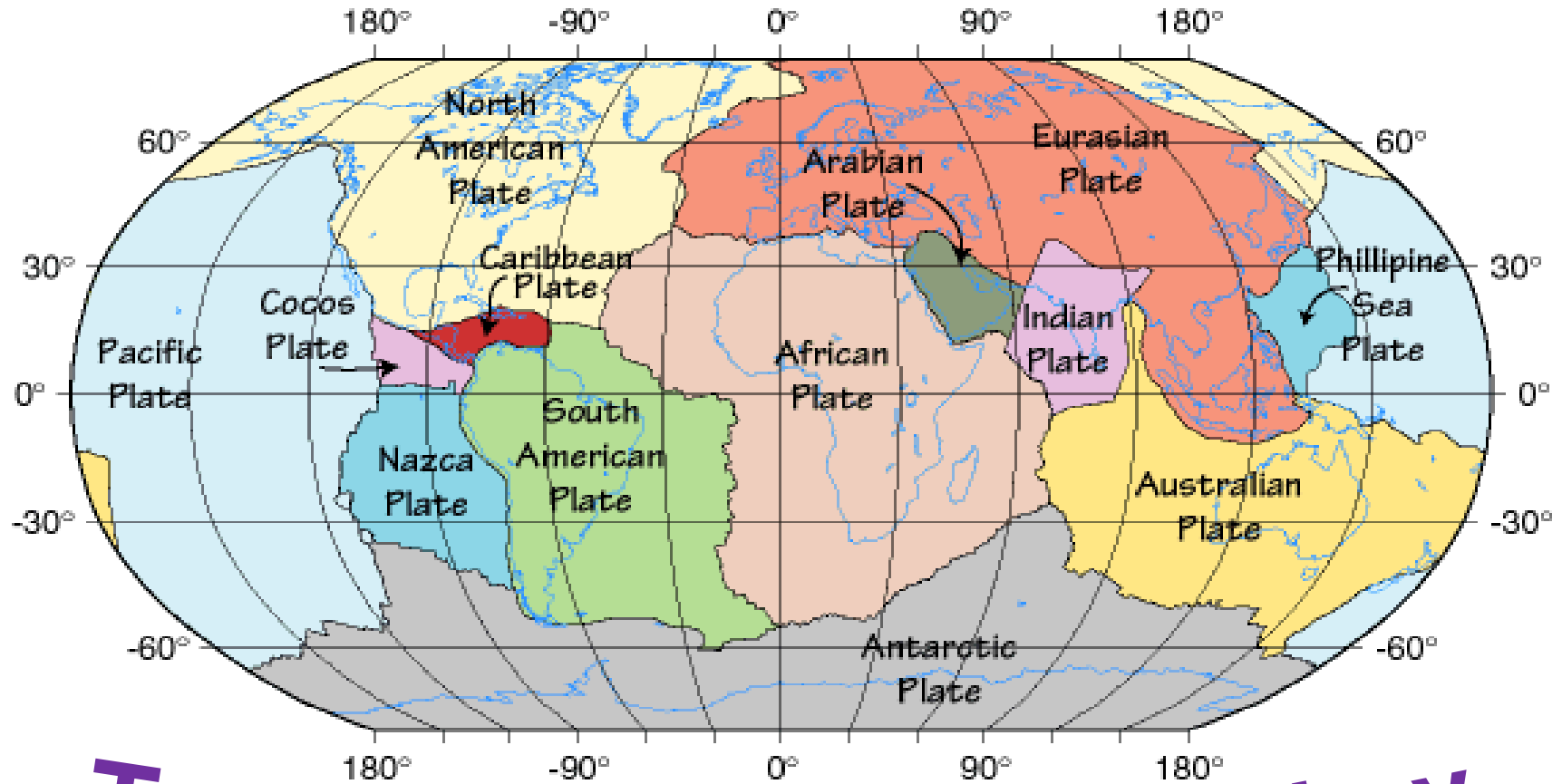


Lithosphere

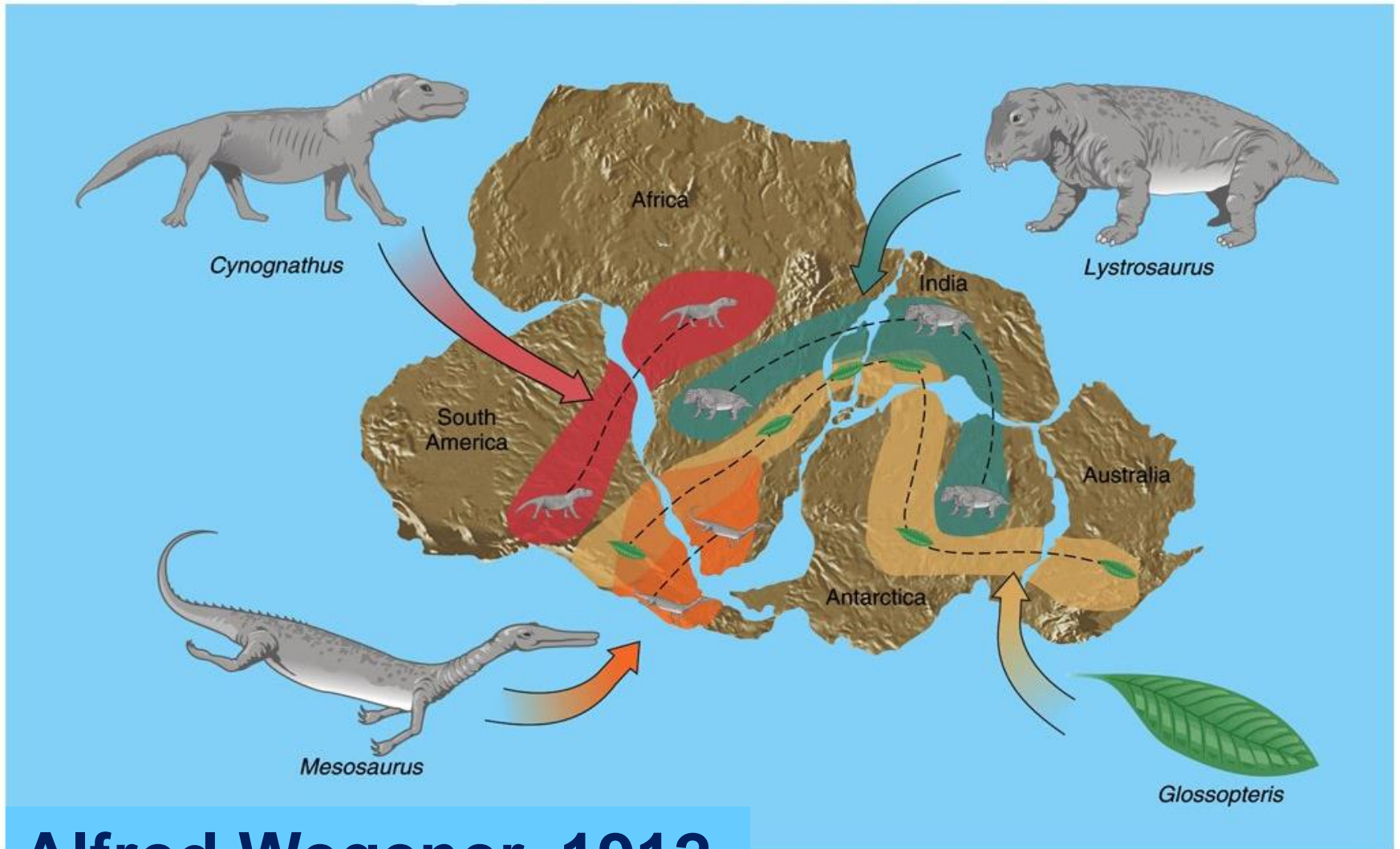


**Tectonic
Plates**

and

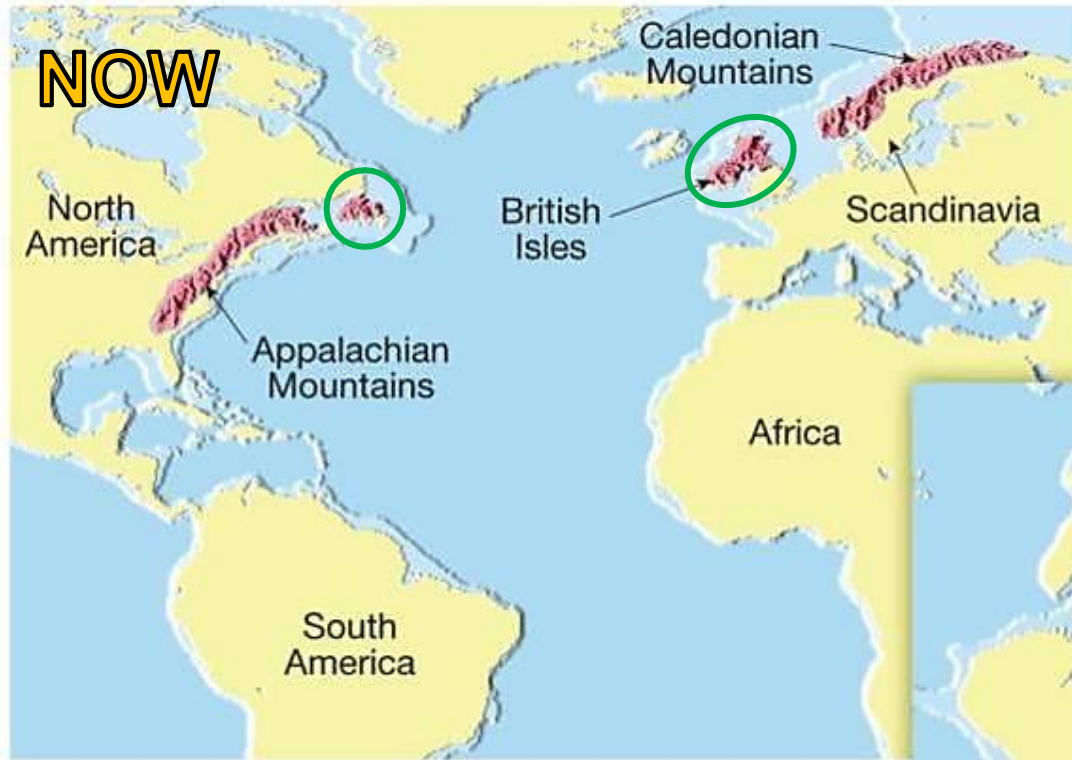
**How They
Move**

Continental Drift: Fossil Evidence



Alfred Wegener, 1912

Matching Mountain Ranges

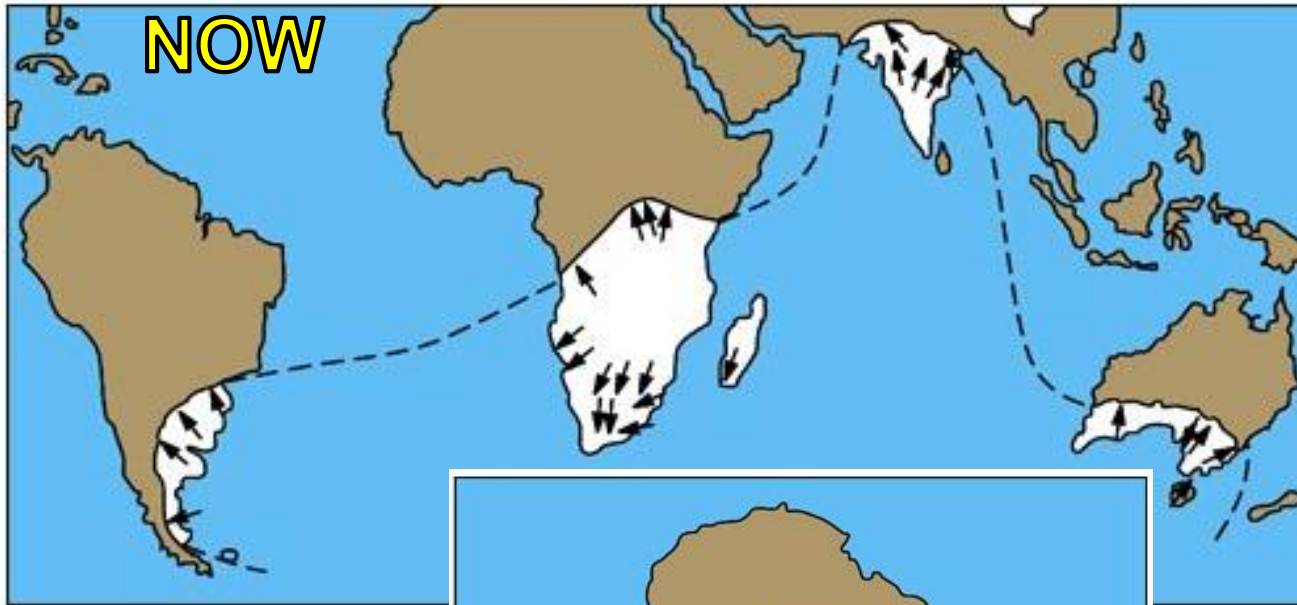


- Parts of **Scotland and Ireland** contain rocks very similar to those found in **Newfoundland and New Brunswick**.

- The **Caledonian Mountains of Europe** and parts of the **Appalachian Mountains of North America** are very similar in structure and composition.

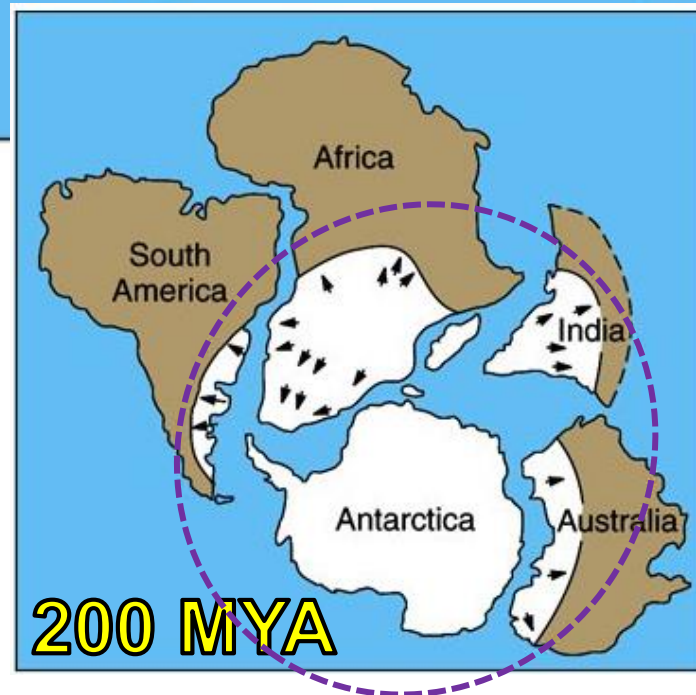


Paleo Glaciation Evidence



- Ancient glacial deposits are found on the southern ends of all Southern Hemisphere continents.

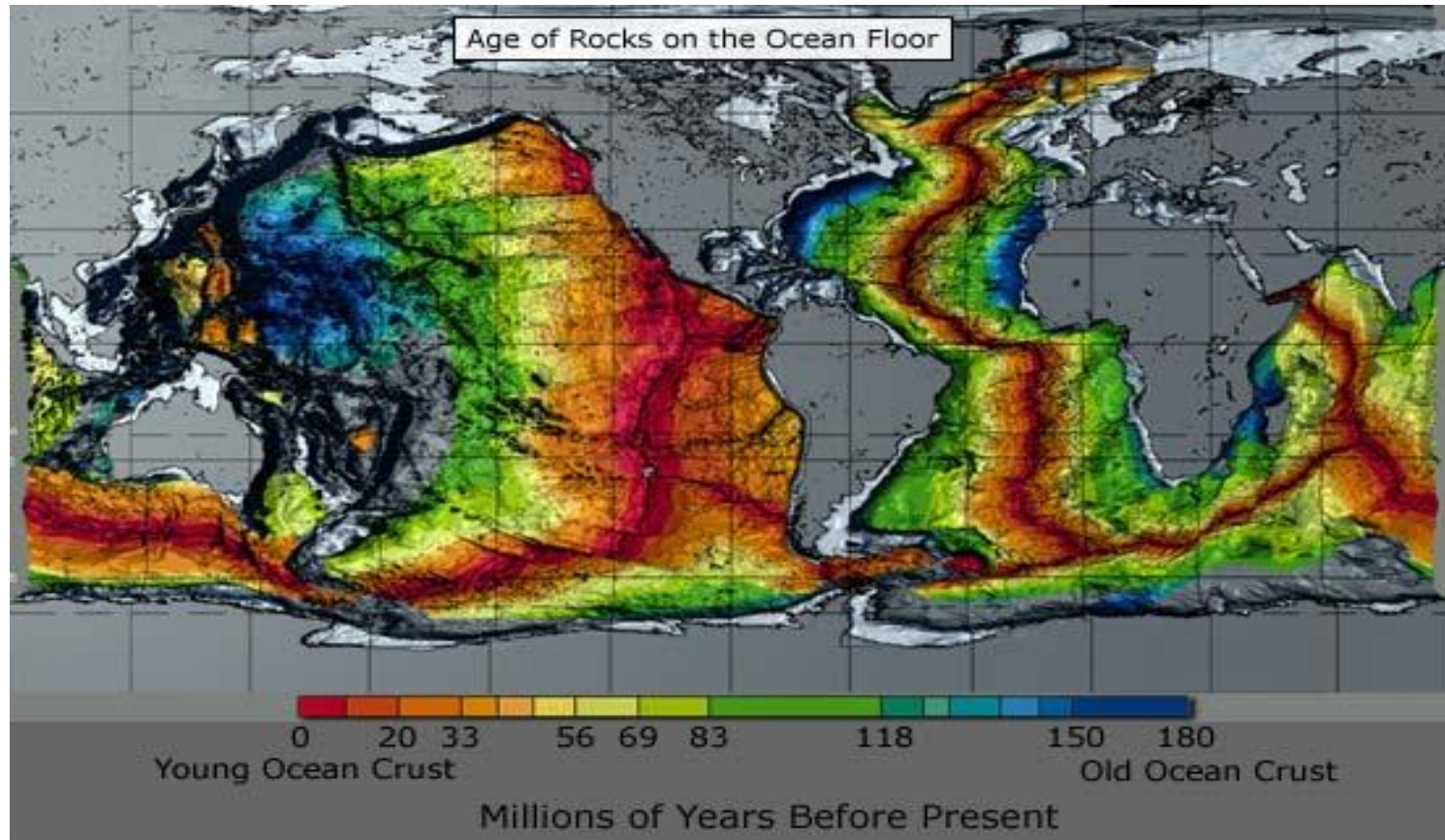
- Glacier retreat “scars” are evident in rocks that are now located in tropical (very warm!) regions.



- This data is consistent with the ice flow of a **single ancient ice cap that once covered a part of Pangea**, similar to the Antarctic ice sheet of our time.

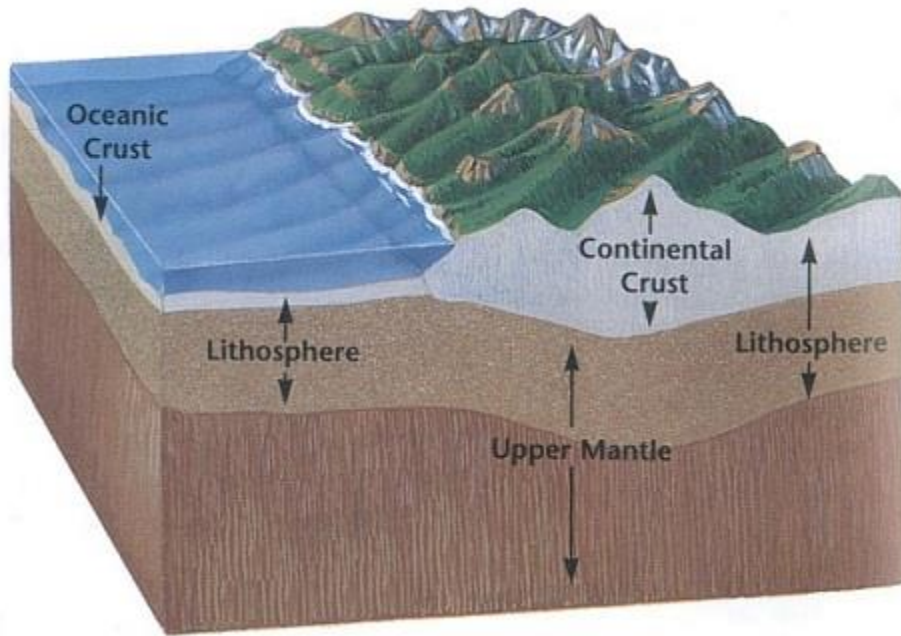
Strong Geophysical Proof

Oceanic crust is seldom more than **200 million years old!**



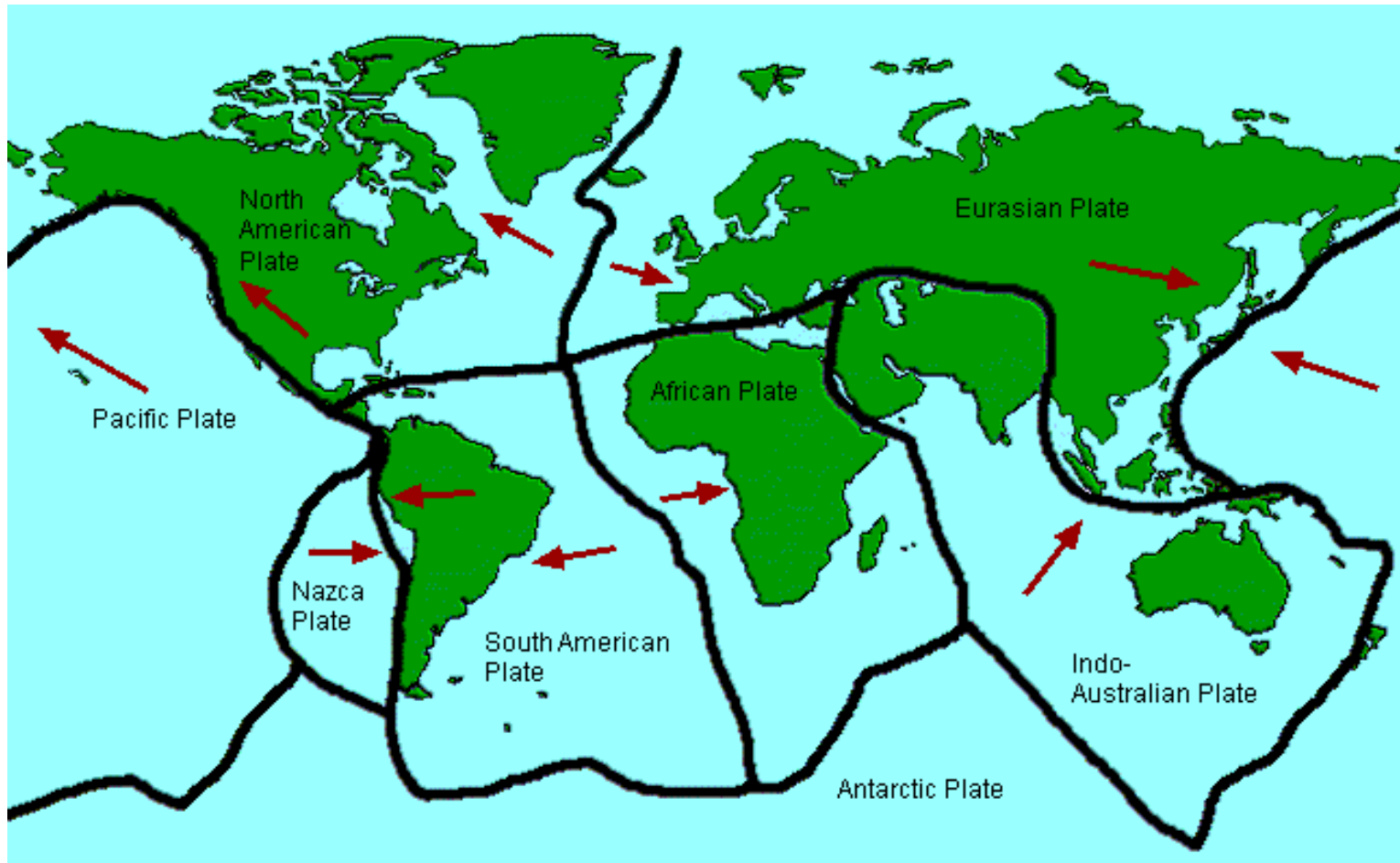
Late 1950s and early 60s data on the **bathymetry of the deep ocean floors** and the nature of the oceanic crust revealed **evidence of seafloor spreading** along the *mid-oceanic ridges*.

Lithosphere: Sphere of Rock



- rigid outer layer
- made of **crust** and the **uppermost** part of the **mantle**
- broken into pieces called **tectonic plates**
- eight major tectonic plates (plus several minor)

Major Tectonic Plates



All tectonic plates **move** in different directions 1-2 inches per year.

How do Plates Move?

- The driving forces of plate motion is **an active subject of on-going research** within geophysics.
- **Leading theory:** plates of lithosphere are moved around by **convection in the underlying hot mantle.**

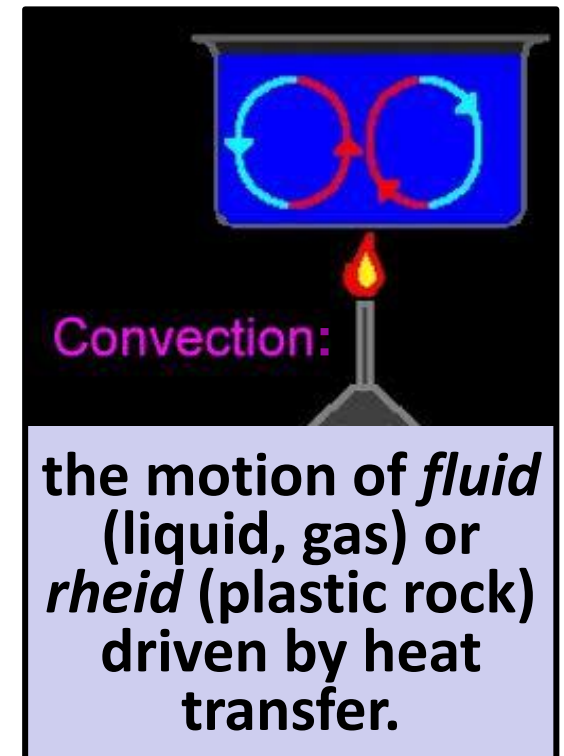
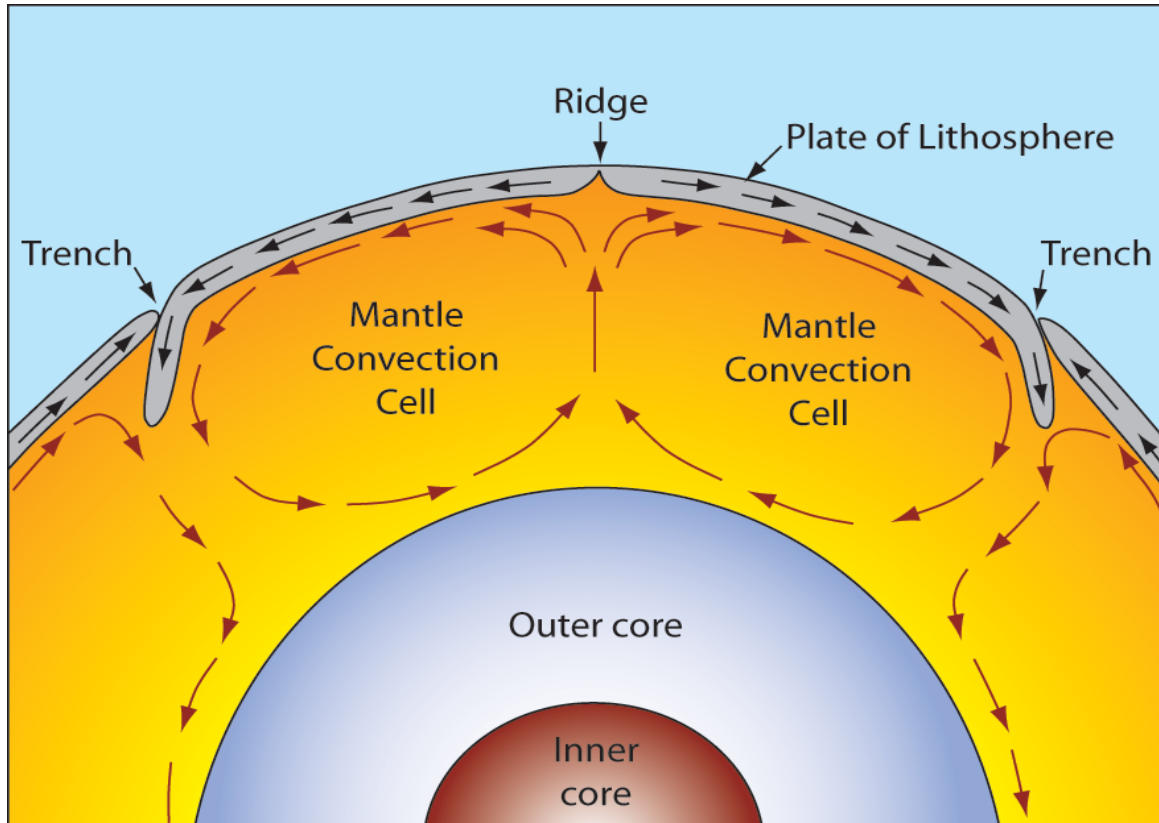
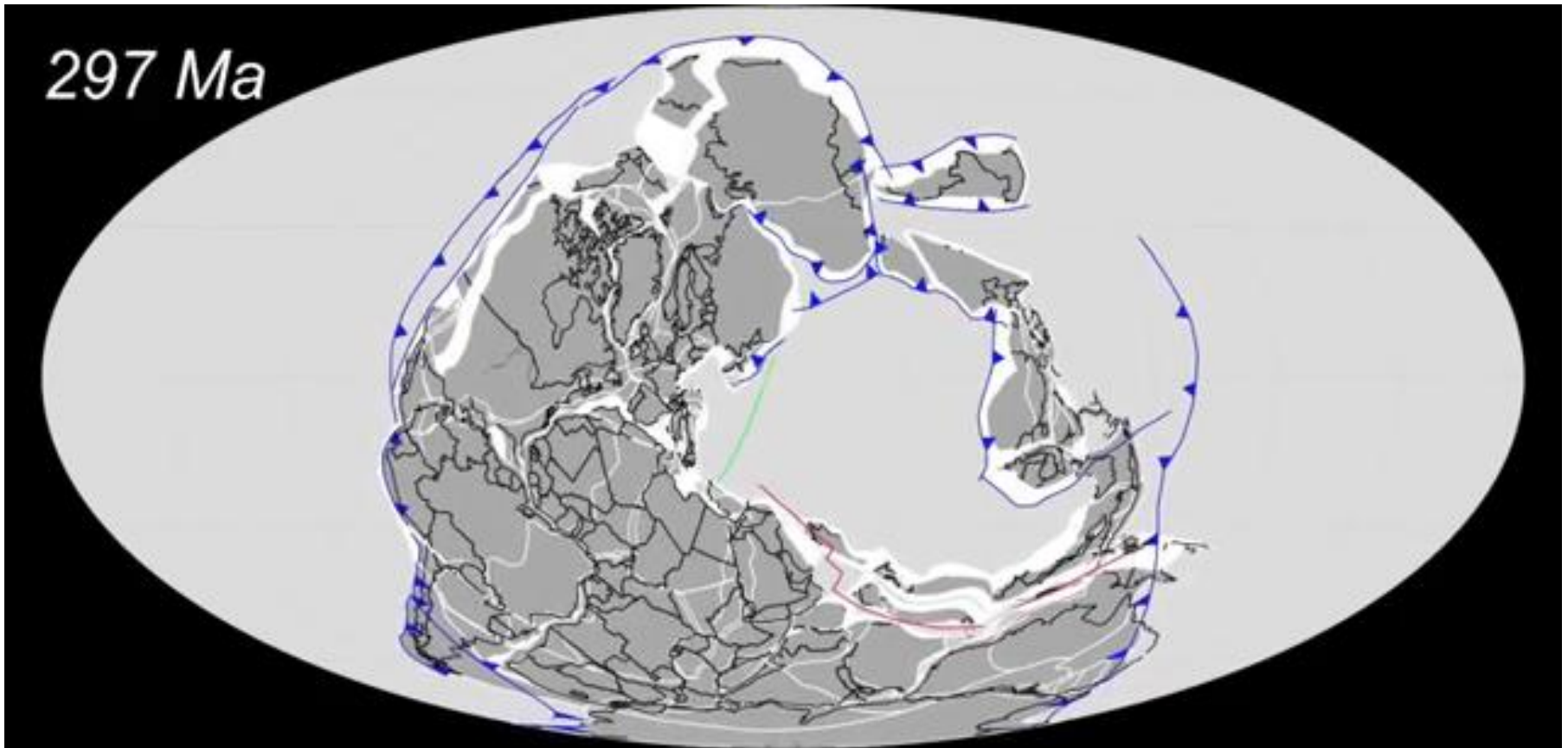


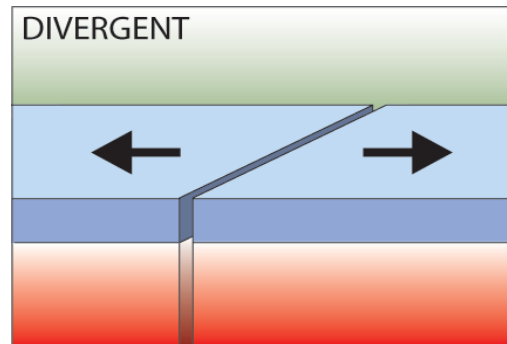
Plate Movement Simulation (past 300 million years)



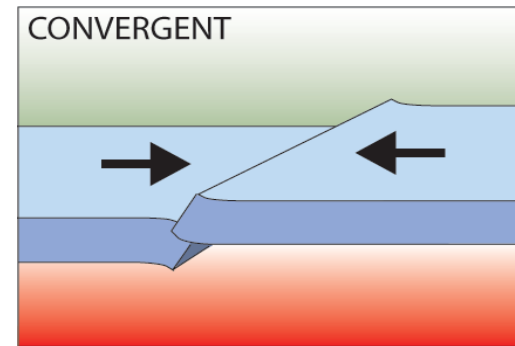
<https://www.youtube.com/watch?v=llnwyAbczog>

Three types of plate boundary

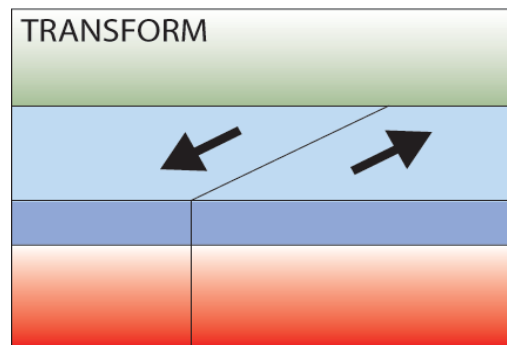
- **Divergent**



- **Convergent**



- **Transform**



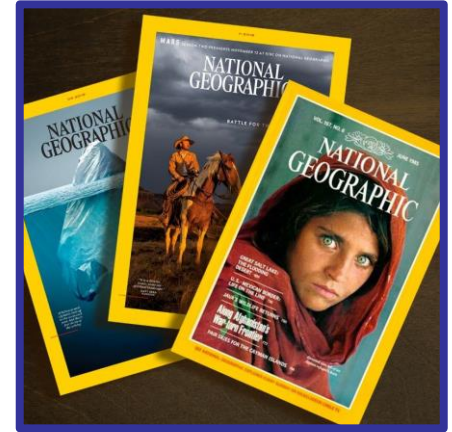
The plate boundary experiment



You will need:

2 **thick** paperback books to represent **continental plates**.

2 **slim** journals/catalogs to represent **oceanic plates**.



You will try to **play out plate interaction** for:

- 1) Divergent boundary – take any two “plates” so that their sides touch and move away from each other.
- 2) Convergent boundary – take any two “plates” and push towards each other; try with all possible pairs of “plates” (thick+thick, thick+thin, thin+thin).
- 3) Transform boundary - take any two “plates”, put them side by side so they are in contact, and then slide against each other.
- 4) In all cases, **note and write down what happens!**