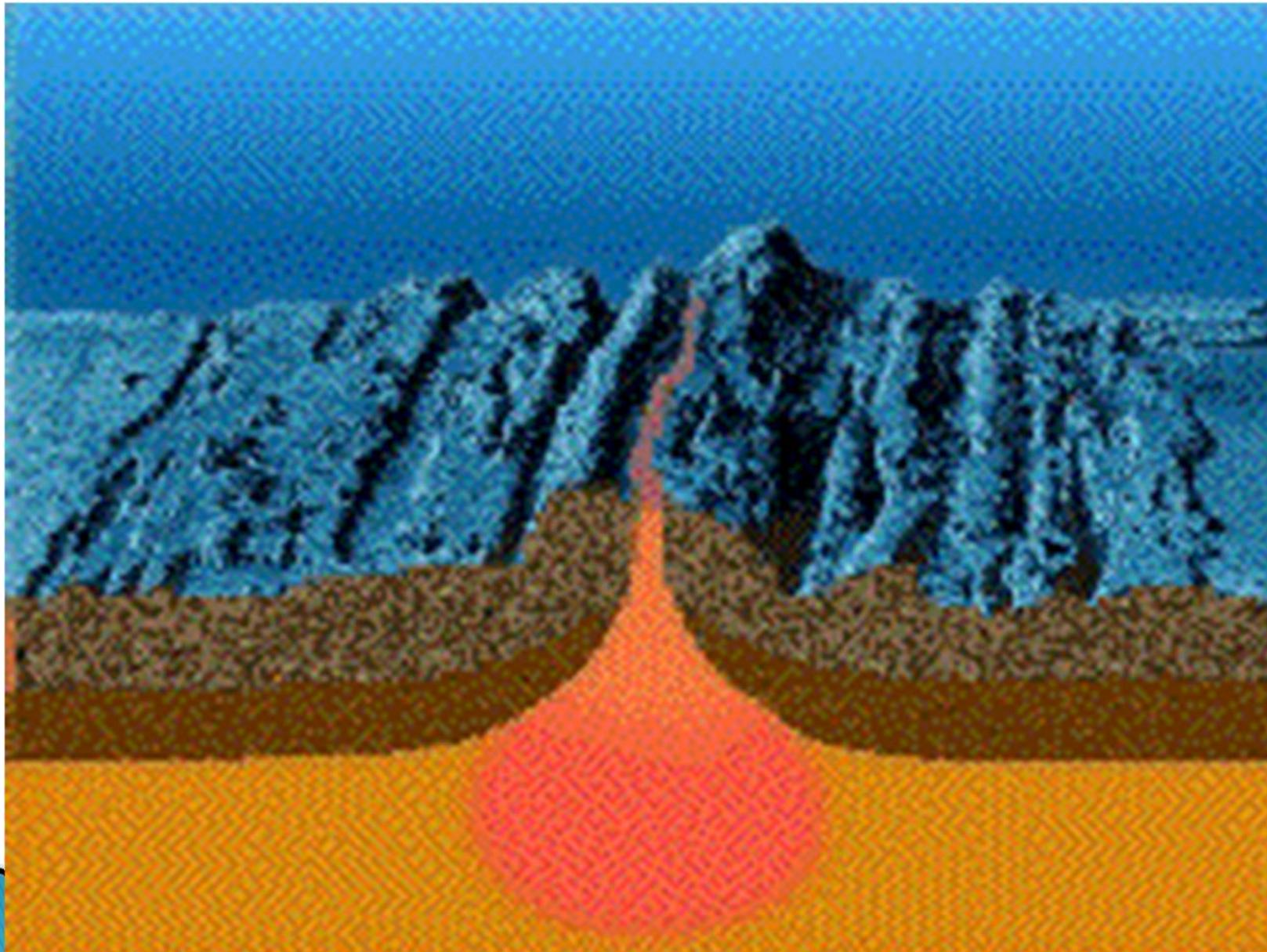
(b)

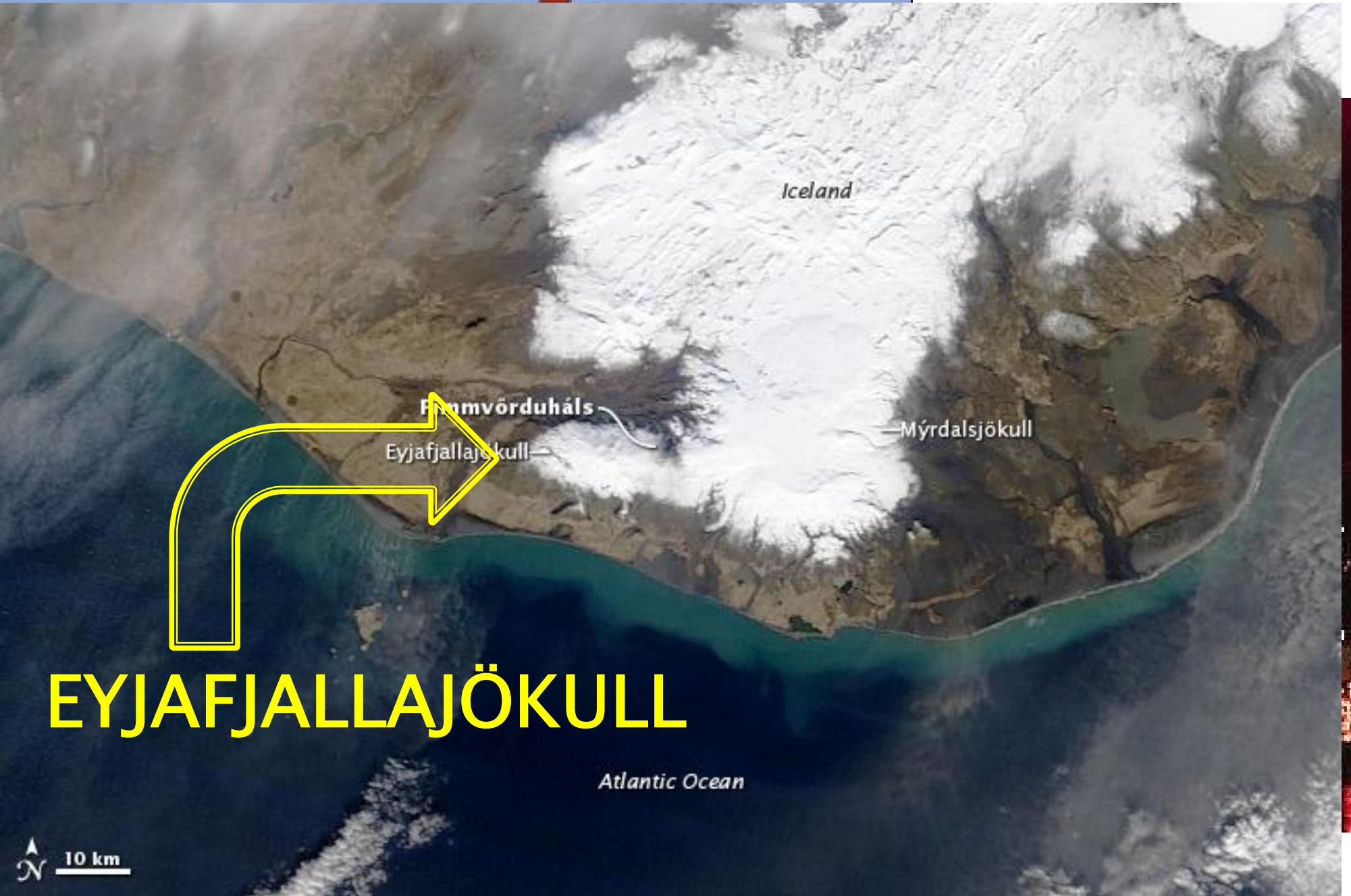
CONVERGENT





DIVERGENT



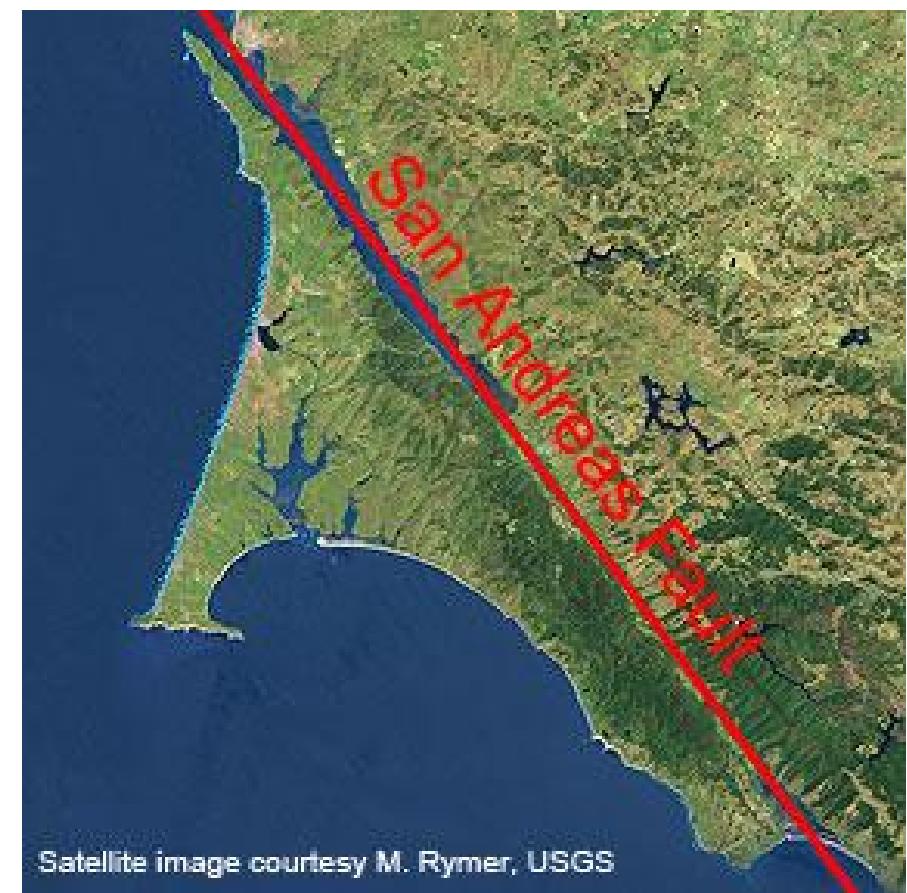
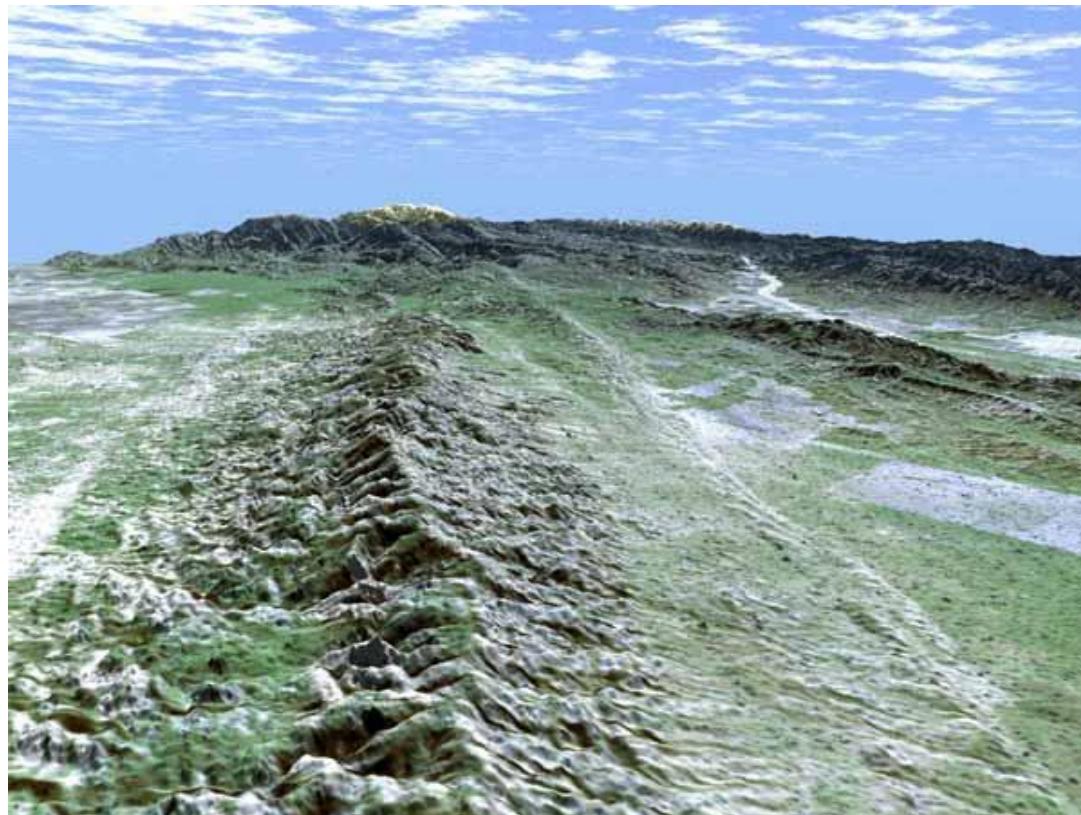


EYJAFJALLAJÖKULL

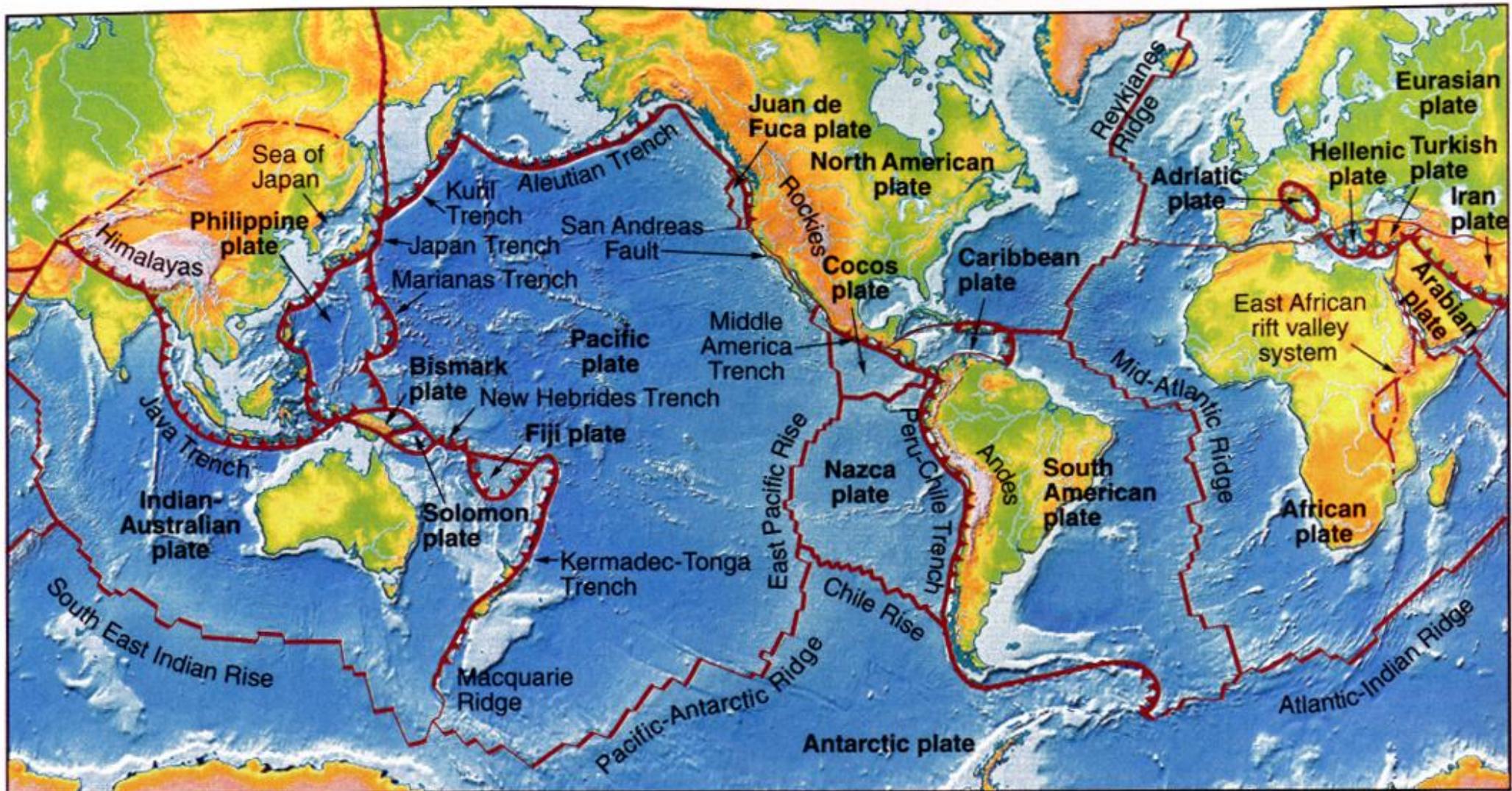
TRANSFORM FAULT



TRANSFORM FAULT



Satellite image courtesy M. Rymer, USGS



Ridge axis
divergent boundary

Transform

Subduction zone
Convergent boundary

Zones of Extension within continents

Uncertain plate
boundary

WHY DO PLATES MOVE?!

