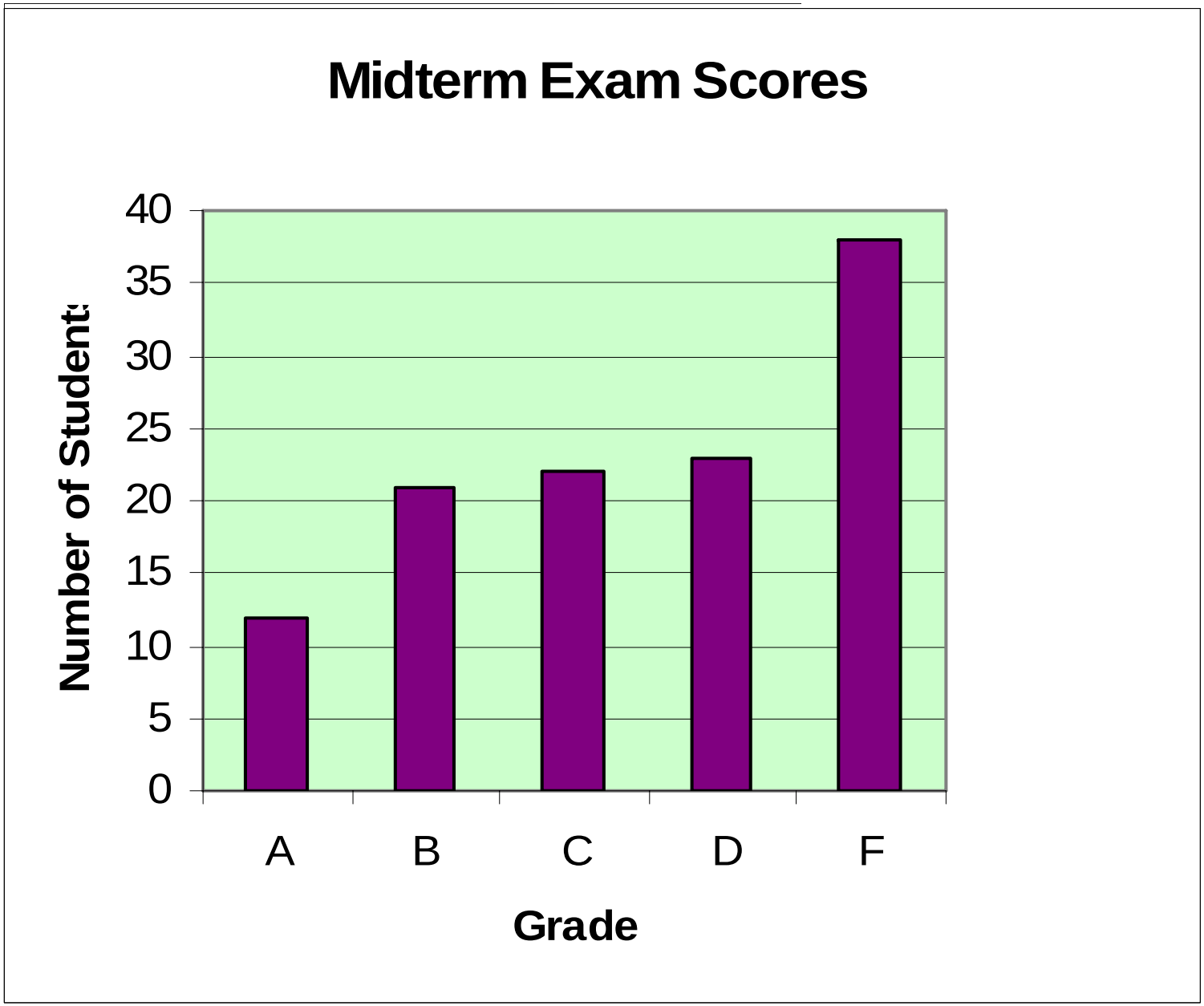
Continental Drift and Plate Tectonics

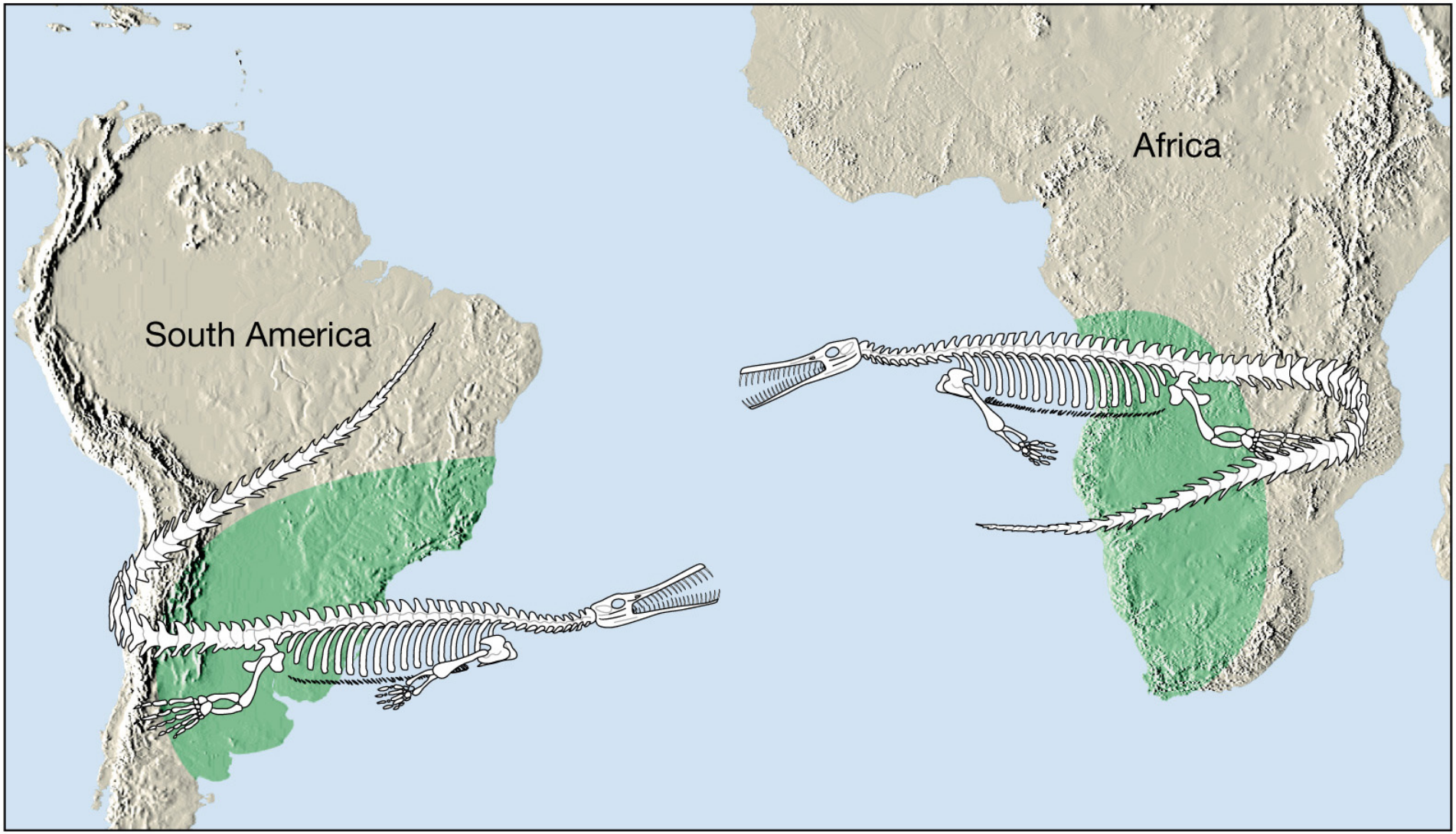
click here for 9/page

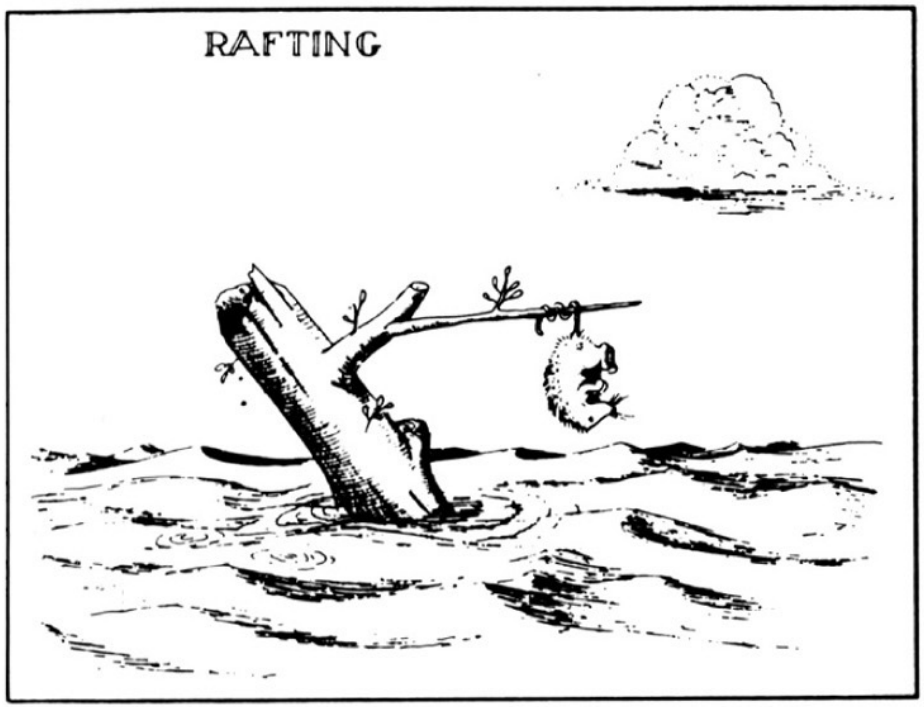

Midterm Exam Scores
Number of Students
40
35
30
25
20
15
10
5
0
A
B
C
D
F
Grade

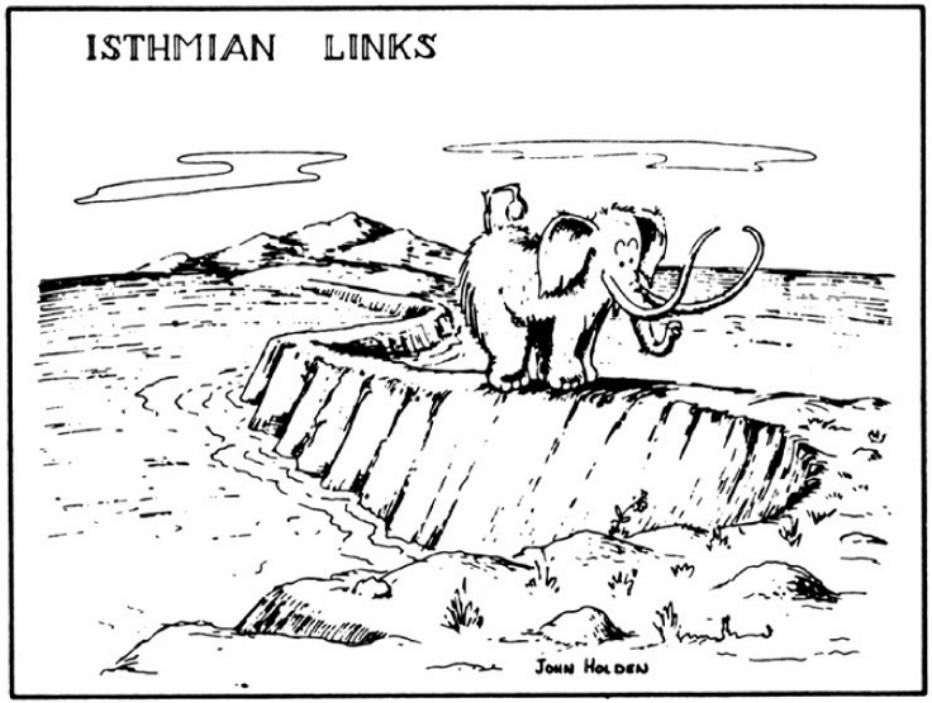
Supercontinent 200 m.y.a.

Shelf fit of southern continents

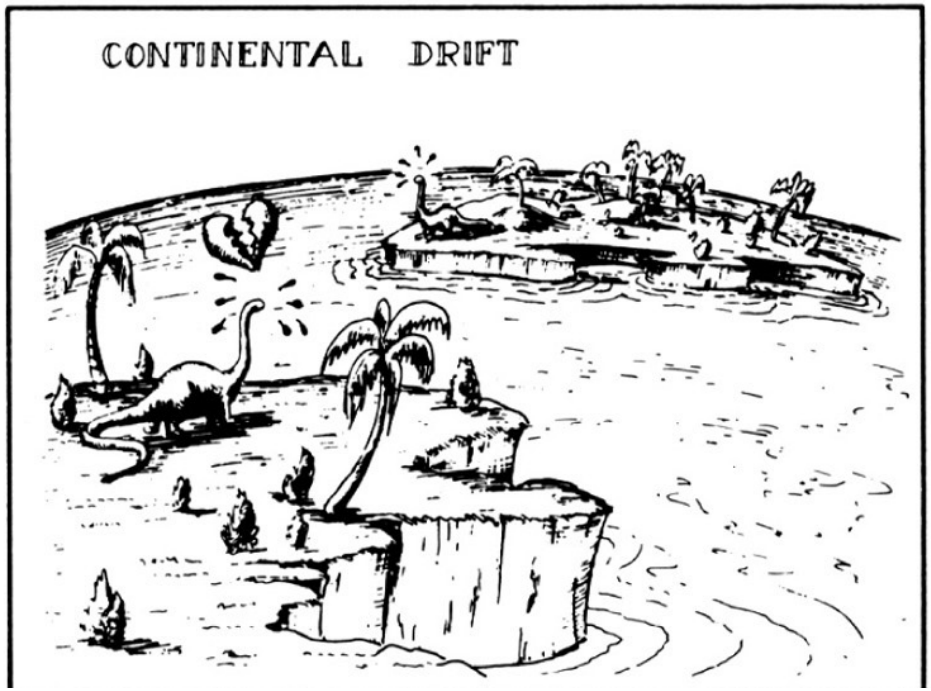
Mesosaurus occurrences



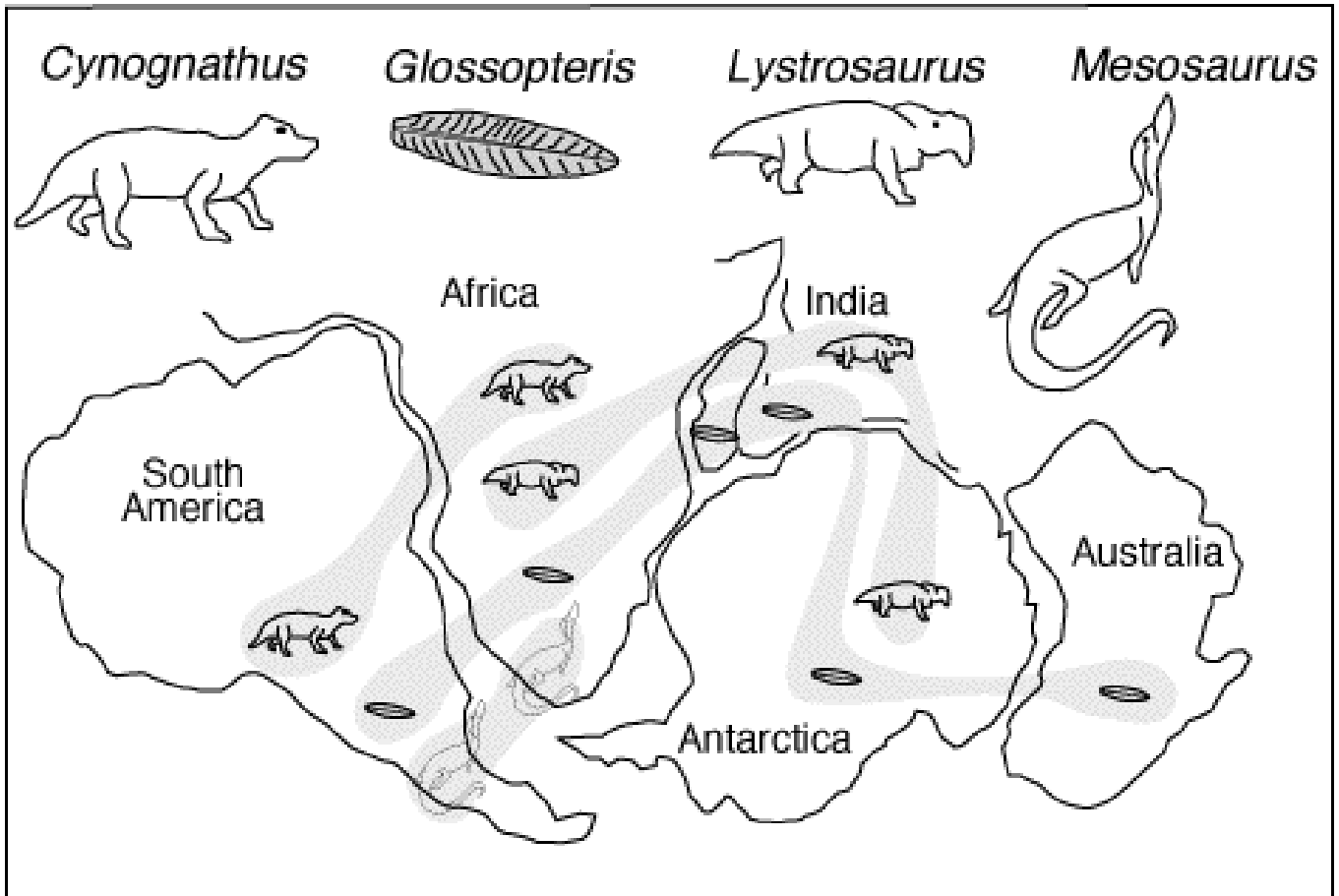

RAFTING


ISTHMIAN LINKS
JOHN HOLDEN

ISLAND STEPPING STONES

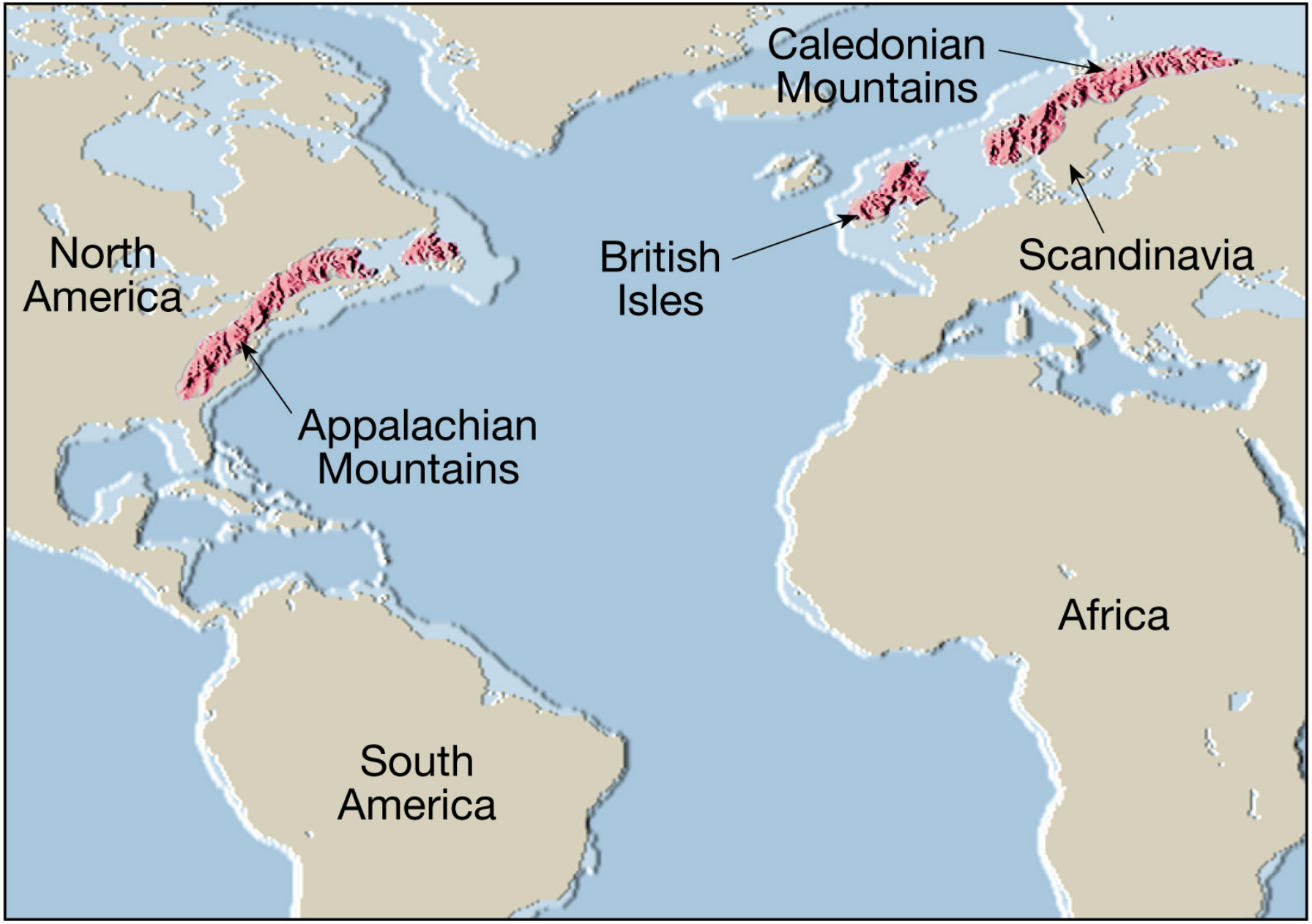

CONTINENTAL DRIFT

Other fossil locations



Distribution of fossils across the southern continents of Pangea.

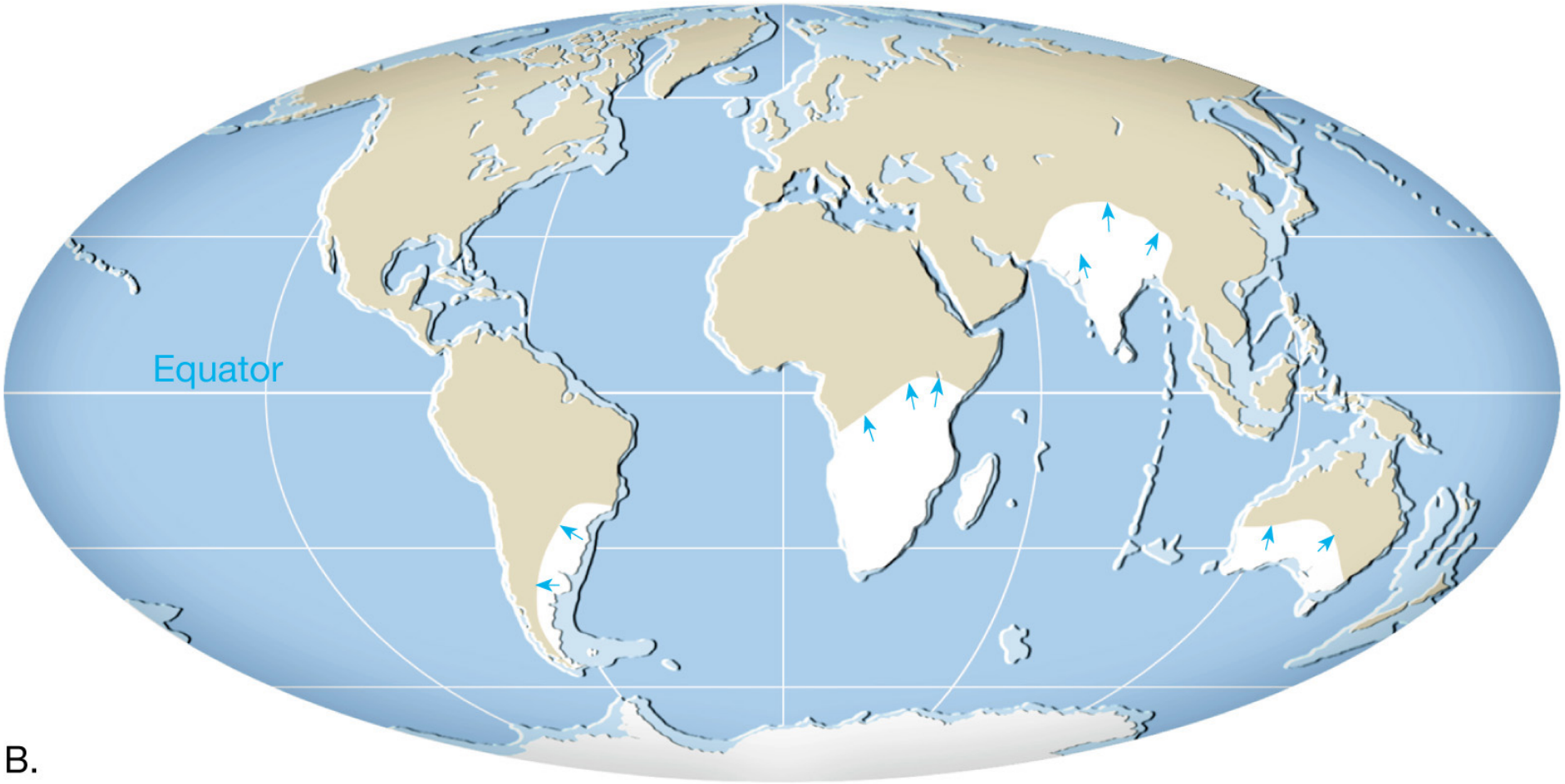
- http://www.mu.edu/classes/day/images/PlateTechtonics/fossils.gif


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

A.

B.

Occurrence of Southern Glaciation

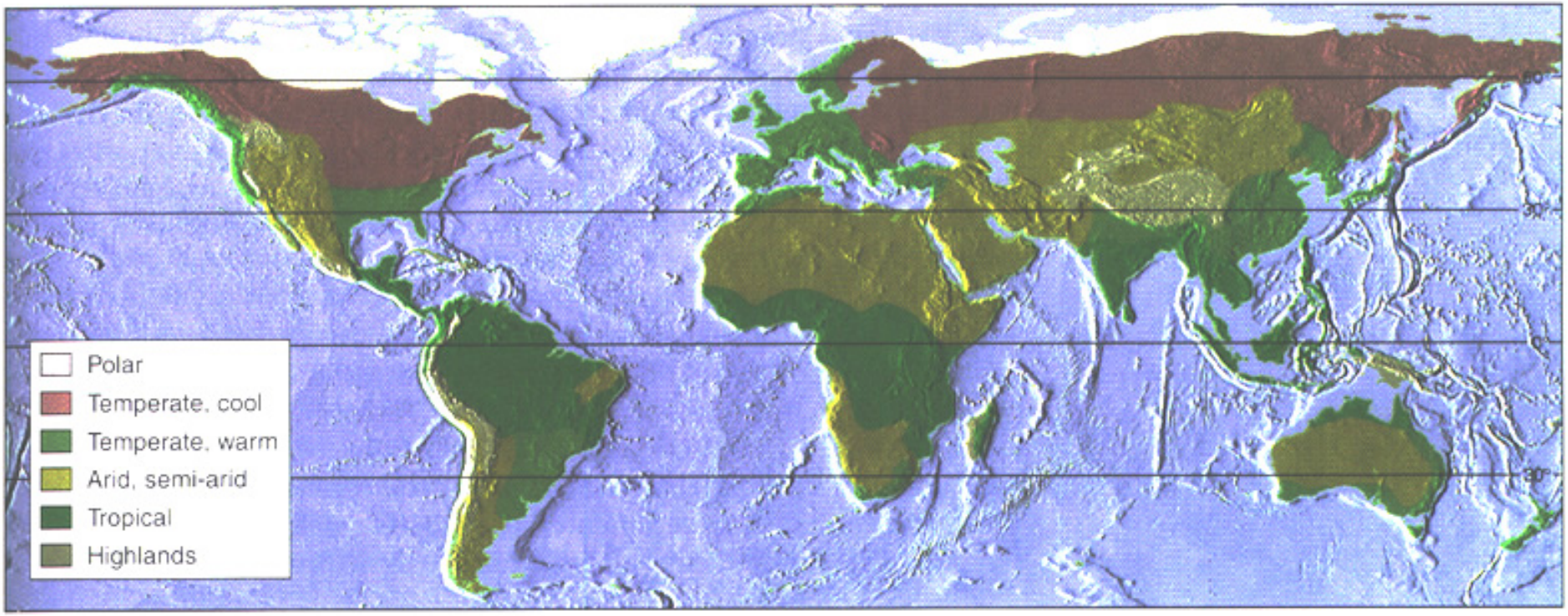


B.

Match of Southern Glaciation

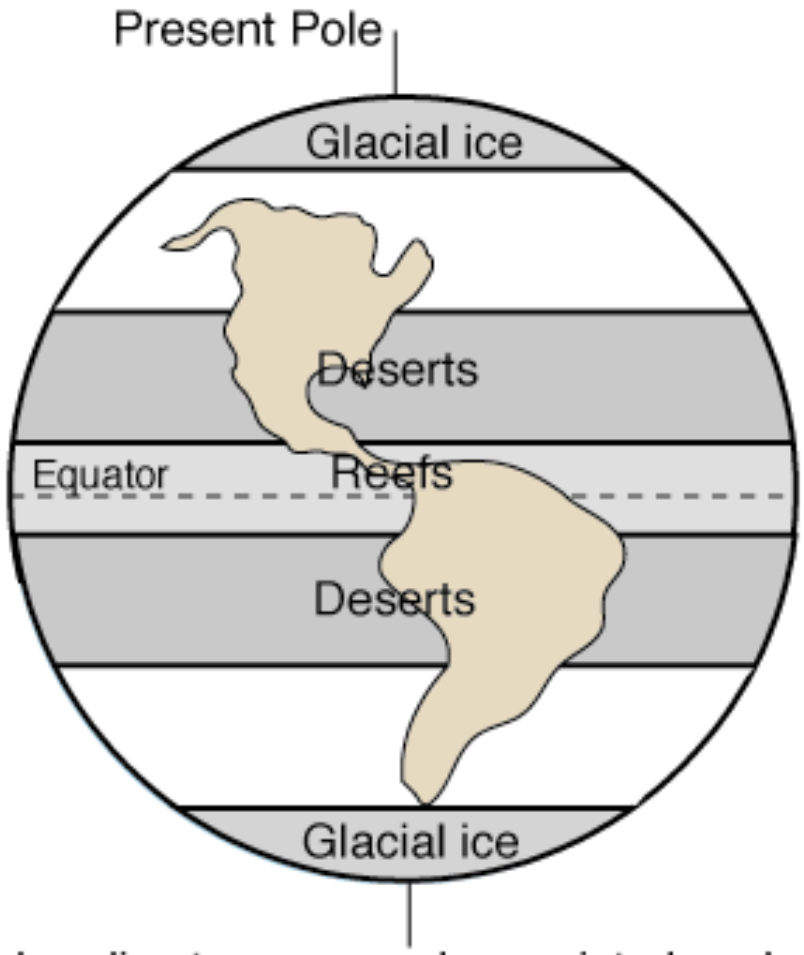
A.

Climate zones



- http://www.geol.umd.edu/~piccoli/100/ch9_2.htm

Climate distribution



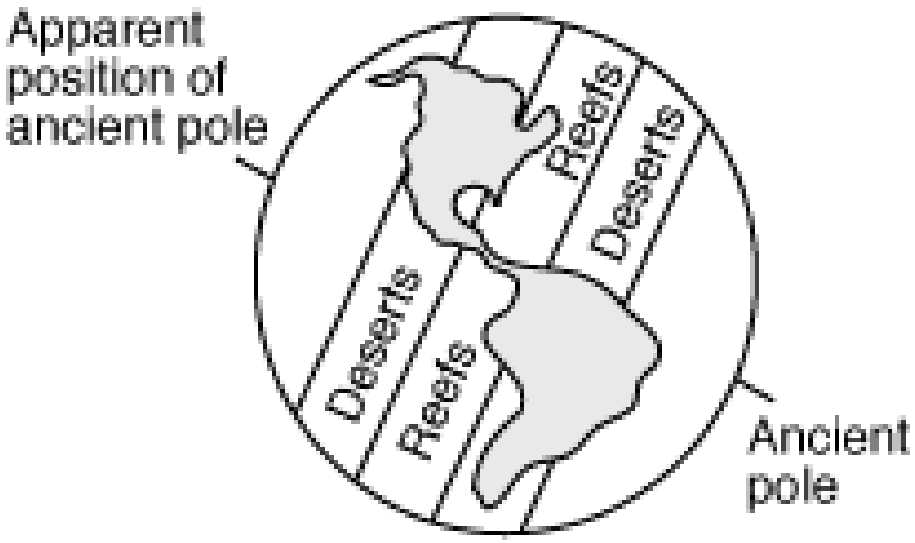
Present-day climate zones and associated geologic features define a pattern relative to the pole of rotation.

- http://www.mu.edu/classes/day/images/PlateTechtonics/climatezones.htm

Change in pole position

Two possible interpretations of the distribution of ancient climate zone.

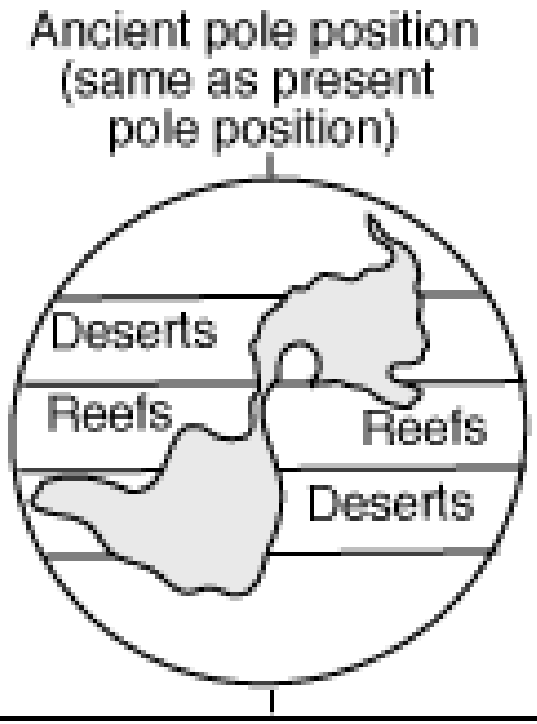
Either the continents remain fixed and the poles wander or



- http://www.mu.edu/classes/day/images/PlateTechtonics/climatezones.htm

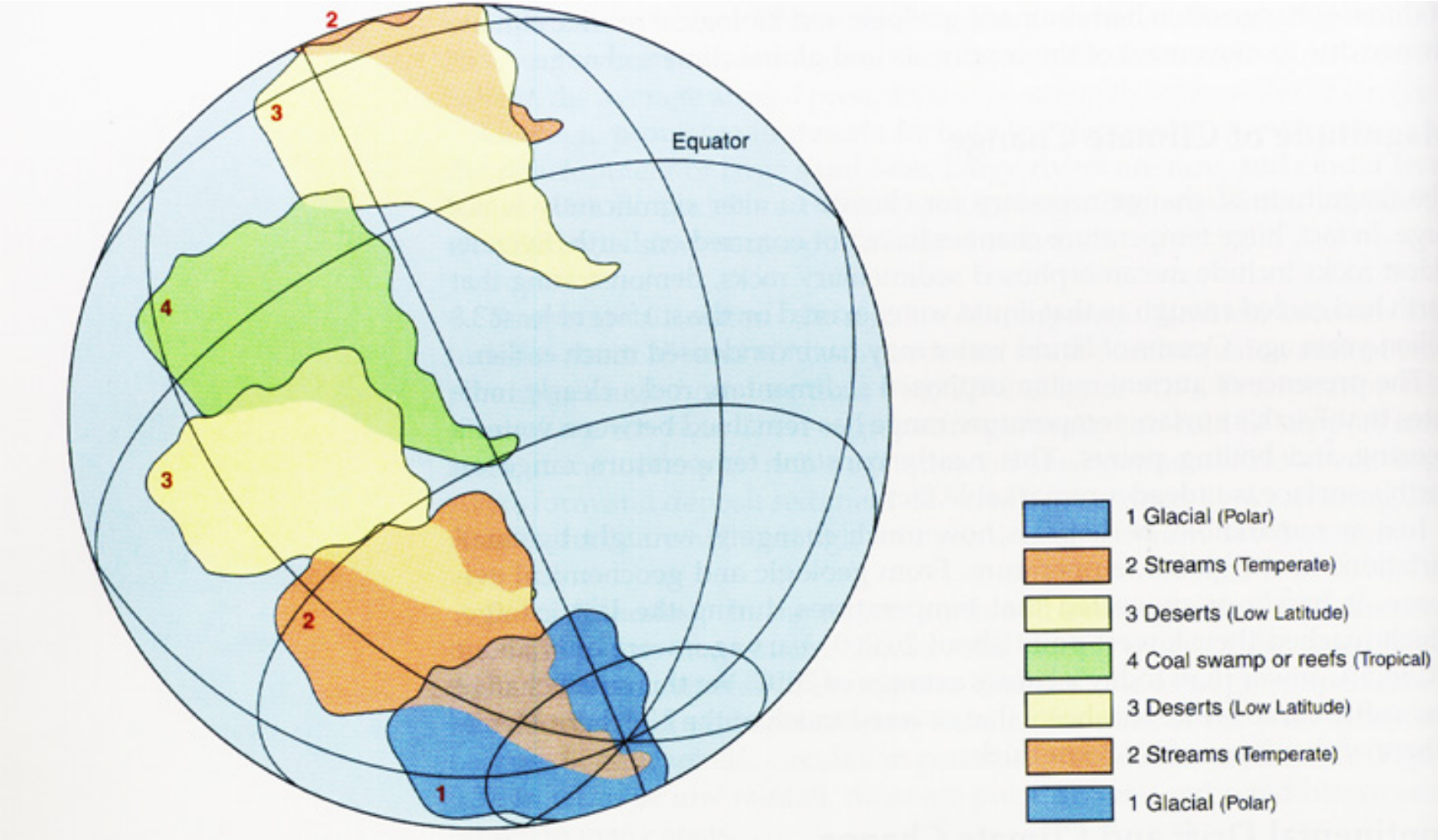
Change in continent position

the poles remained fixed and the continents wander.



- http://www.mu.edu/classes/day/images/PlateTechtonics/climatezones.htm

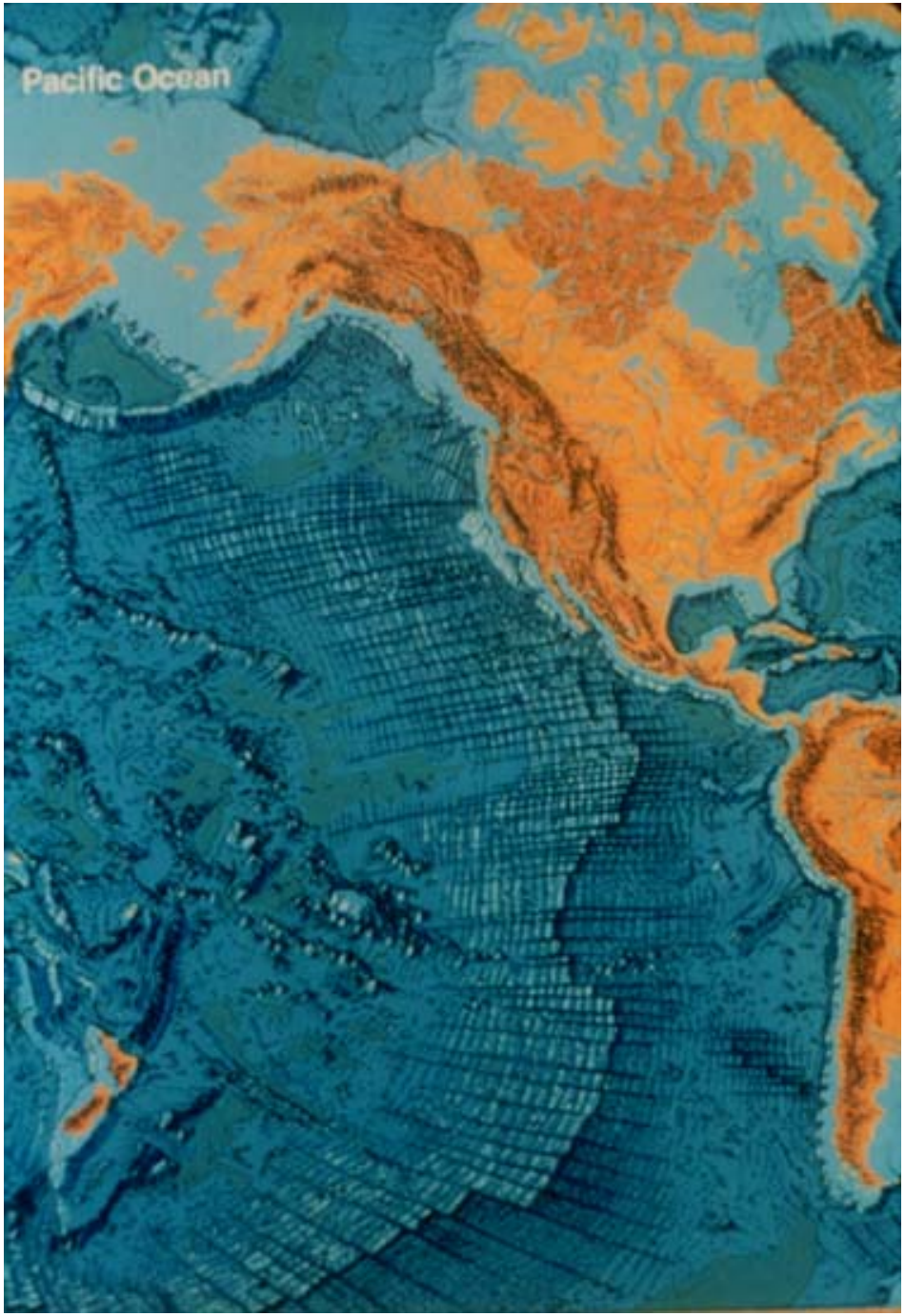
Climatic change with drifting



- http://www.geol.umd.edu/~piccoli/100/ch9_2.htm

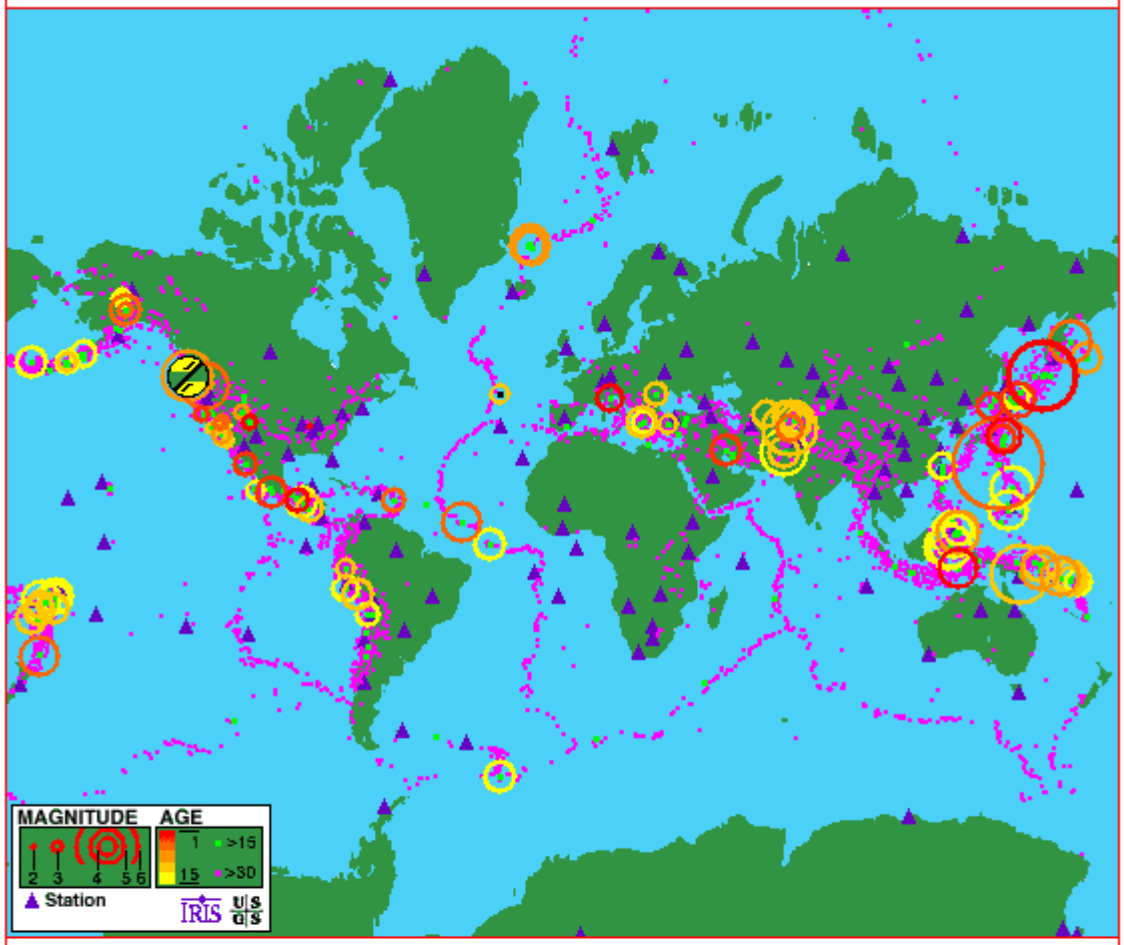
Supercontinent 200 m.y.a.

- http://terra.chemeketa.edu/Faculty/fraa/geology/topics/tectonics/photos/htmls/world-sea-floor2.html



- http://terra.chemeketa.edu/Faculty/fraa/geology/topics/tectonics/photos/htmls/pacific-sea-floor.html

Earthquakes and Plate Tectonics

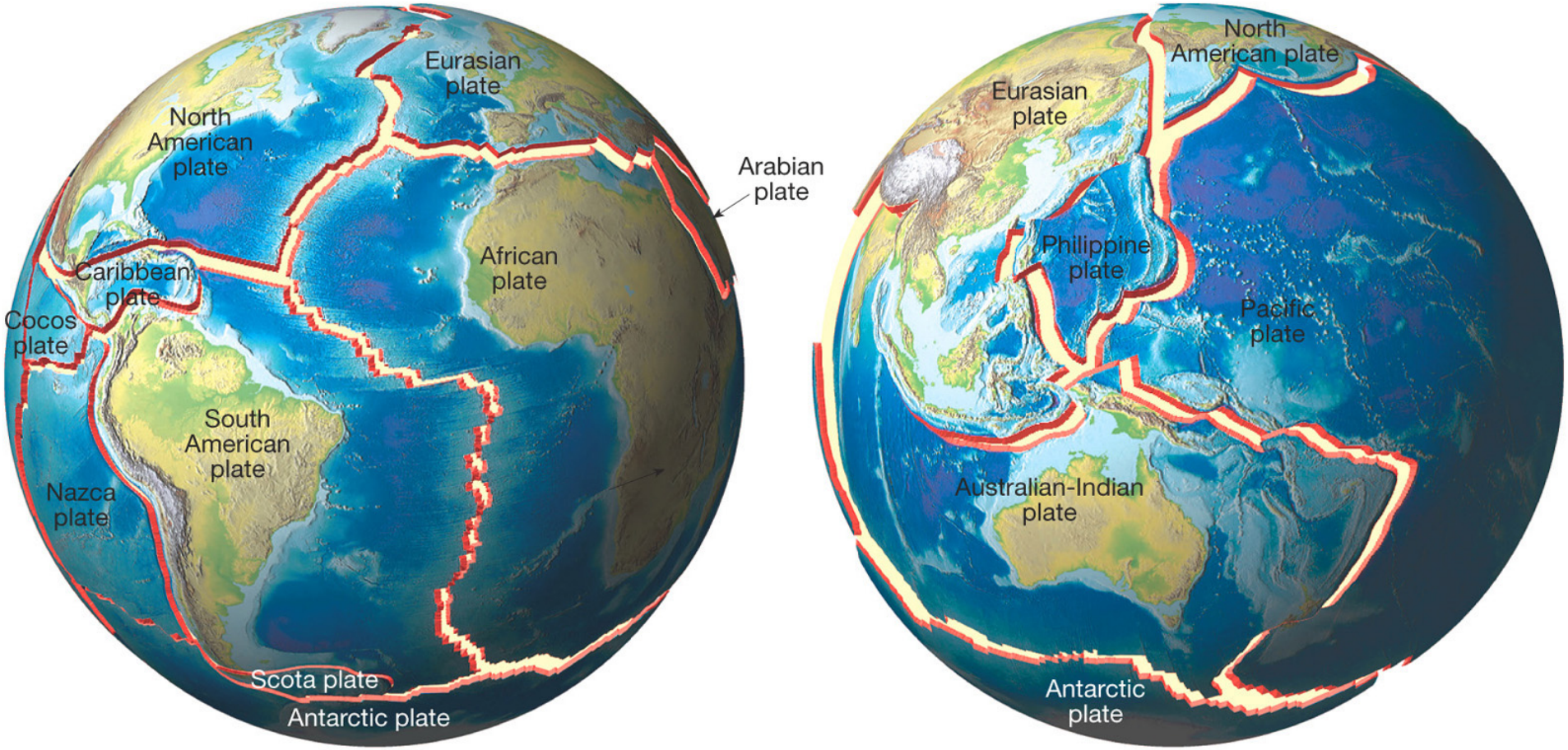


Earthquakes around the world at 23:01:14 GMT on July 7, 1999. Data from National Earthquake Information Center. Chart from IRIS Consortium, U.S.Geological Survey, University of Colorado, Reel Illusions, Inc., and the University of Washington. Chart modifed for web use. Earthquakes that have occurred within the last 24 hours are shown in red circles. The circles fade through orange to yellow within 15 days. Green squares are 15-30 days, and light purple squares are 30 days to 5 years. The distribution of seismicity over the past 5 years demonstrates how earthquakes define the boundaries of tectonic plates. The green/yellow "ball" is a magnitude 5.1 event of July 3, 1999, located 5 miles north of Satsop, Washington. Purple triangles are individual seismic stations.

USGS *Topinka, USGS/CVO, 1999*

- http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map_quakes_world_990707_flat.html

Lithospheric Plates



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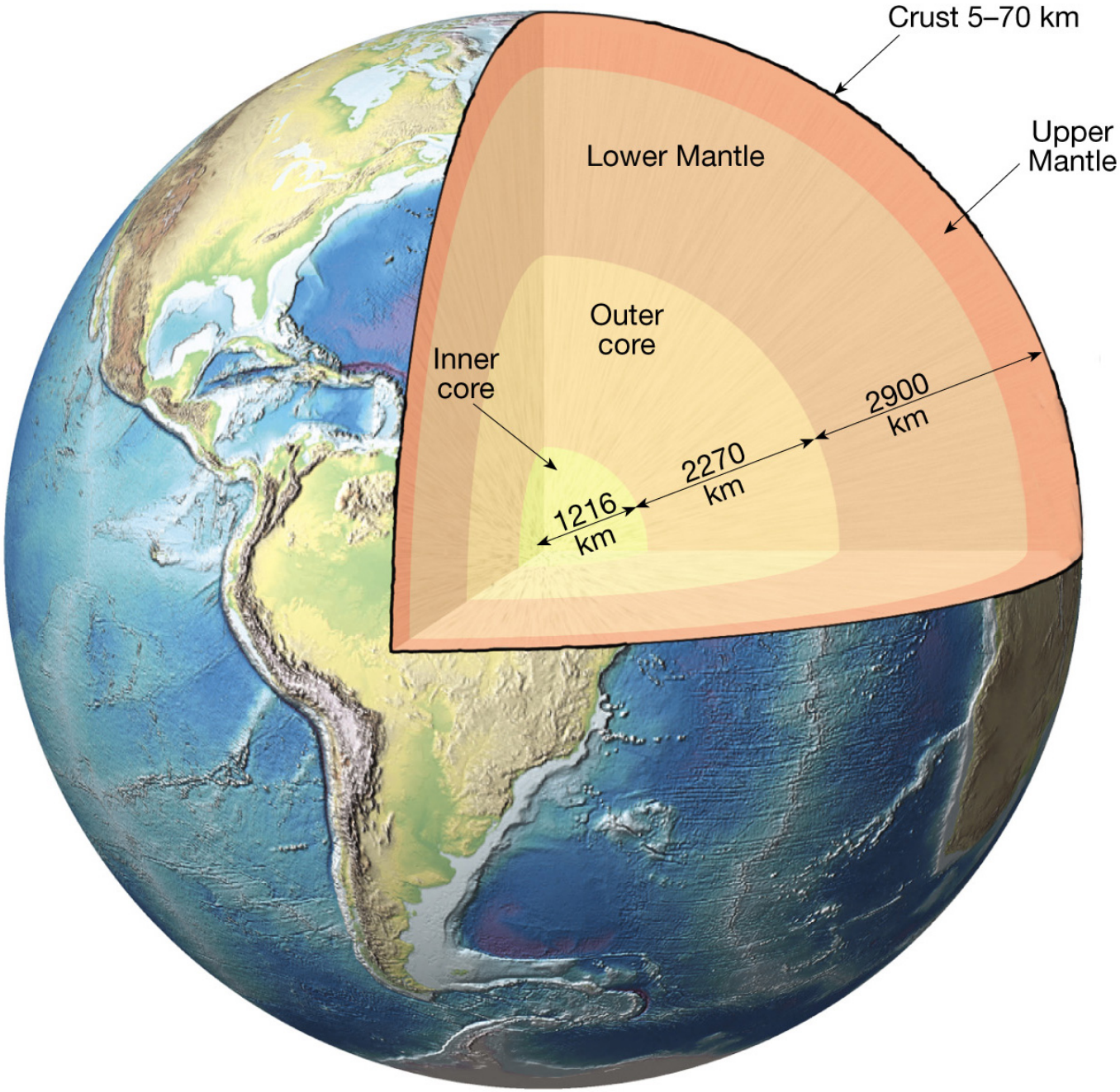
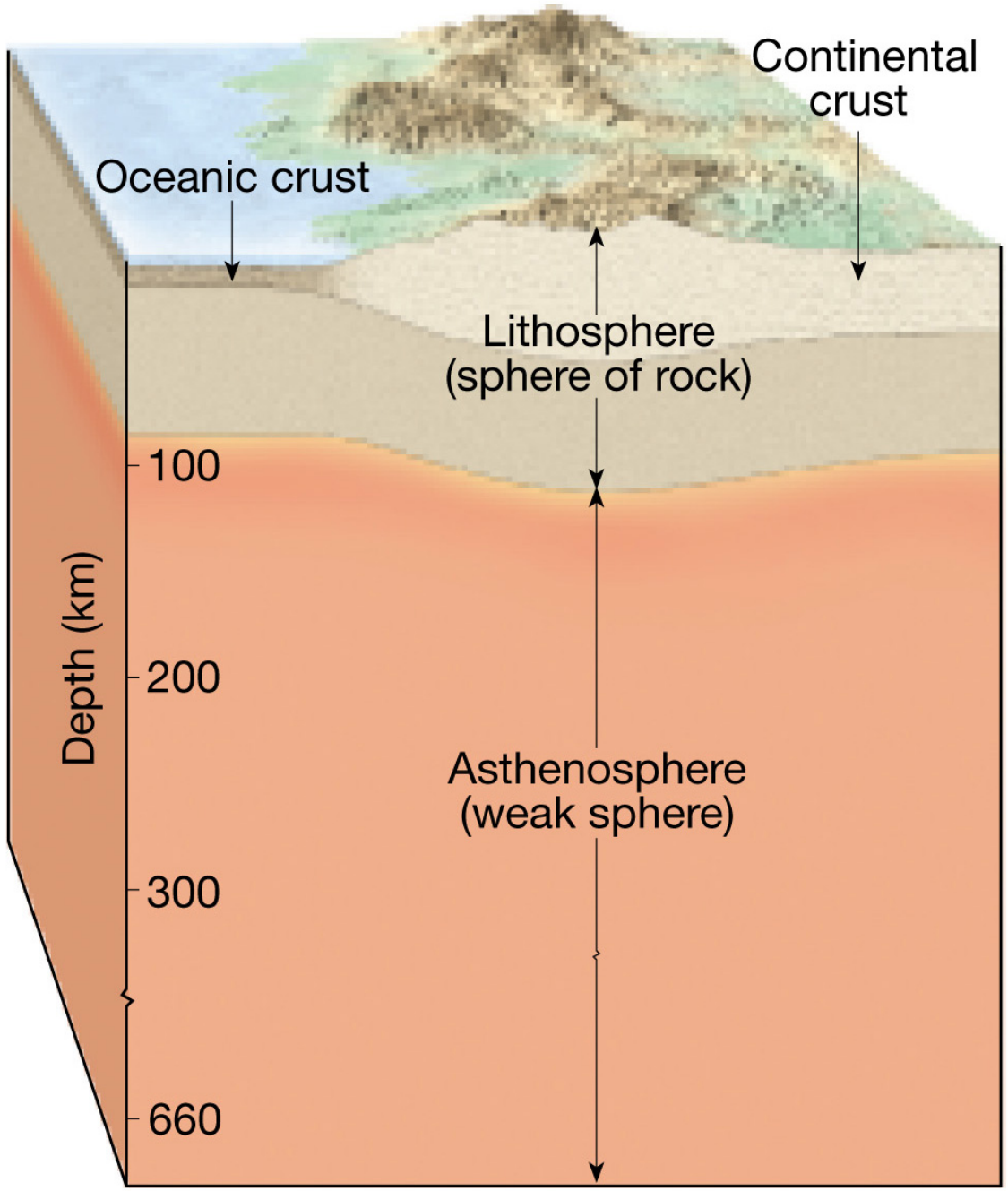
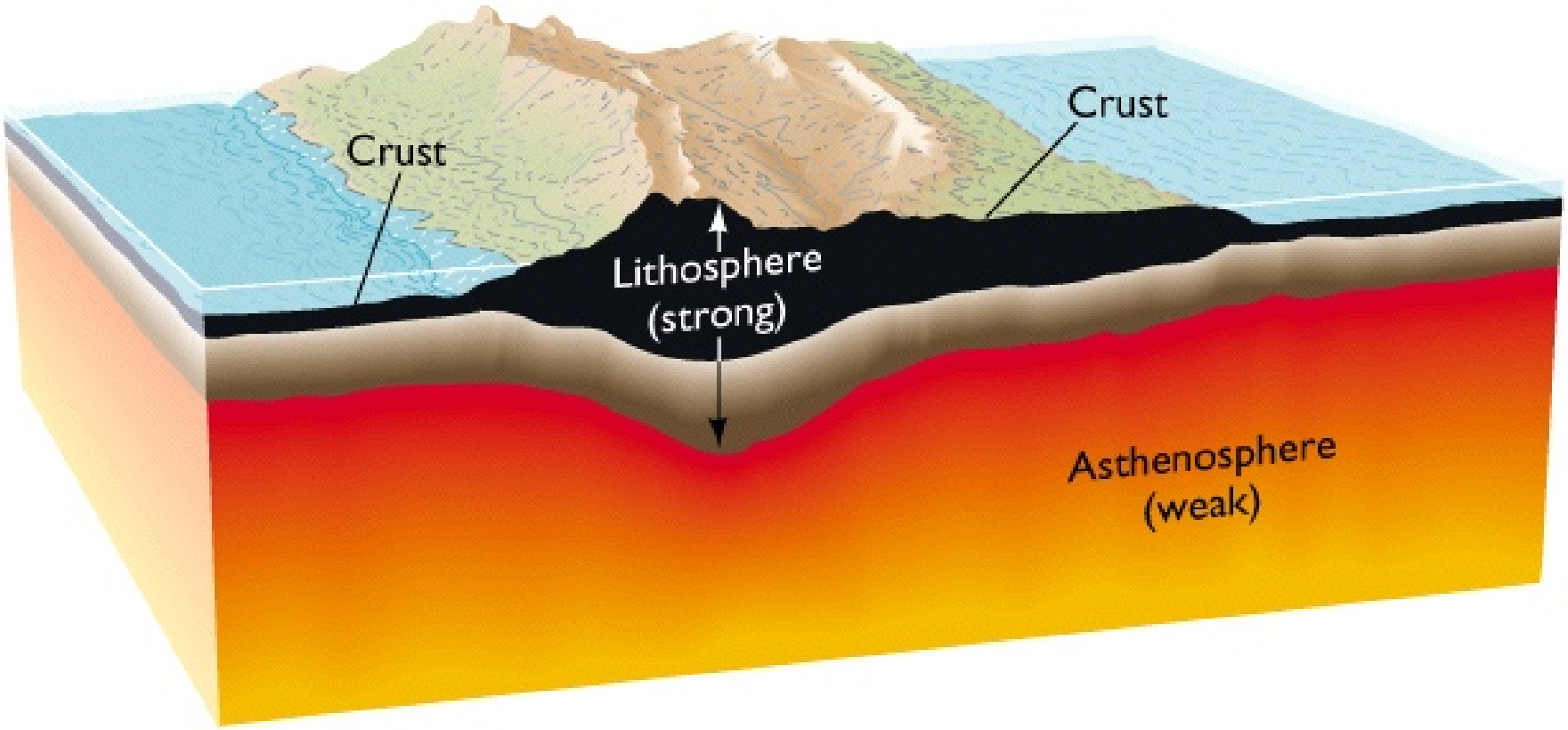
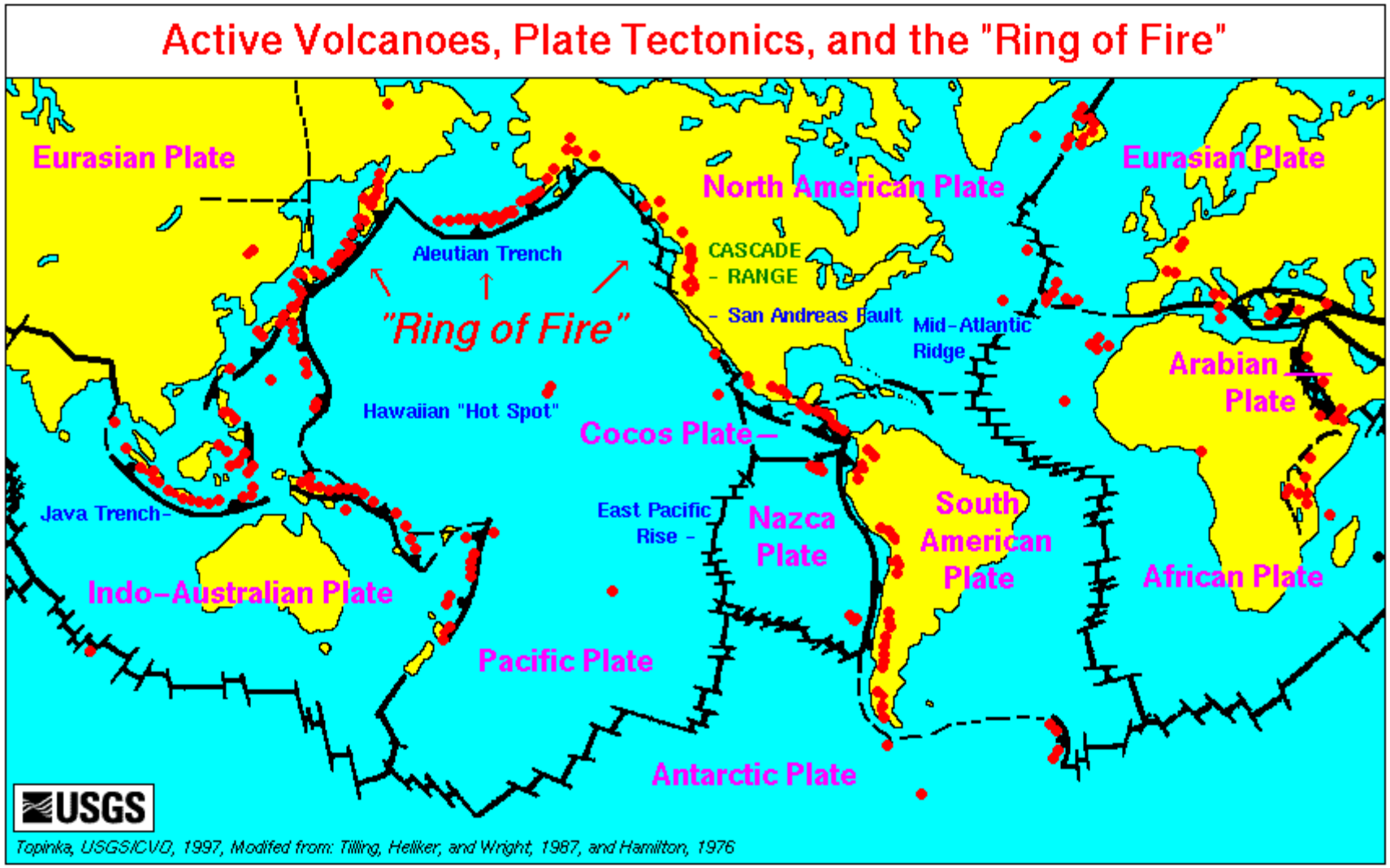

Crust 5–70 km
Upper Mantle
Lower Mantle
Outer core
Inner core
2900 km
2270 km
1216 km


Continental crust
Oceanic crust
Lithosphere (sphere of rock)
100
200
300
660
Depth (km)
Asthenosphere (weak sphere)

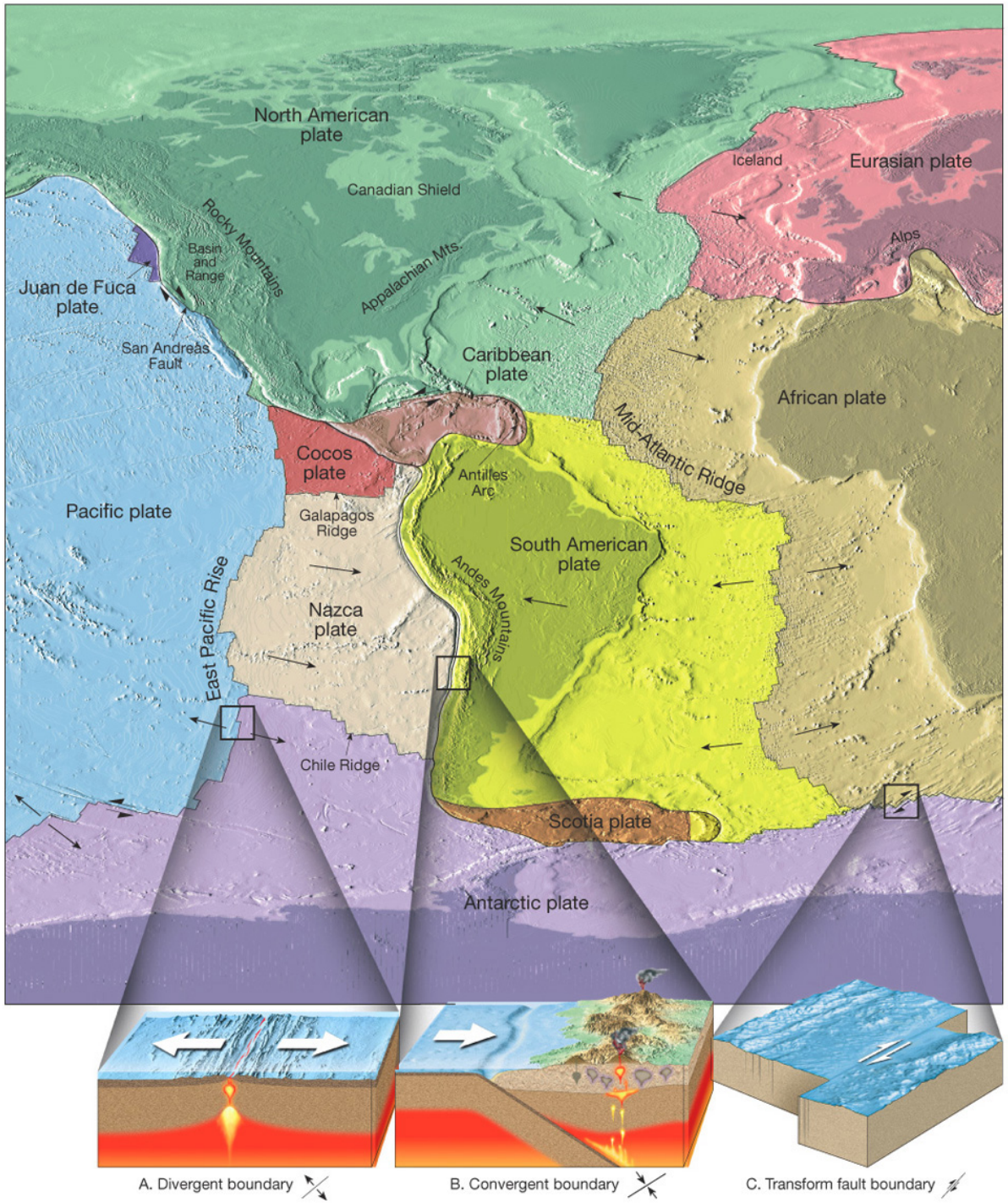
Relationship of crust, lithosphere and asthenosphere

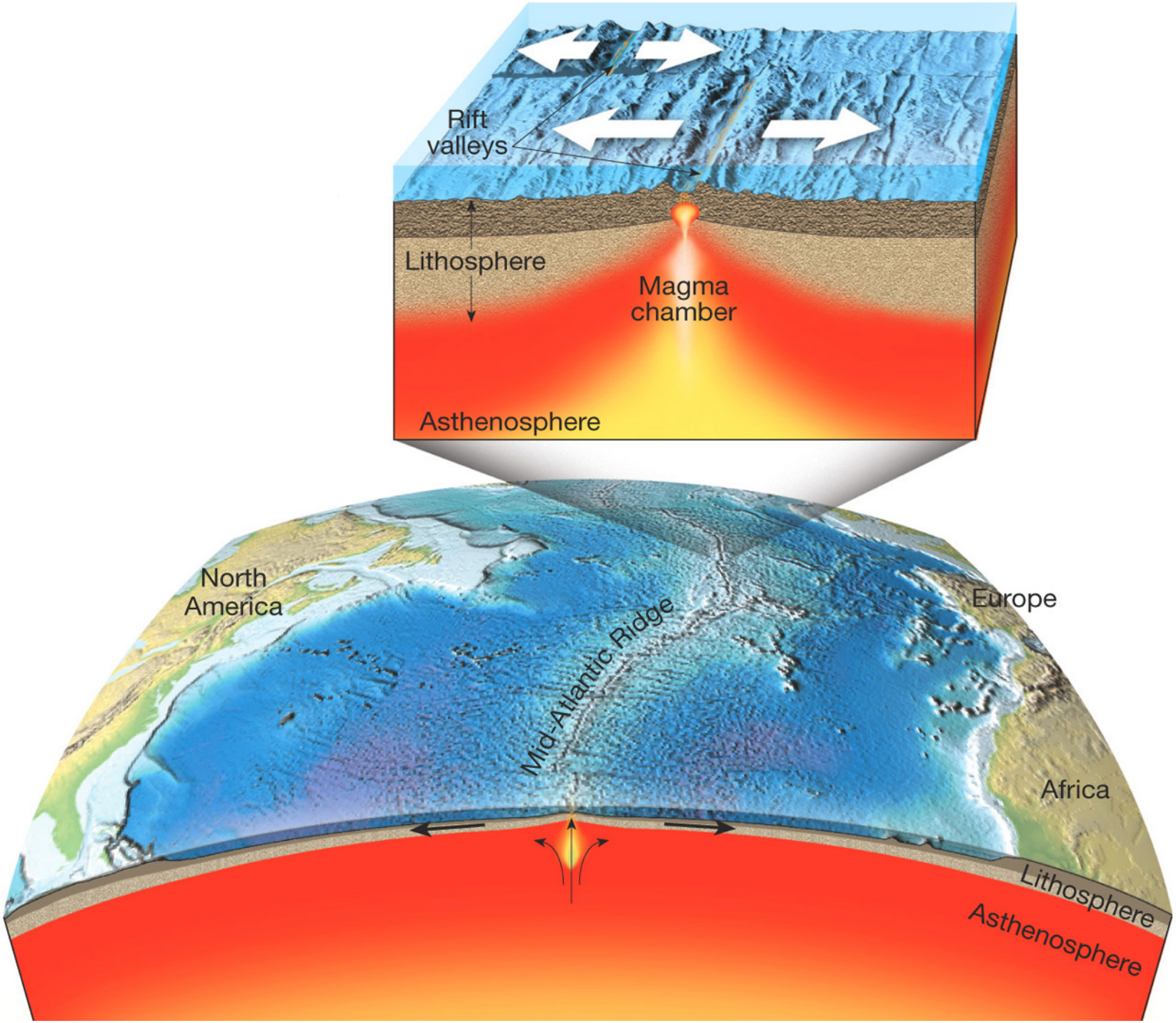


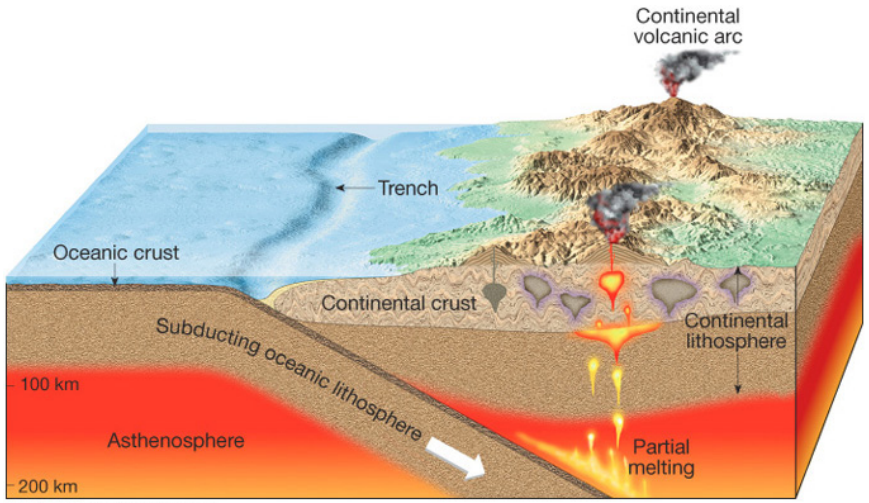
- http://earth.geol.ksu.edu/sgao/g100/plots/0829_12_litho.jpg



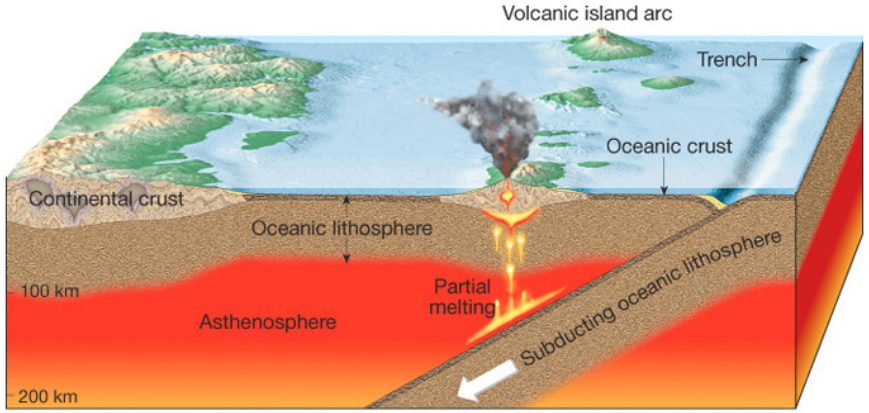
http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map_plate_tectonics_world.html


North American plate
Canadian Shield
Iceland
Eurasian plate
Alps
Rocky Mountains
Basin and Range
Appalachian Mts.
Juan de Fuca plate
San Andreas Fault
Caribbean plate
African plate
Mid-Atlantic Ridge
Cocos plate
Antilles Arc
Pacific plate
Galapagos Ridge
South American plate
Andes Mountains
Nazca plate
East Pacific Rise
Chile Ridge
Scotia plate
Antarctic plate
A. Divergent boundary
B. Convergent boundary
C. Transform fault boundary

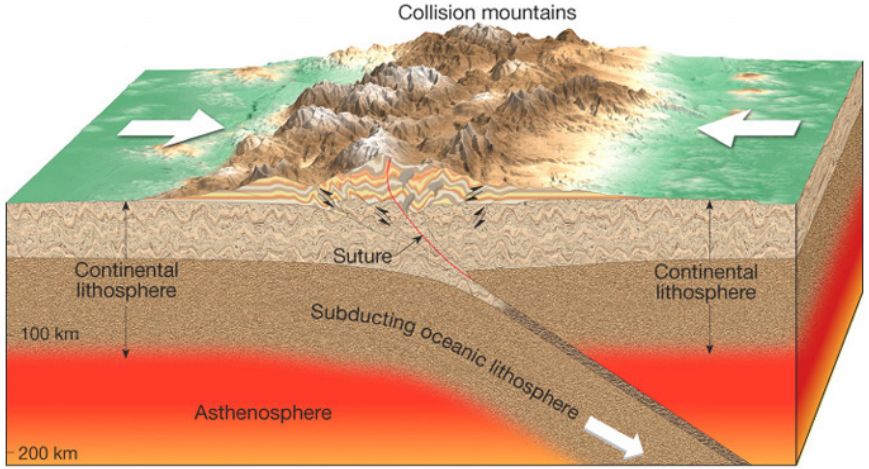

Rift
valleys
Lithosphere
Magma
chamber
Asthenosphere
North
America
Mid-Atlantic Ridge
Europe
Africa
Lithosphere
Asthenosphere

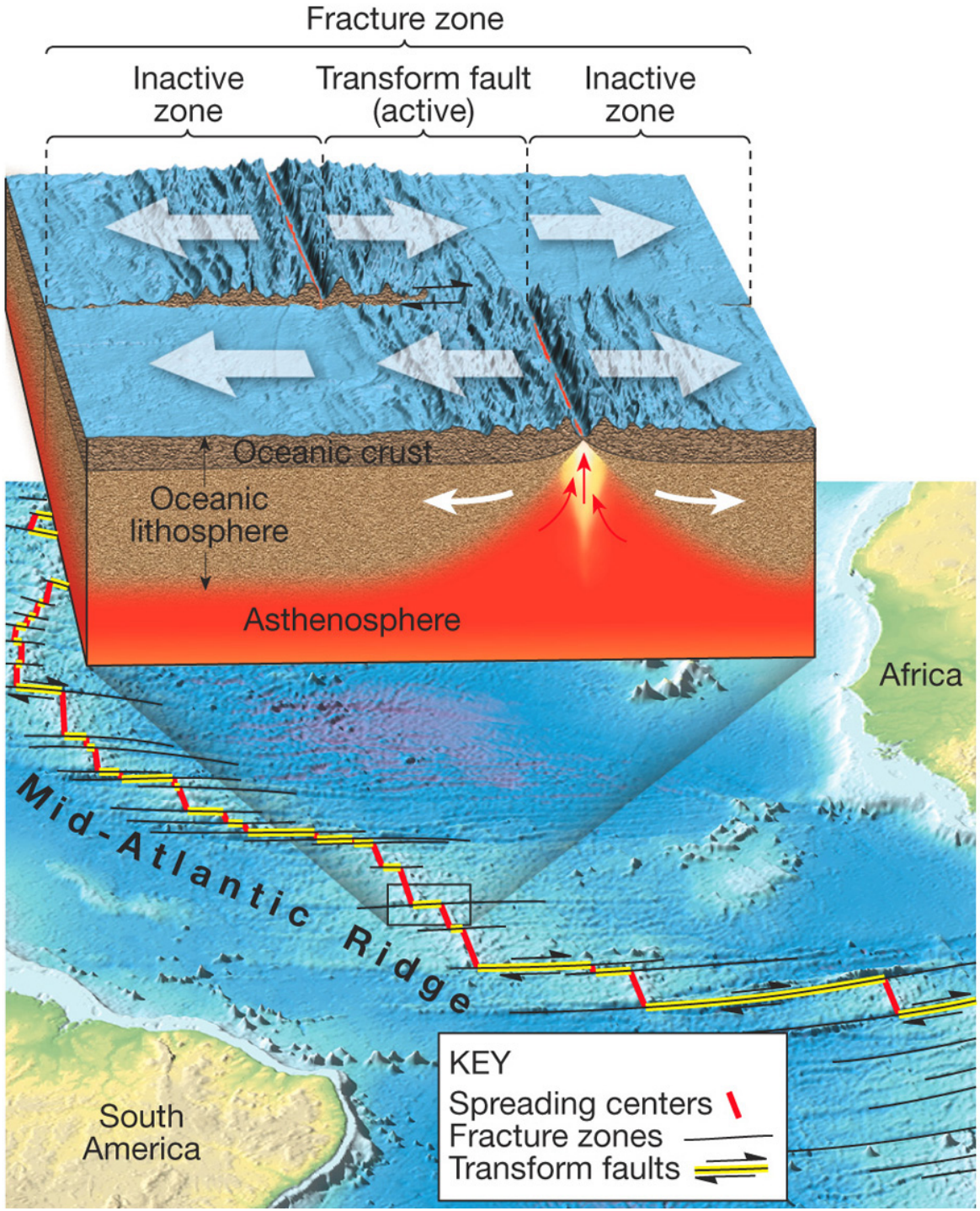


A. Oceanic-continental



B. Oceanic-oceanic




Fracture zone
Inactive zone
Transform fault (active)
Inactive zone
Oceanic crust
Oceanic lithosphere
Asthenosphere
Africa
Mid-Atlantic Ridge
South America
KEY
Spreading centers
Fracture zones
Transform faults