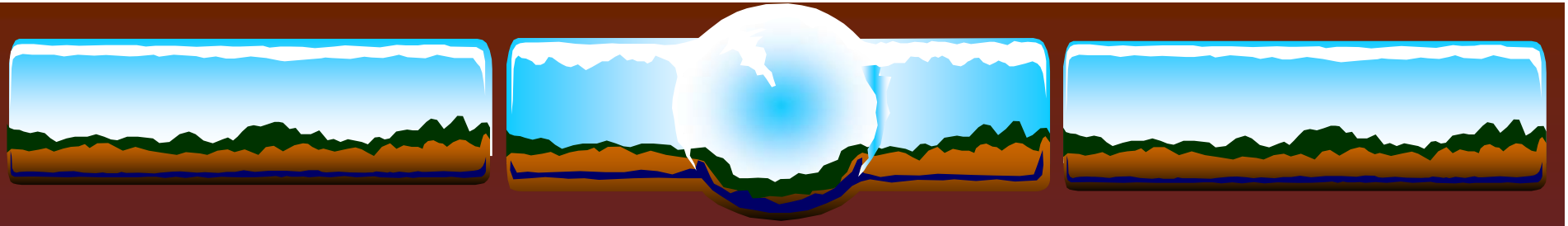
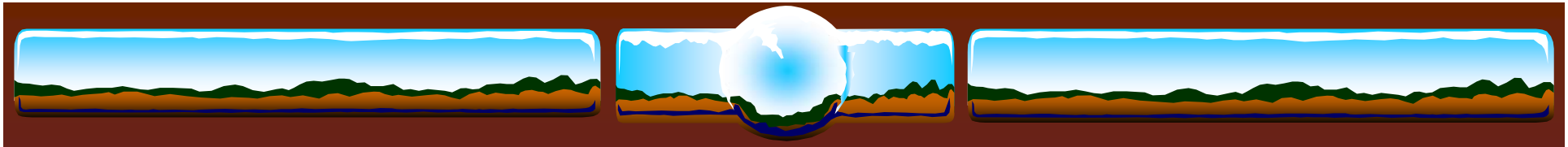


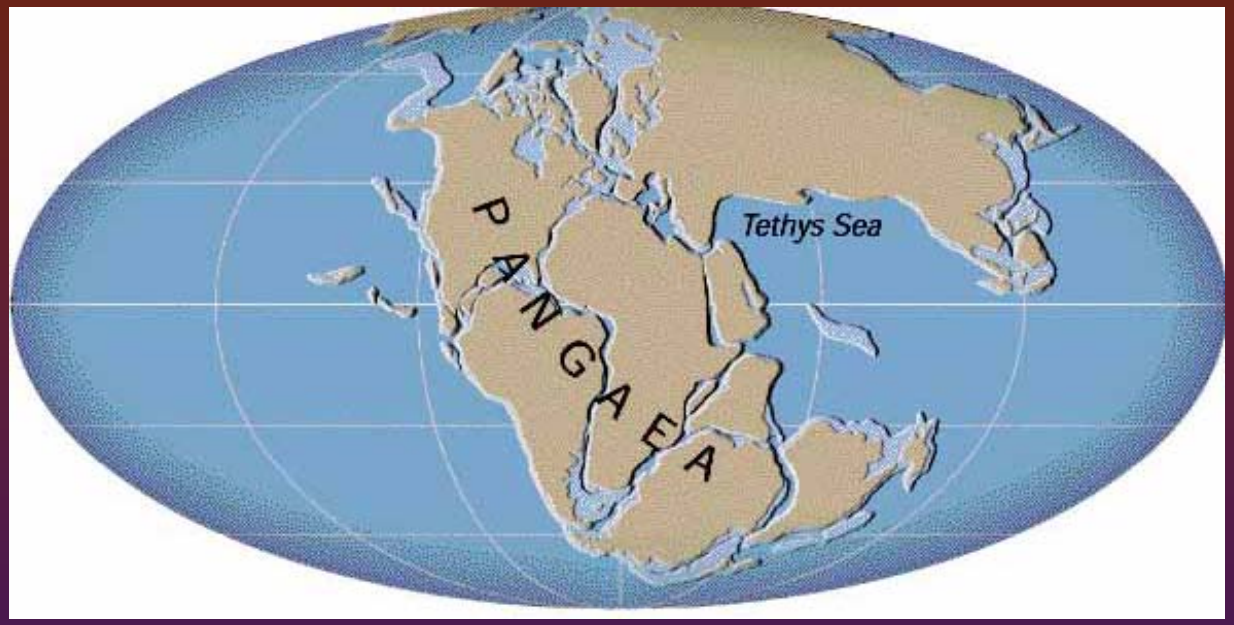
Plate Tectonics



Outline

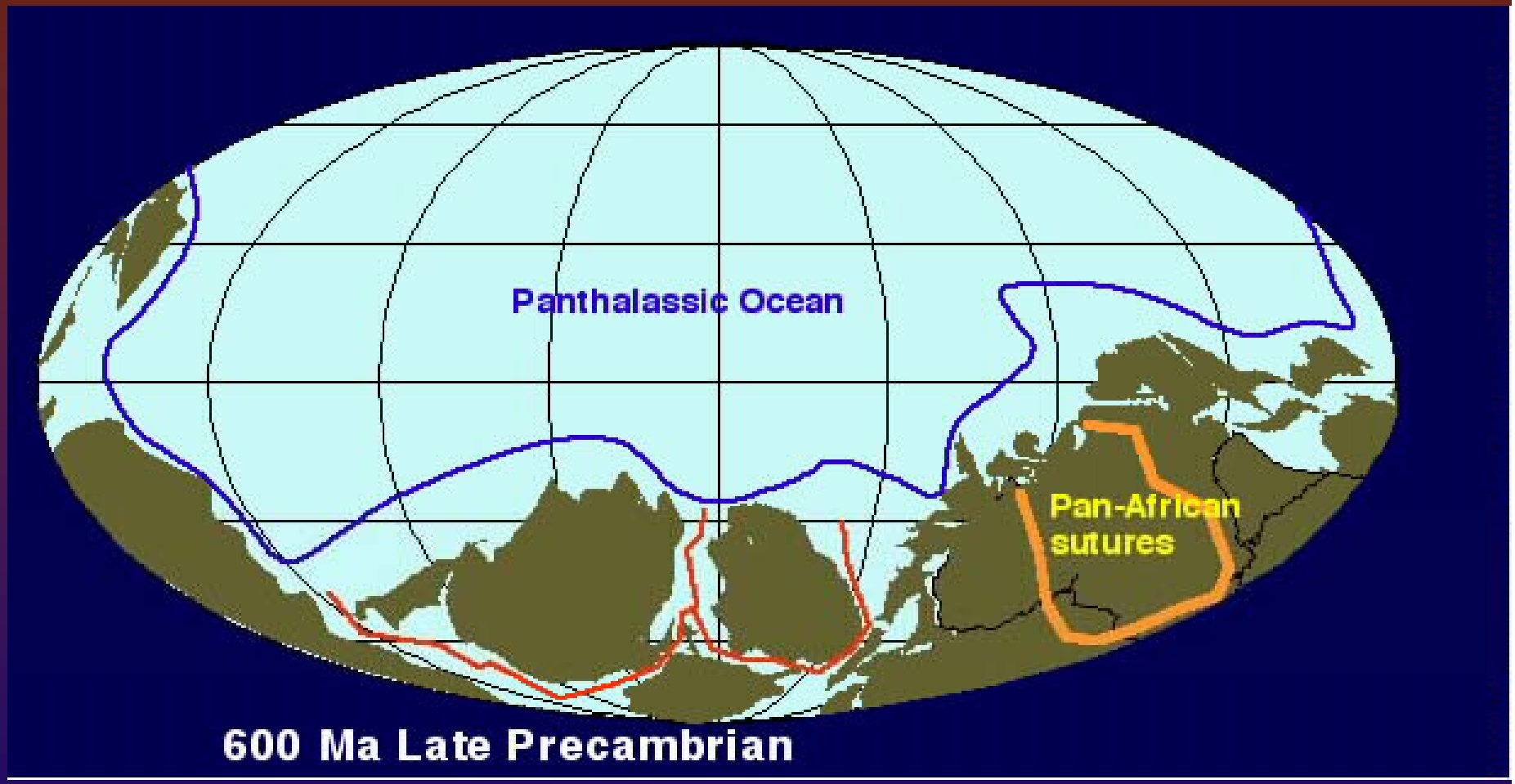
- Pangaea
- Continental Drift
- Mid-ocean ridges and seafloor spreading
- Magnetic patterns on the seafloor
- Plate tectonics: map of plates and theory
- Plate boundaries

Pangaea

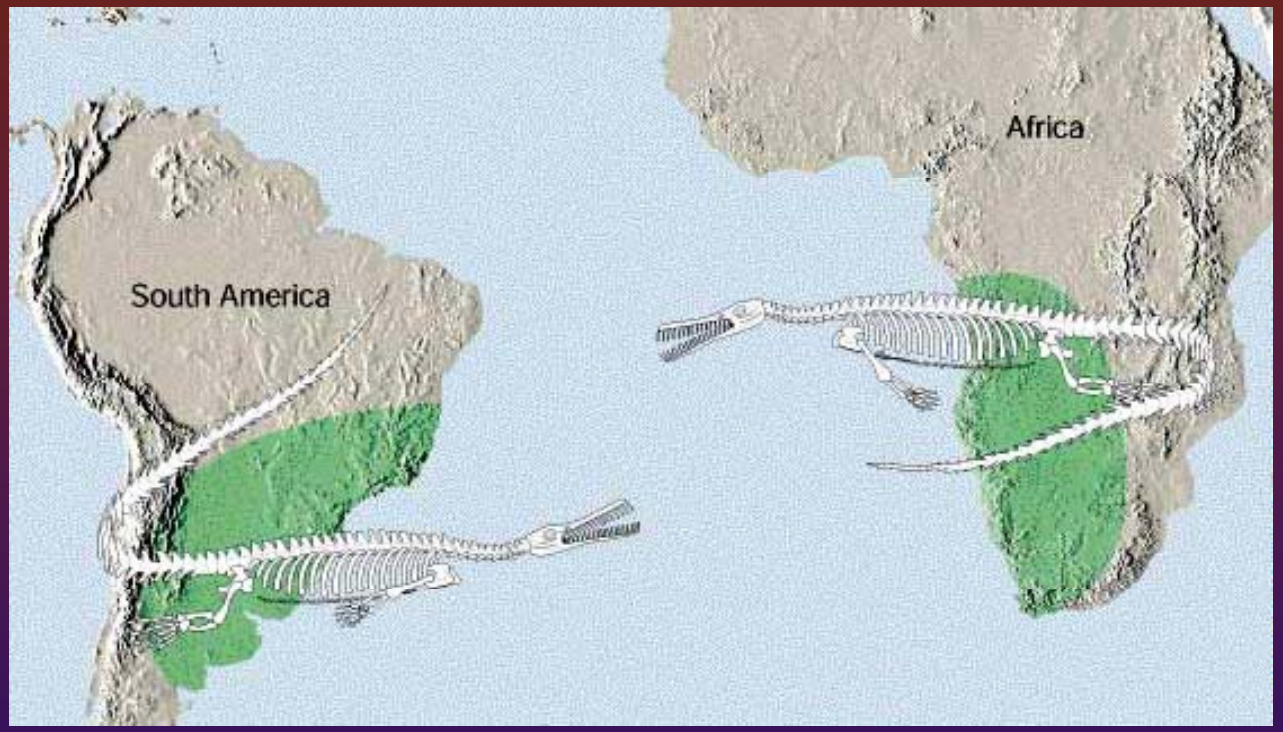


- Means “all lands”
- Name given to the single landmass composed of all the continents
- Idea developed by Wegener
- Pangaea broke apart into 7 continents (200 MYA):

Continental drift


Panthalassic Ocean
Pan-African sutures
600 Ma Late Precambrian

Continental Drift: Evidence

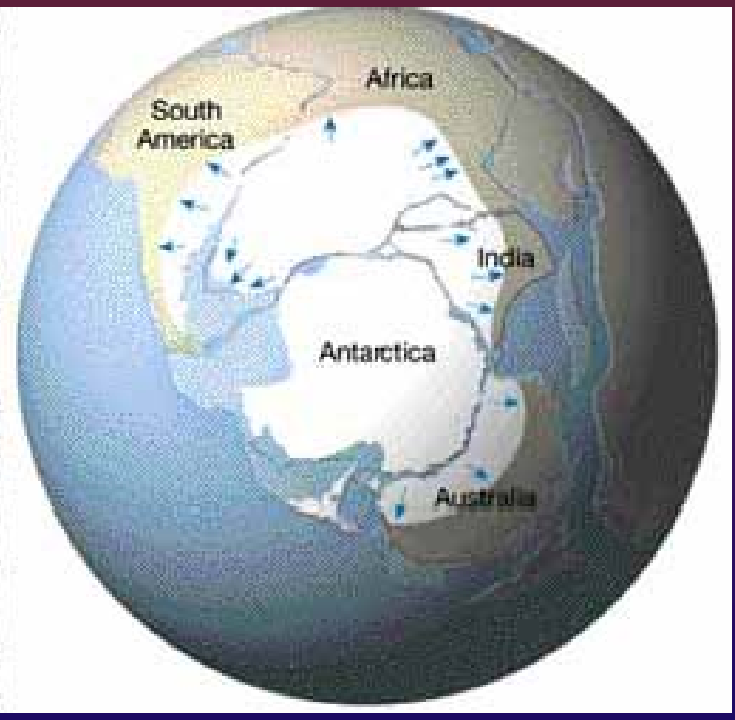


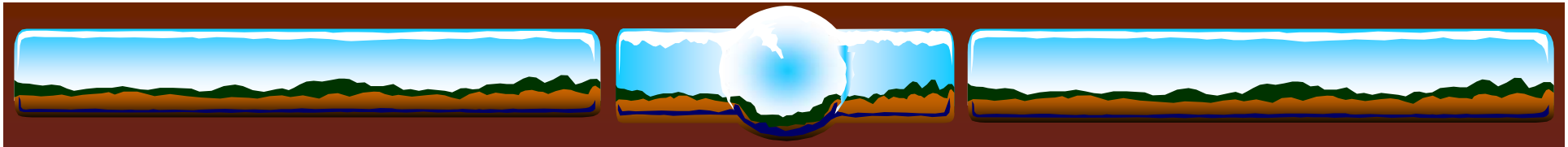
- Fossils
- Rock type
- Paleoclimates
- Fit of coastlines
- Structural similarities

Rock Type


Caledonian Mountains
British Isles
North America
Scandinavia
Appalachian Mountains
Africa
South America
Greenland
Europe
North America
Africa
South America

Paleoclimate

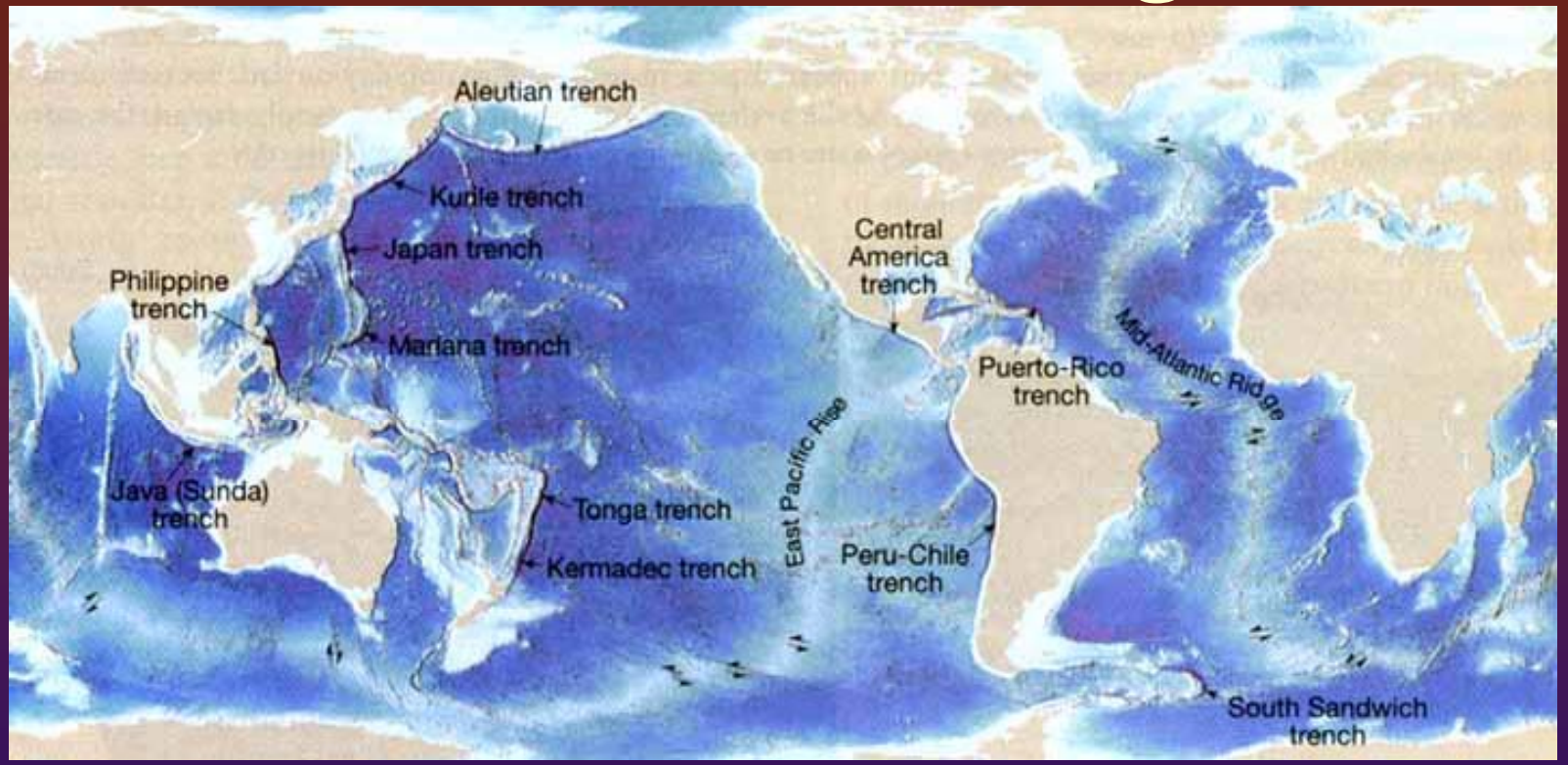




Rejection of the theory

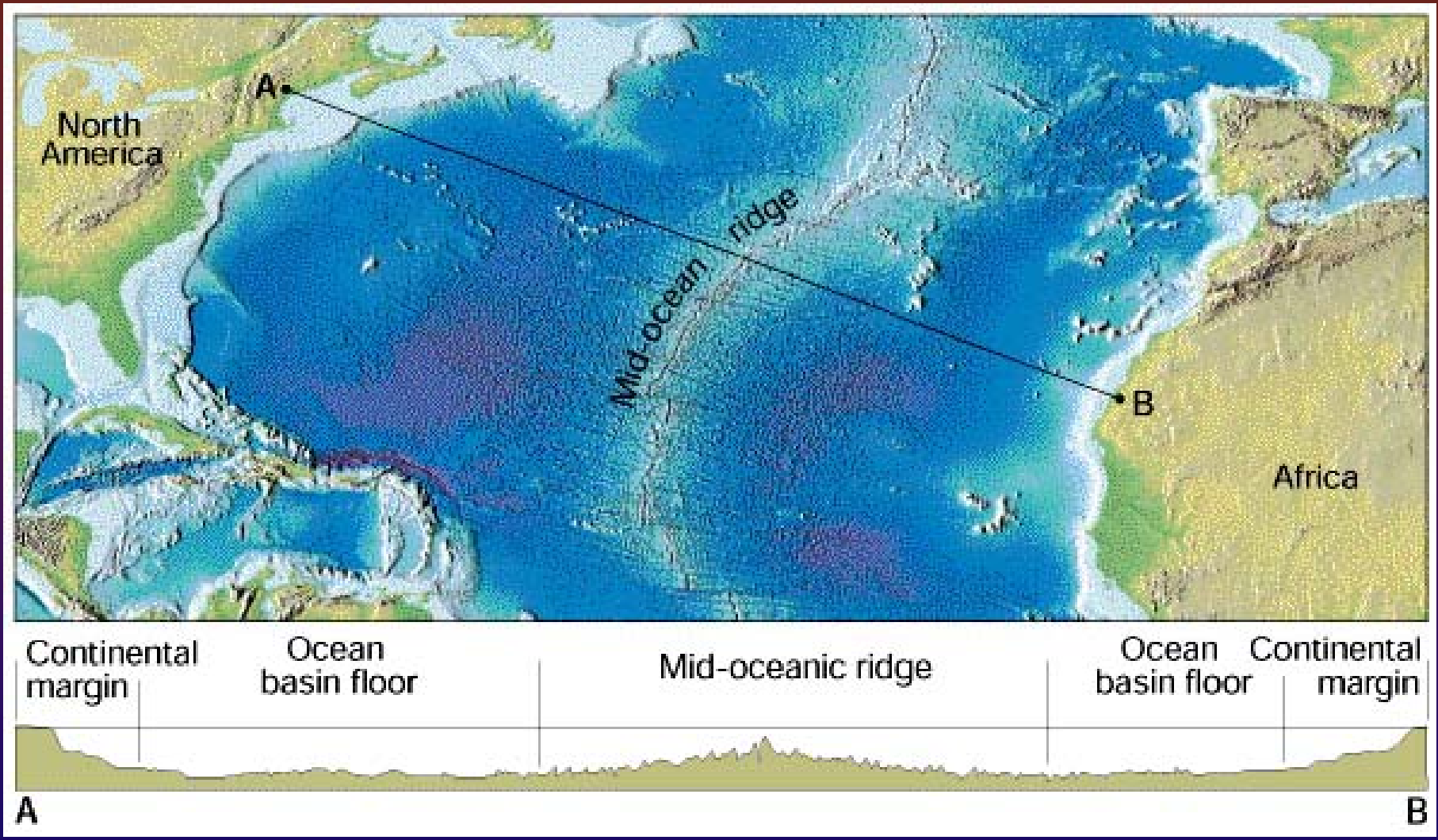
- Continental drift was not accepted initially
- Wegener believed that continents moved through the ocean: ***FALSE***
- Continents and oceans actually move together!
- Wegener could not explain ***WHY*** the plates move

Mid-ocean ridges

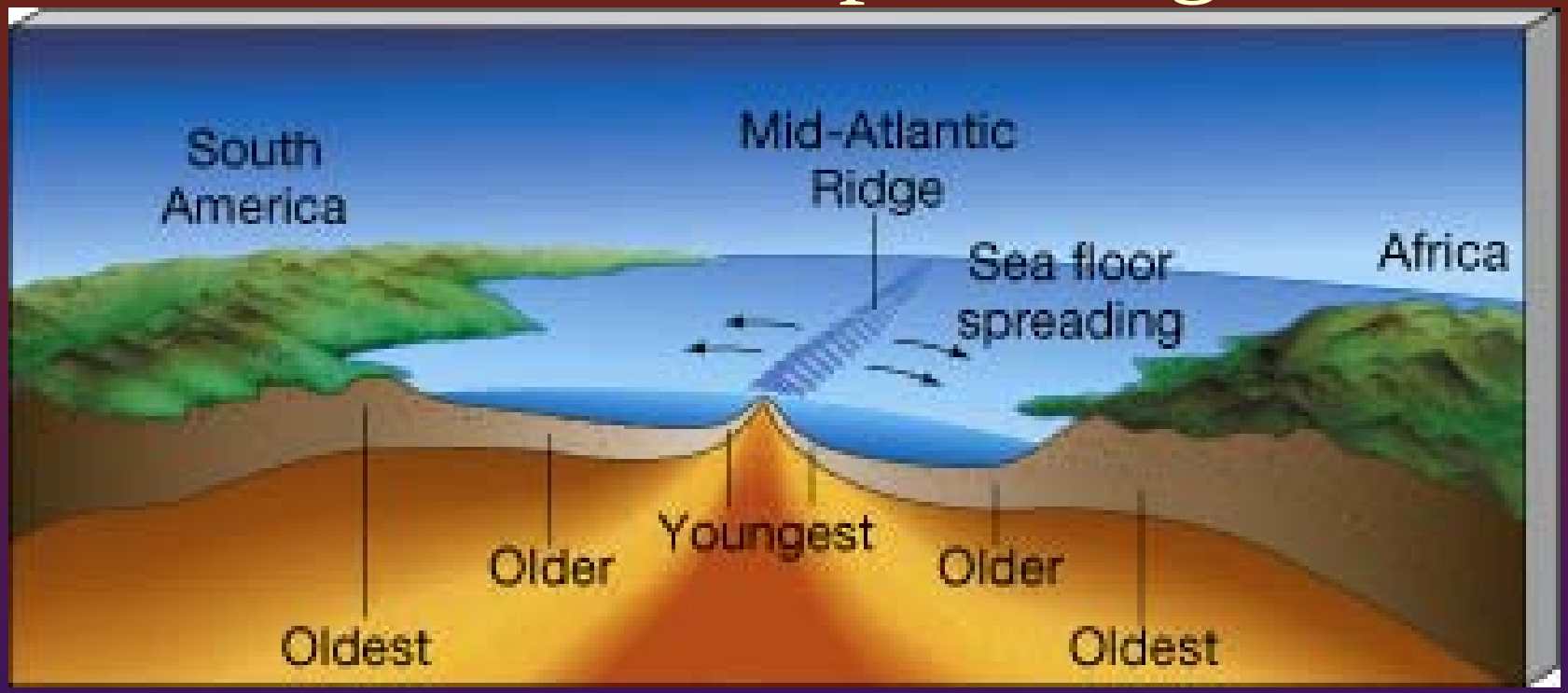


- Mid-ocean ridges discovered in early 1960s
- Mountain ranges on the ocean floor
- Discovered using echo sounders

Mid-Atlantic Ridge



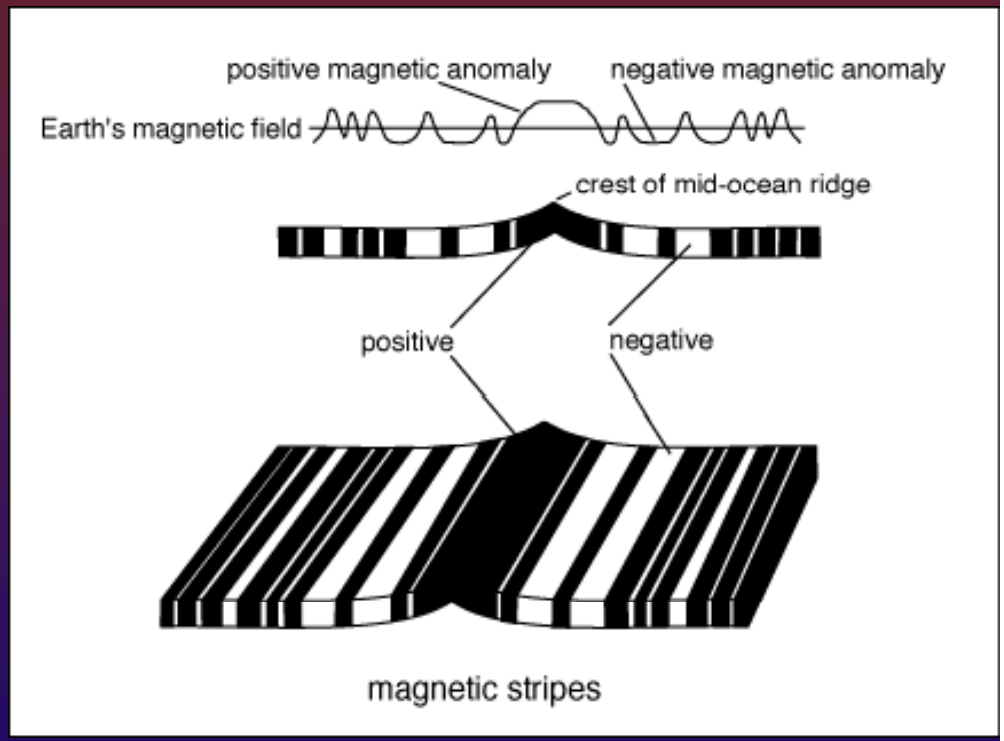
Seafloor spreading



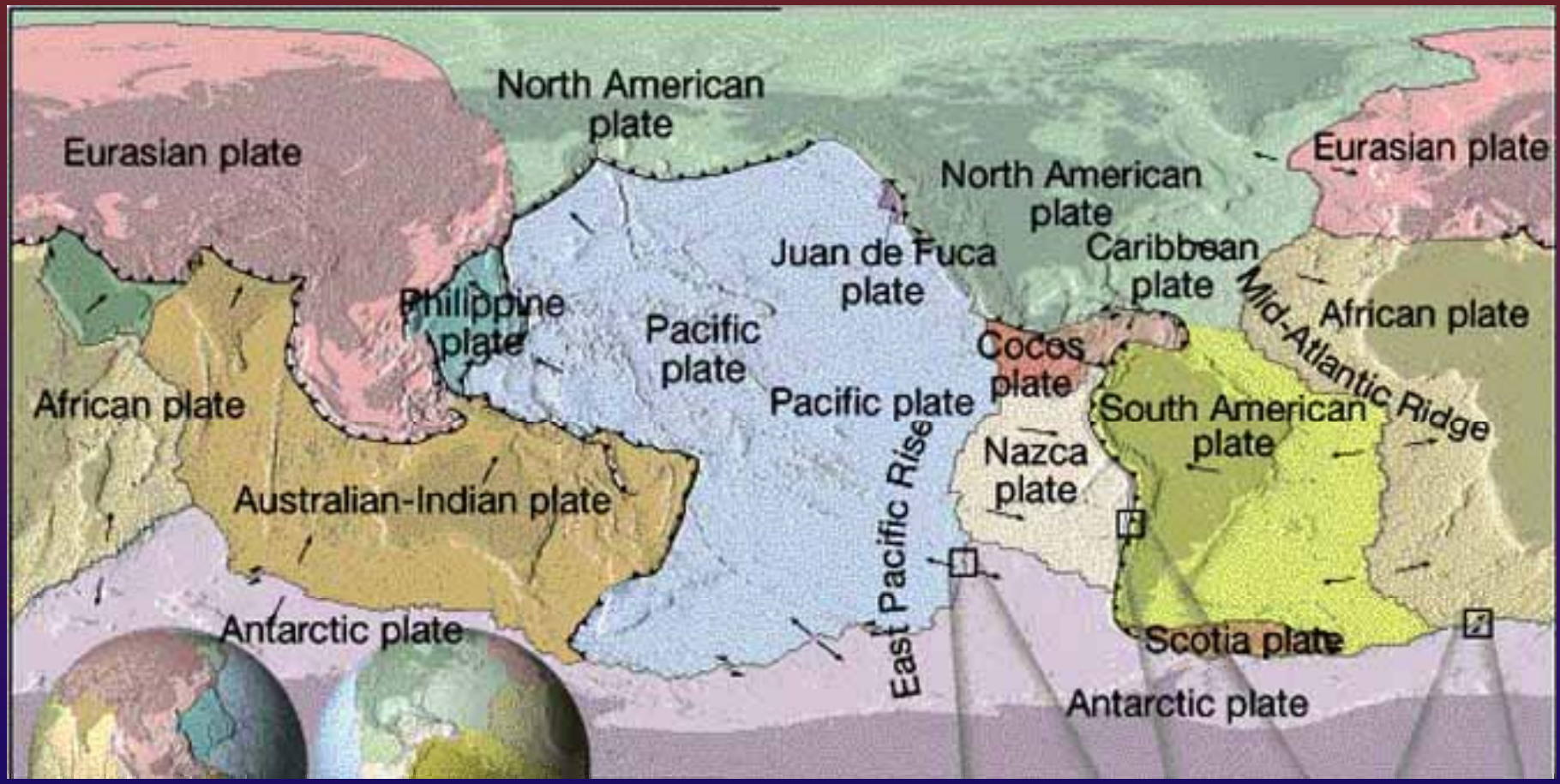
- Seafloor spreading occurs at MORs
- Sea floor on either side of the ridge pushed away by rising magma from the mantle

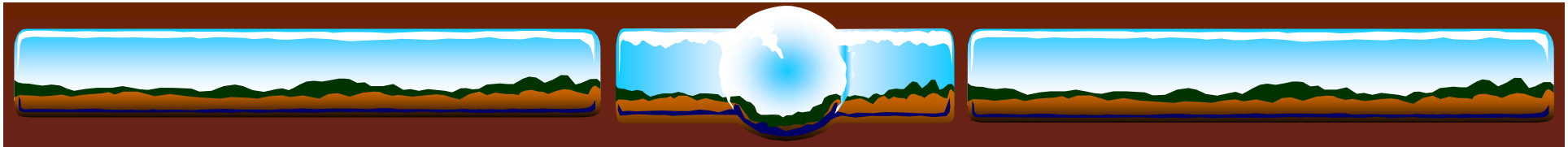
Magnetic patterns on the seafloor

- Earth's magnetic polarity reverses
- The magnetism is trapped in the rocks at the spreading center when rocks cool
- Creates a pattern on the seafloor



Plates are pieces of the lithosphere

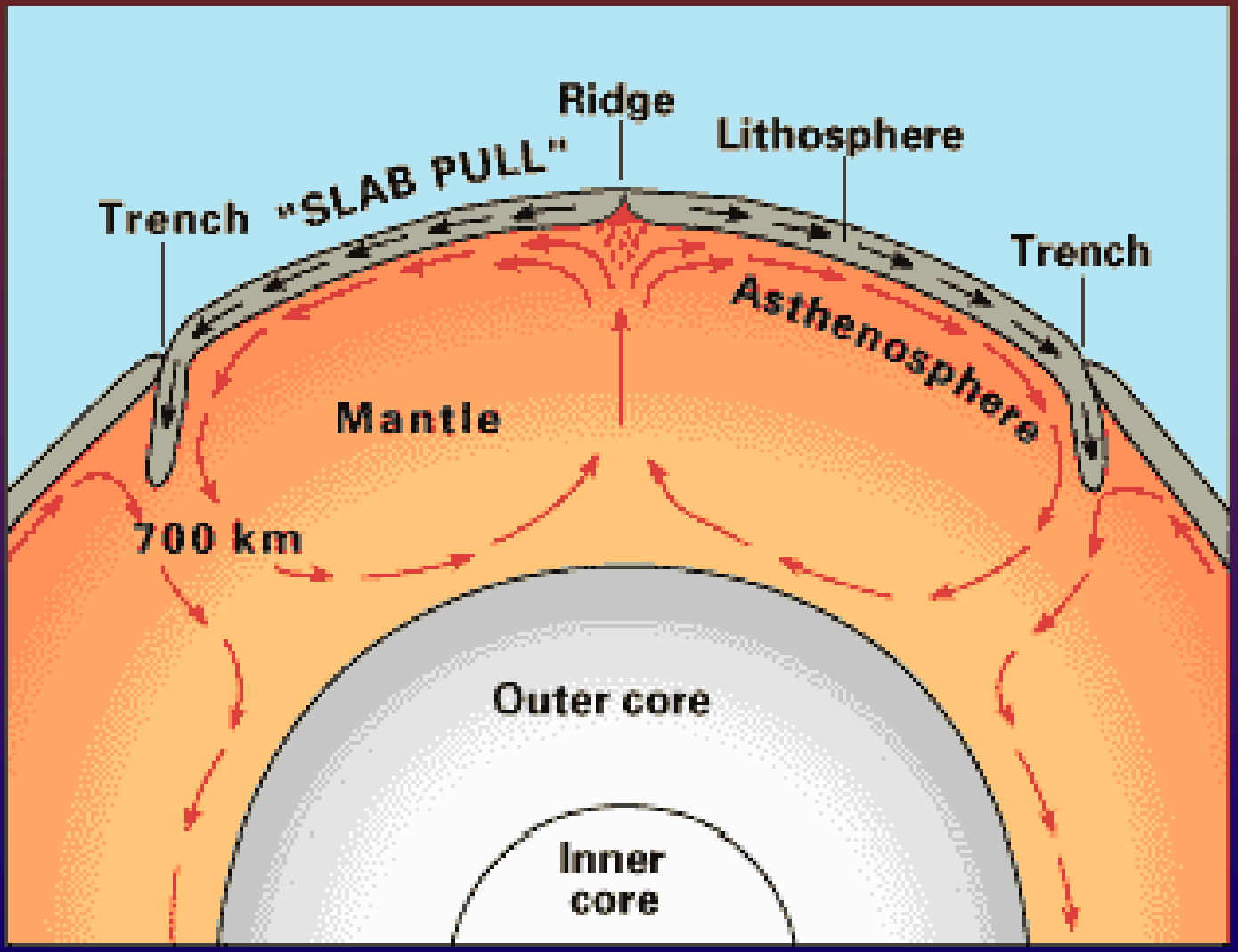




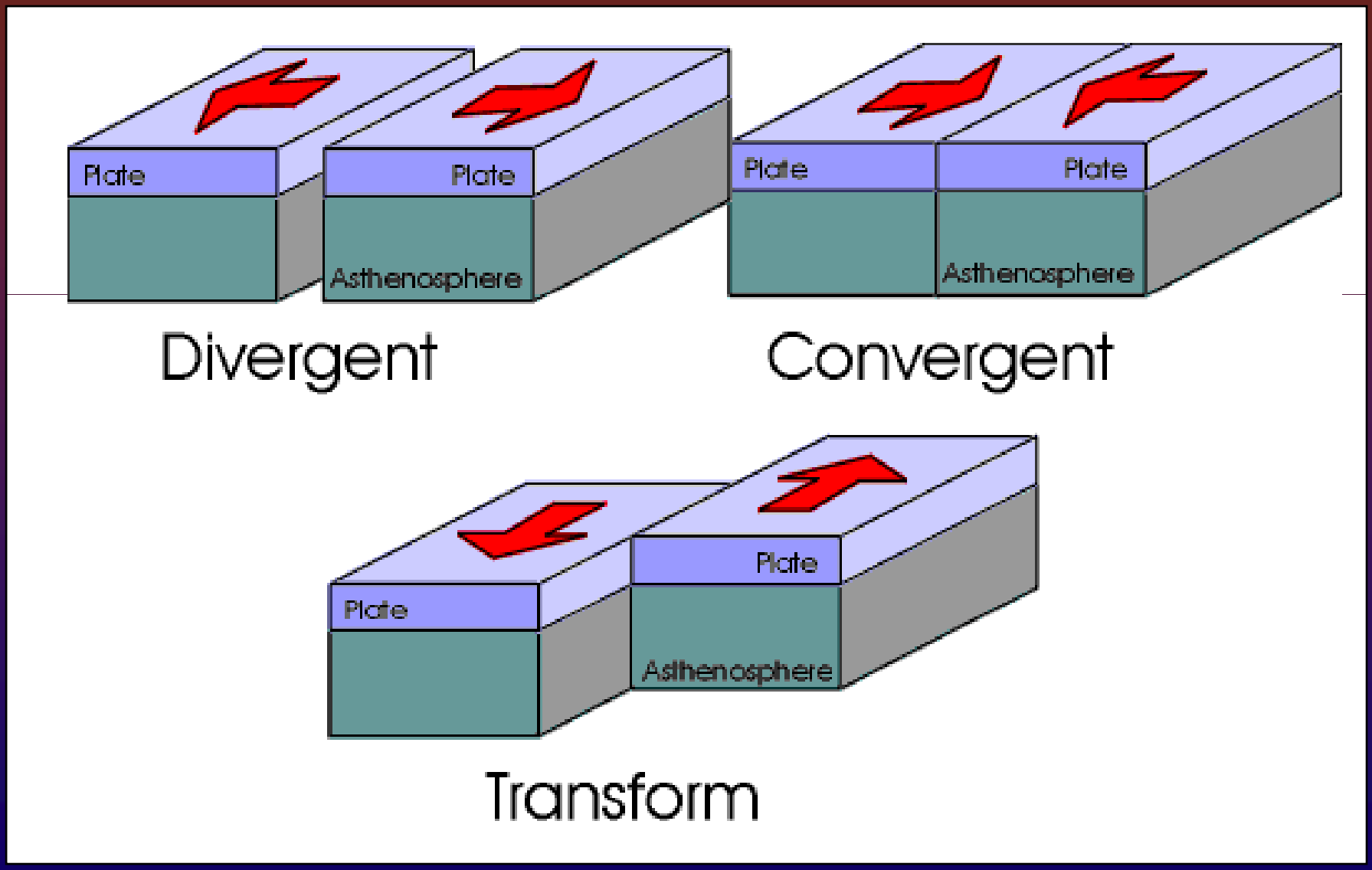
Putting it all together

- Magnetic patterns
- Seafloor spreading
- Continental drift
- Lithosphere divided into plates

How does it happen?



Types of boundaries



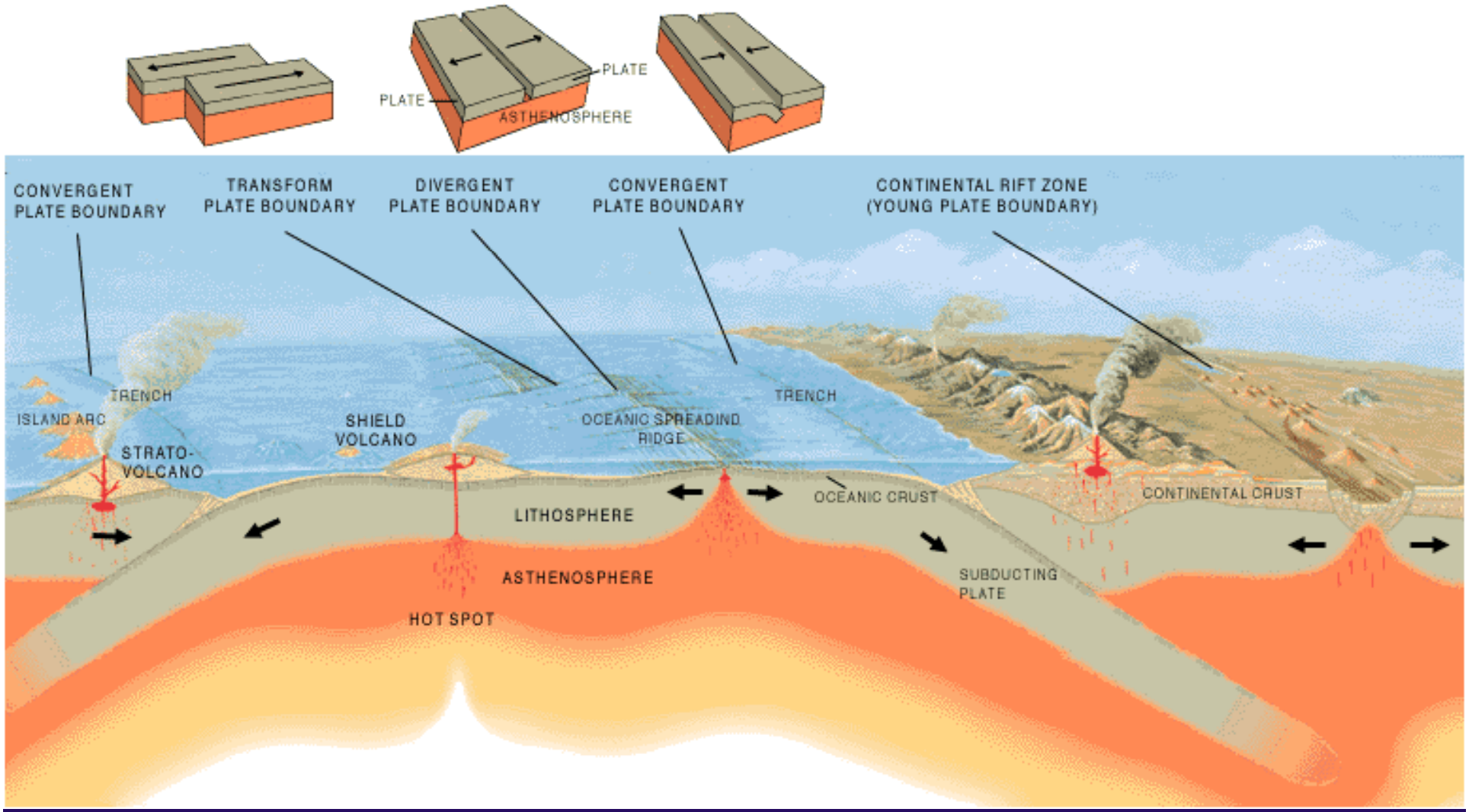


PLATE
PLATE
ASTHENOSPHERE
CONVERGENT PLATE BOUNDARY
TRANSFORM PLATE BOUNDARY
DIVERGENT PLATE BOUNDARY
CONVERGENT PLATE BOUNDARY
CONTINENTAL RIFT ZONE (YOUNG PLATE BOUNDARY)
TRENCH
ISLAND ARC
STRATO-VOLCANO
SHIELD VOLCANO
OCEANIC SPREADING RIDGE
TRENCH
OCEANIC CRUST
CONTINENTAL CRUST
LITHOSPHERE
ASTHENOSPHERE
SUBDUCTING PLATE
HOT SPOT

Why is this important?

- Most geologic activity occurs at plate boundaries
- Volcanoes, earthquakes, tsunamis