PLATE TECTONICS

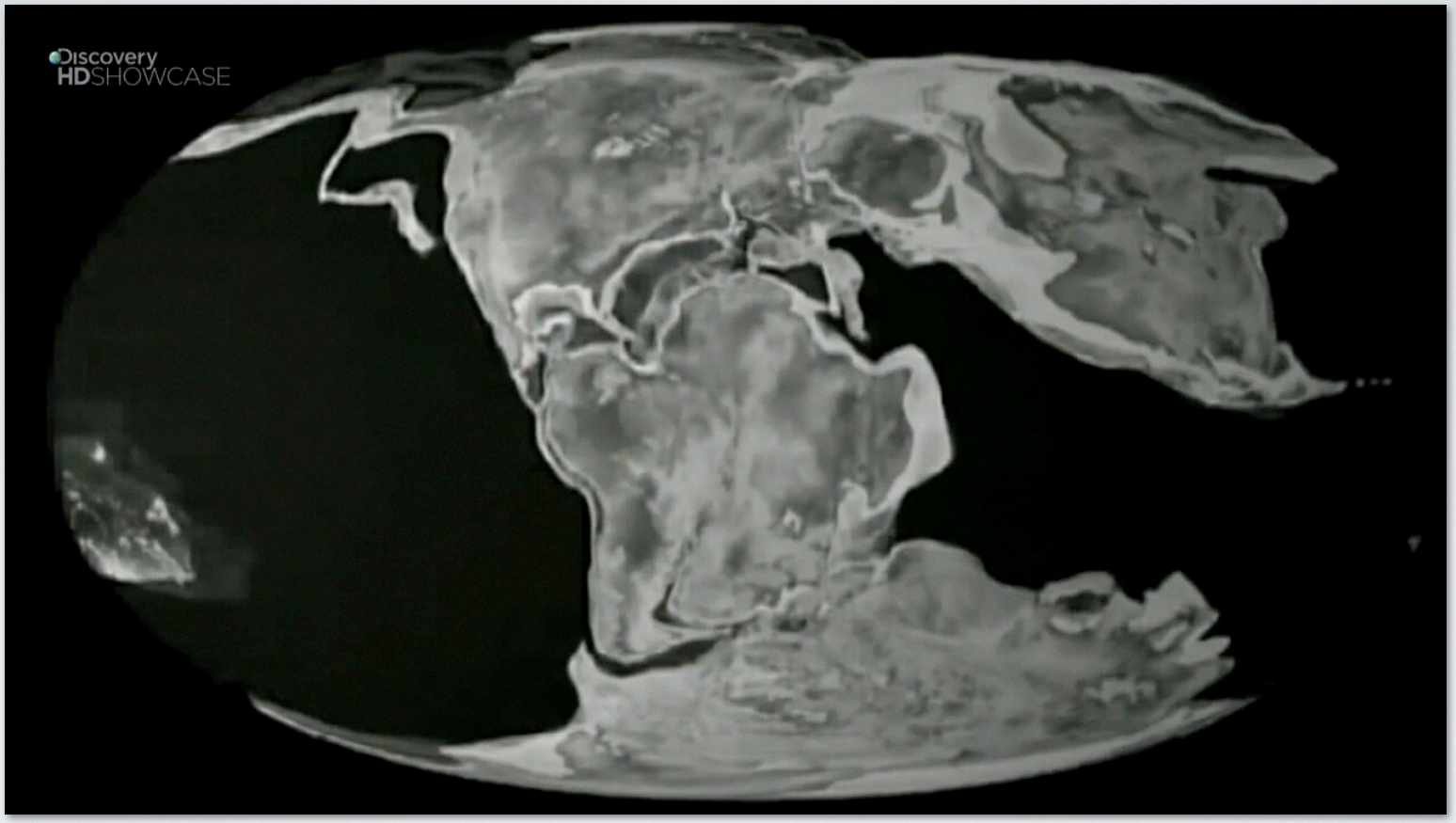


Plate Tectonics

PLATE TECTONICS

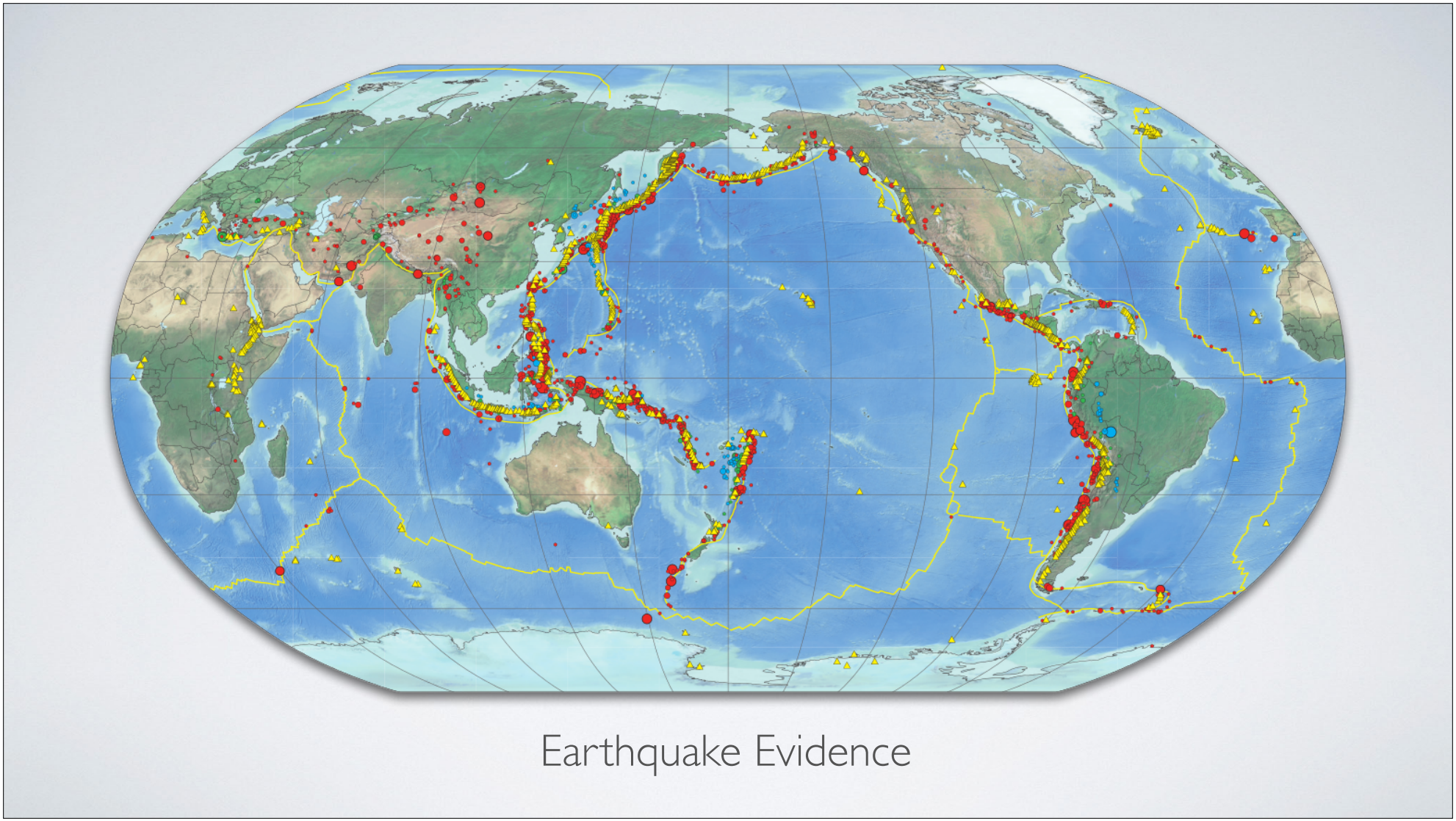
- Plate Tectonics - the study of the formation and movements of plates
- Earth's surface consists of a dozen major plates moving about 10 cm/year

PLATE TECTONICS

- The idea of continental drift had been around since the early 1900's, but lacked enough scientific evidence to support the theory
- New advancements after World War II help provide the evidences needed to validate the Theory of Plate Tectonics
    - Examples: sonar, seismometers, magnetometer

PLATE TECTONICS

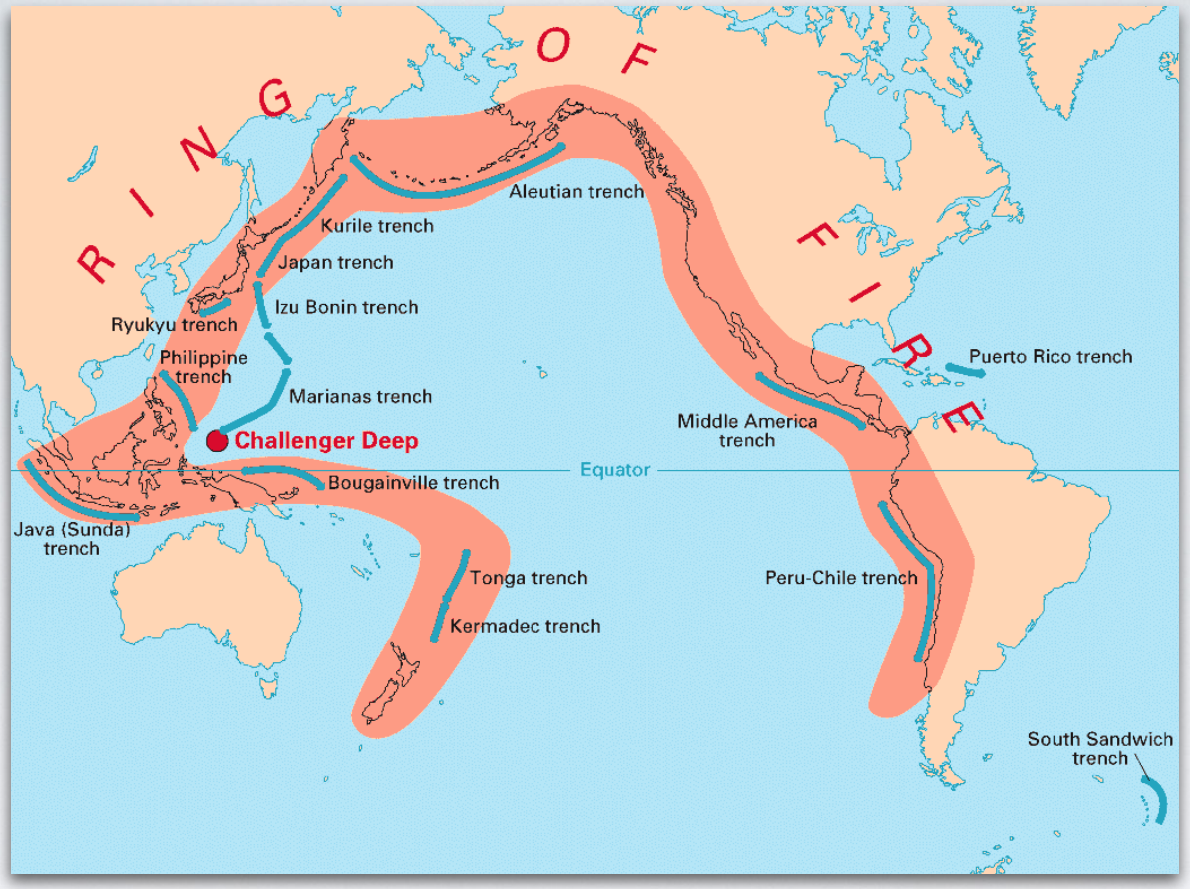
- New Evidences Include:
    - Earthquake location data along plate boundaries



Earthquake Evidence

PLATE TECTONICS

- New Evidences Include: (continued)
  - Ring of Fire - isolated belt around the Pacific Ocean where 90% of the world's volcanoes exist


RING OF FIRE
Aleutian trench
Kurile trench
Japan trench
Izu Bonin trench
Ryukyu trench
Philippine trench
Marianas trench
Challenger Deep
Bougainville trench
Java (Sunda) trench
Tonga trench
Kermadec trench
Equator
Middle America trench
Puerto Rico trench
Peru-Chile trench
South Sandwich trench

Ring of Fire

PLATE TECTONICS

- New Evidences Include: (continued)
  - Tilted and folded rock layers

Tilting and Folding

PLATE TECTONICS

- New Evidences Include: (continued)
  - Mountain building evidence and fossilized marine organisms can be found at these high altitudes

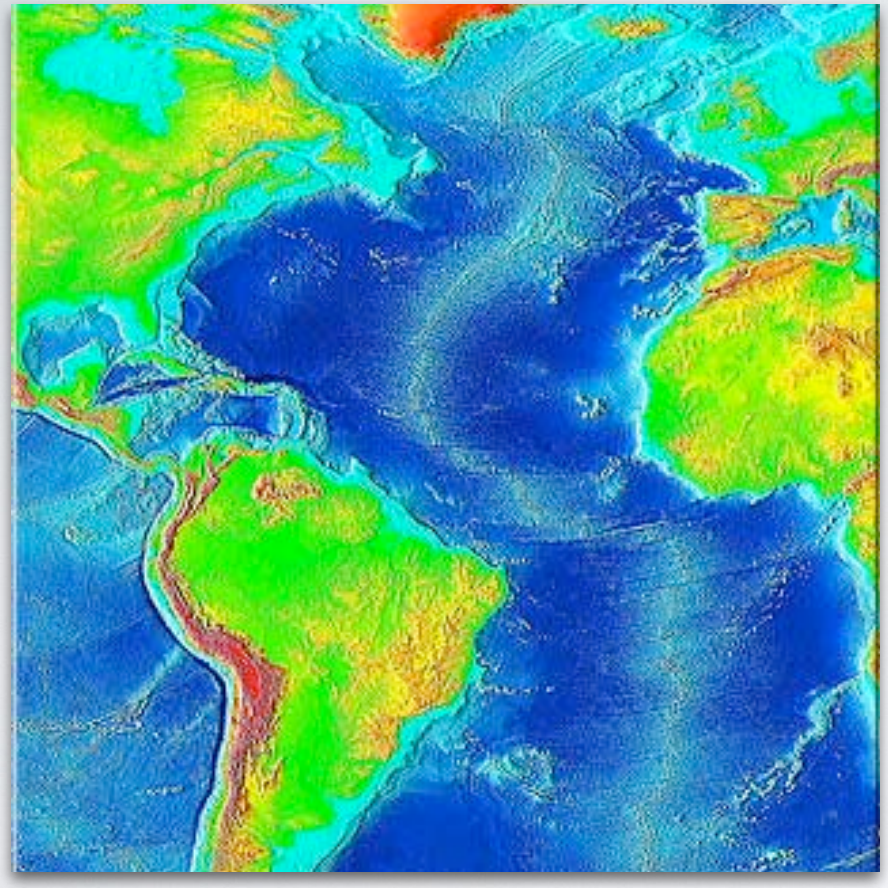
Himalayan Mountains

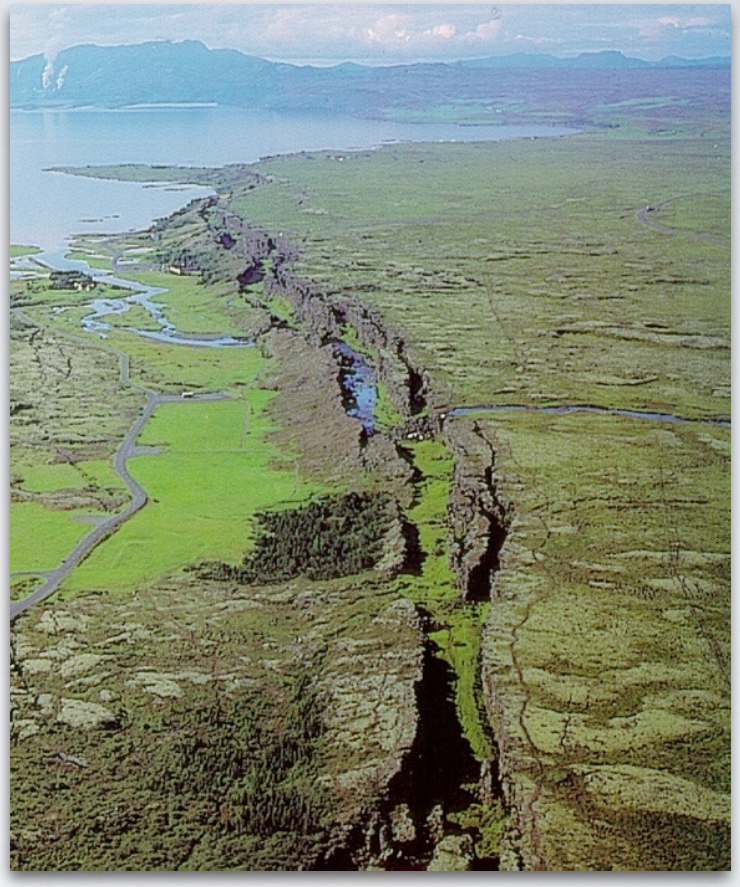
PLATE TECTONICS

- After the discover of all these new evidences scientist began to realize that the plates interacting in three motions:
  - Converging
  - Diverging
  - Transform

PLATE TECTONICS

- Perhaps the greatest discovery came when scientist discovered the mid-ocean ridge systems where the plates are moving apart
    - Found mainly under the ocean's surface except in Iceland
- Seafloor Spreading - the process where ocean floor is extended when two plates move apart

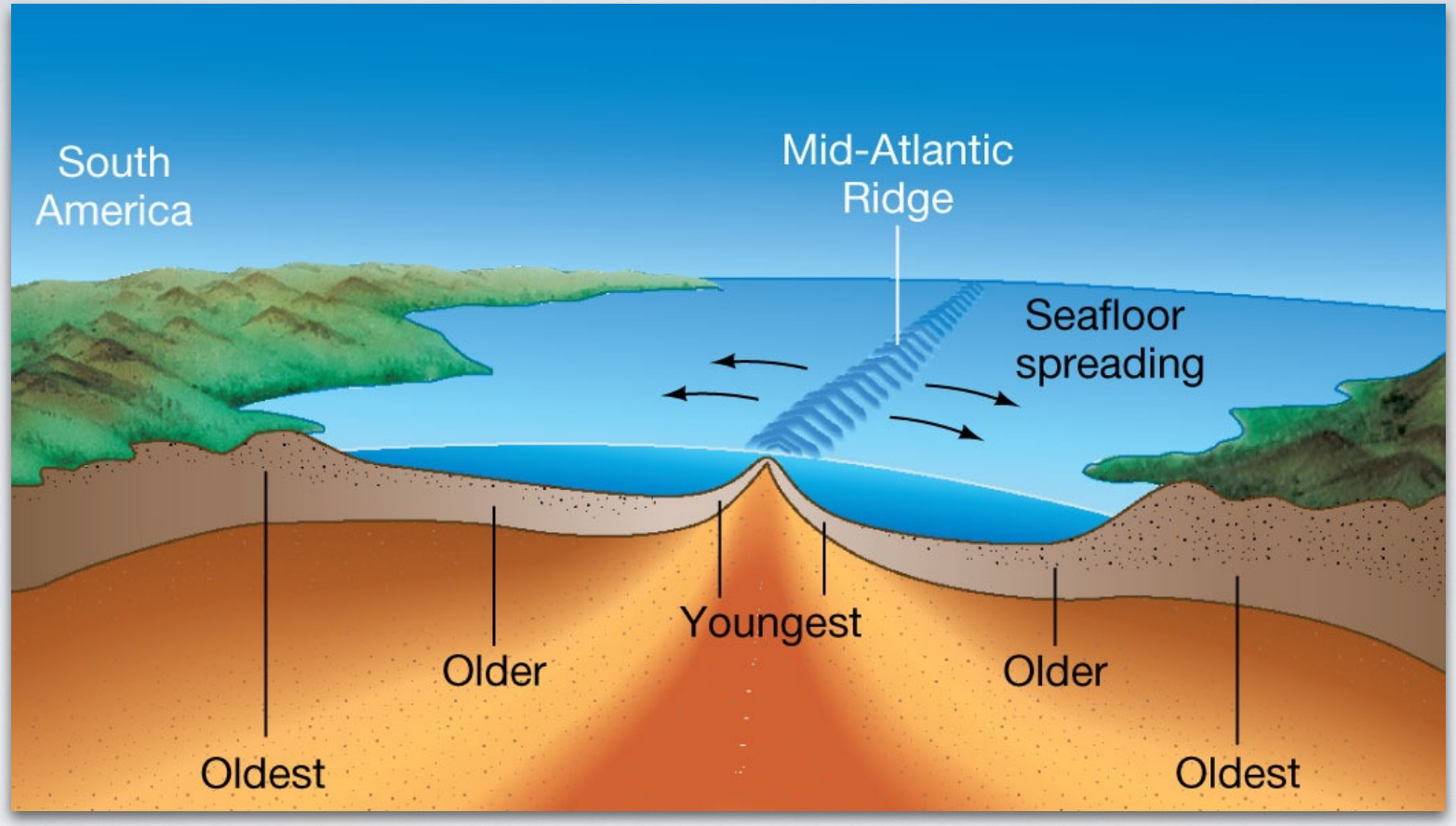




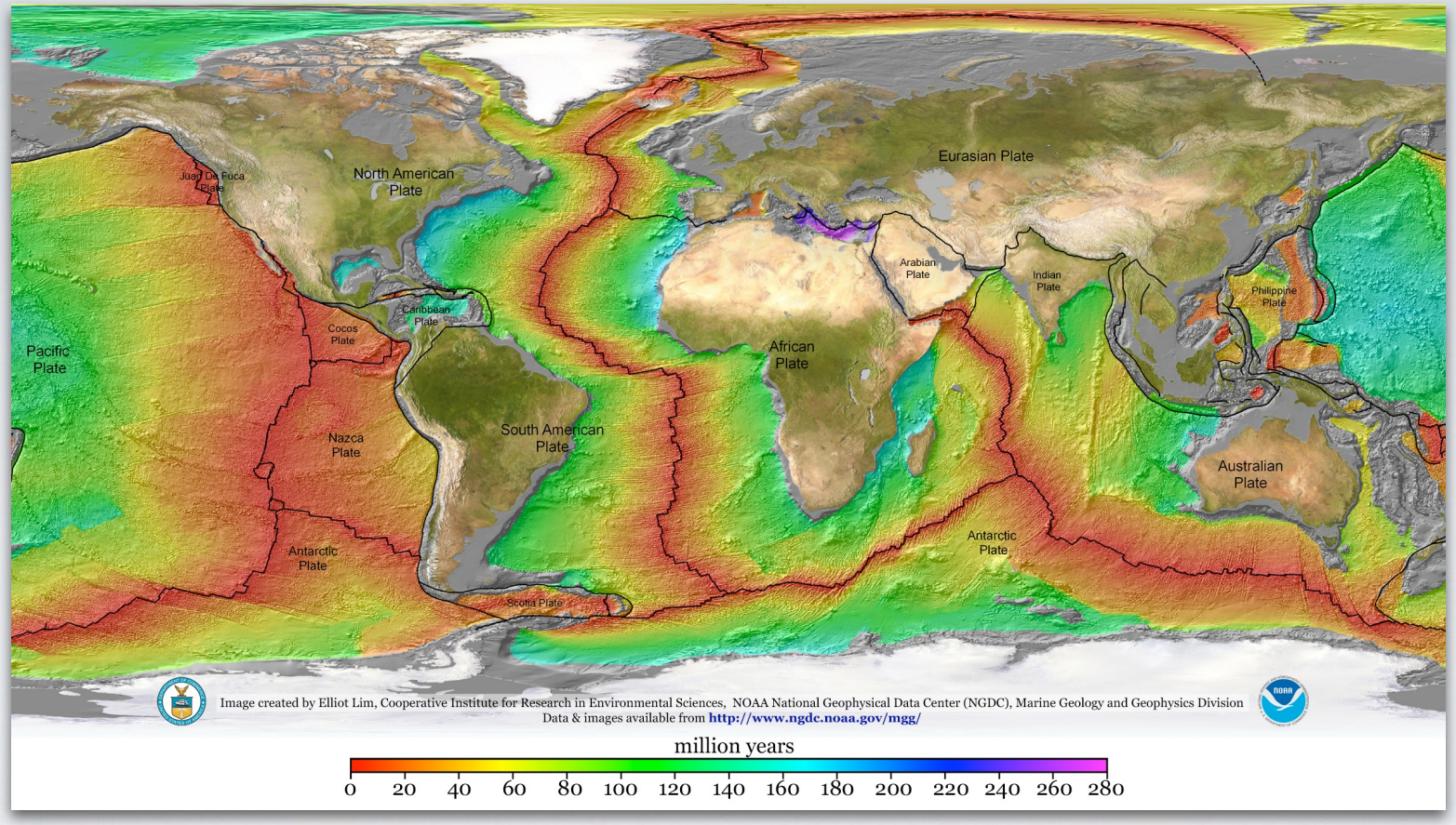
Mid-Ocean Ridges and Iceland

PLATE TECTONICS

- Evidence of Sea-floor Spreading:
  - Age of the seafloor gets progressively older away from the ridge
  - Reversed polarity in rock record away from the ridge



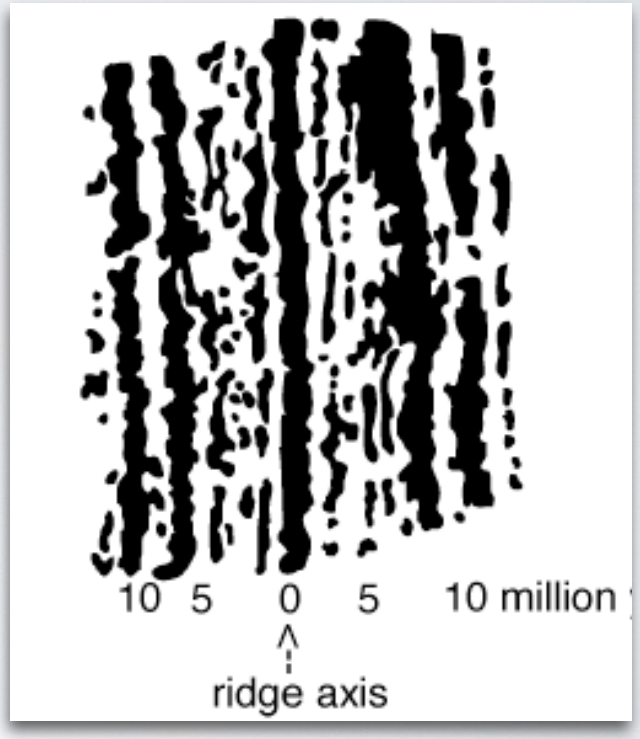
Age of the Seafloor

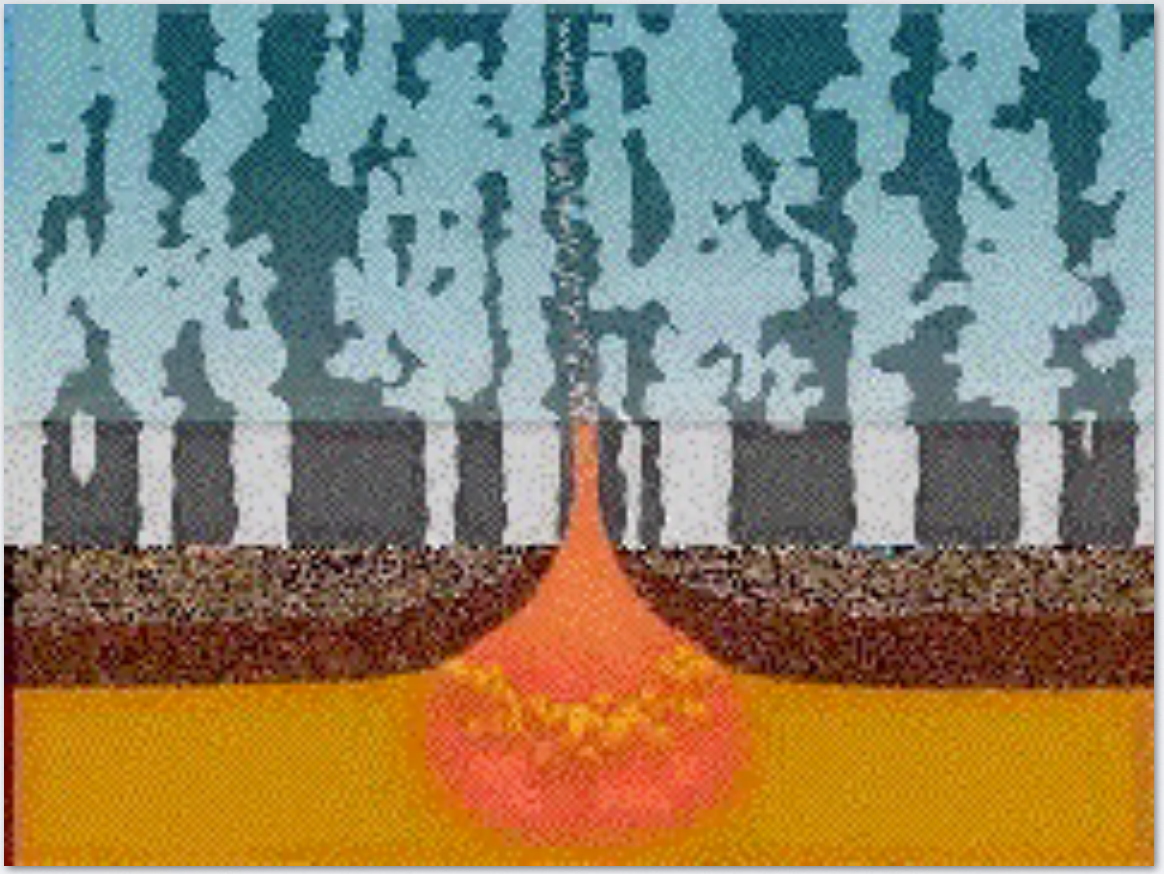


Age of the Seafloor

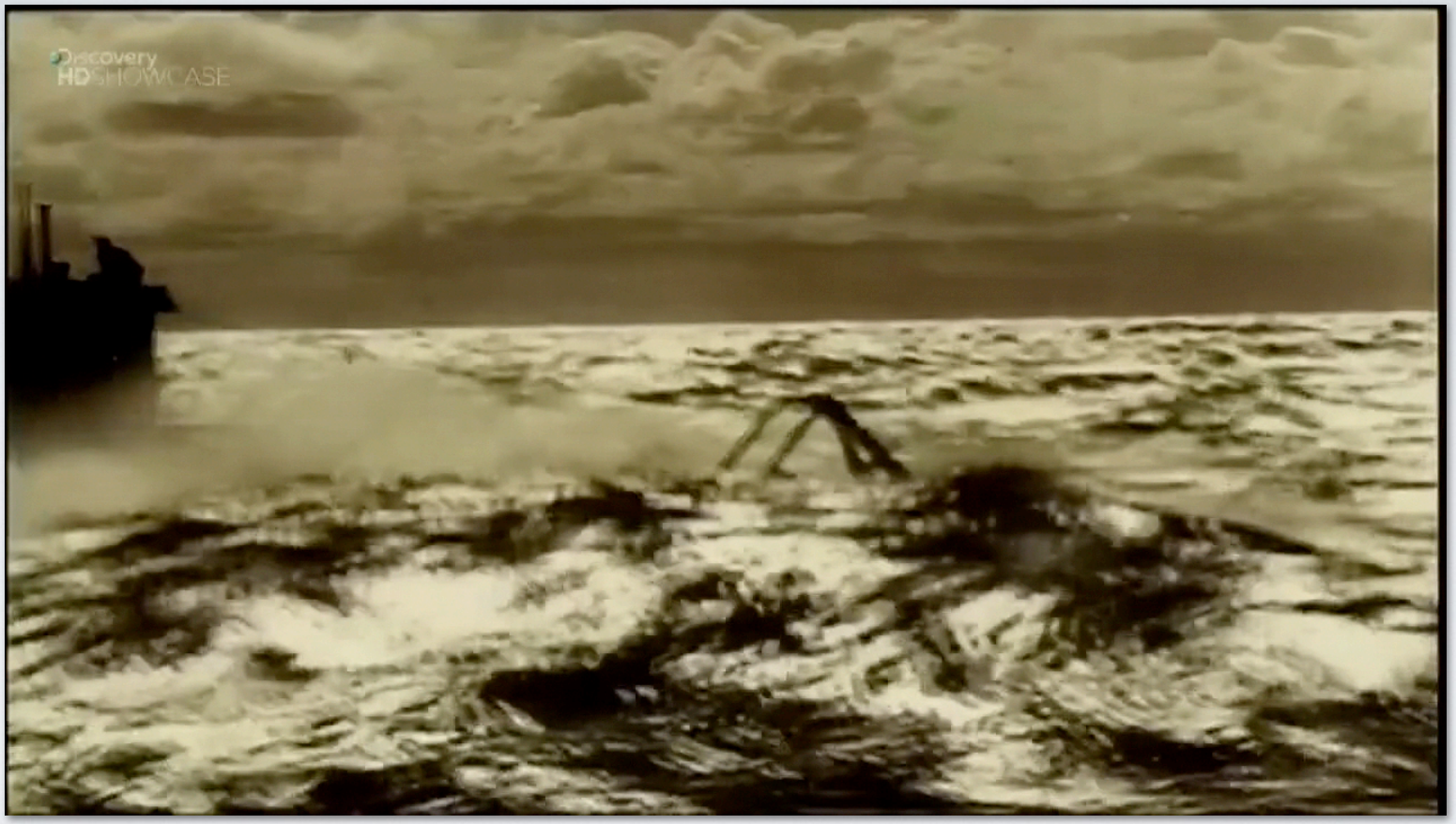
PLATE TECTONICS

- When a magnetometer surveyed the ocean floor a unique magnetic pattern emerged
    - Stripes of normal and reversed polarity parallel the mid-ocean ridge flipping every 200,000 to 300,000 years





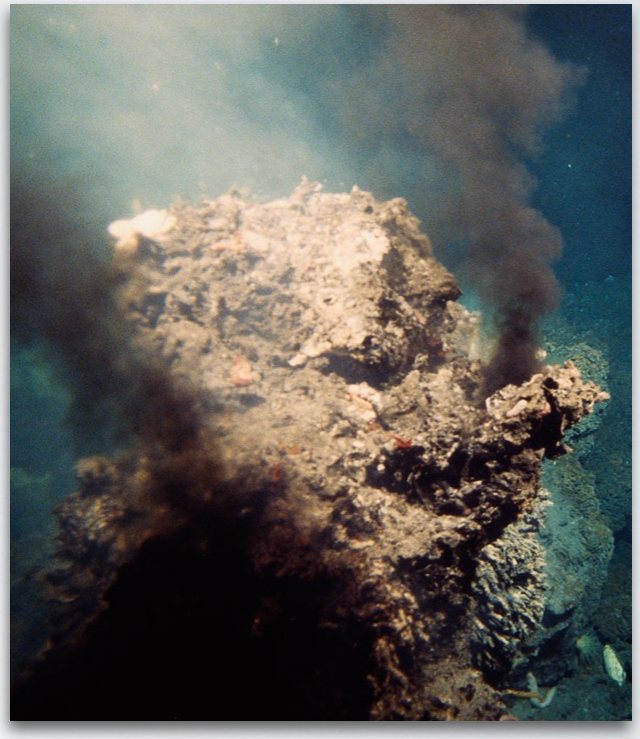
Reversed Polarity



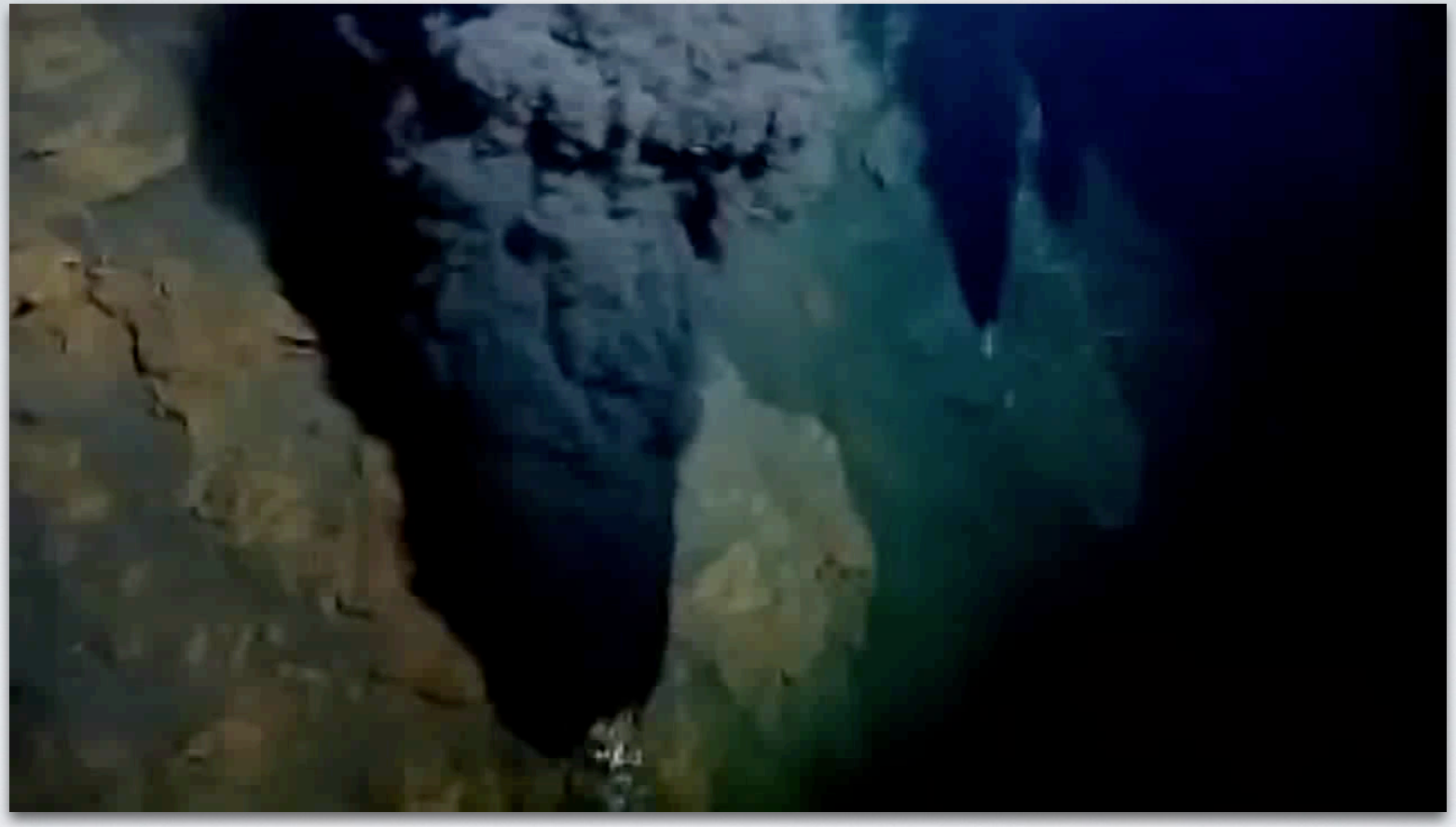
Sea-floor Spreading

PLATE TECTONICS EARTH

- Not only was this the location of new crust formation, but the heat source at the mid-ocean ridges allowed for life to exist where it was once thought impossible



Giant Tube Worms



Life Along the Ridge