Planet Earth

Standards

- SSWG1: The student will explain the physical aspects of geography
  - A. describe the concept of place by explaining how physical characteristics such as landforms, bodies of water, climate, soils, natural vegetation, and animal life are used to describe a place.

Essential Question

- What are the internal and external forces that shape the Earth?

Water, Land , and Air

- Water (71%)
    1. Hydrosphere – oceans, lakes, rivers
- Land
    1. Lithosphere – Continents and ocean basins (land beneath oceans)
- Air
    1. Atmosphere – extends approximately 1,000 feet above Earth's surface
- Biosphere – part of Earth where life is found

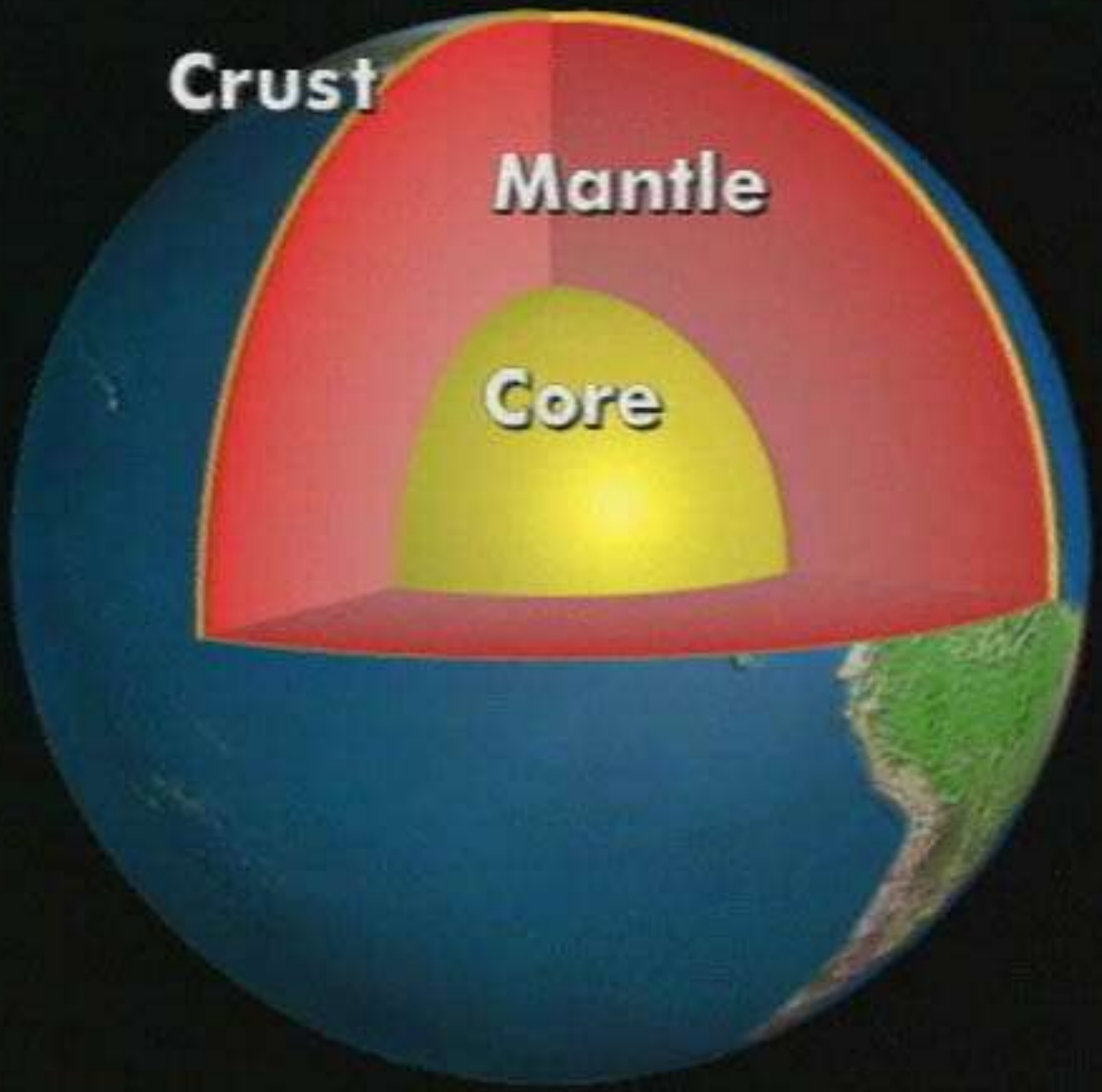
Earth's heights and depths

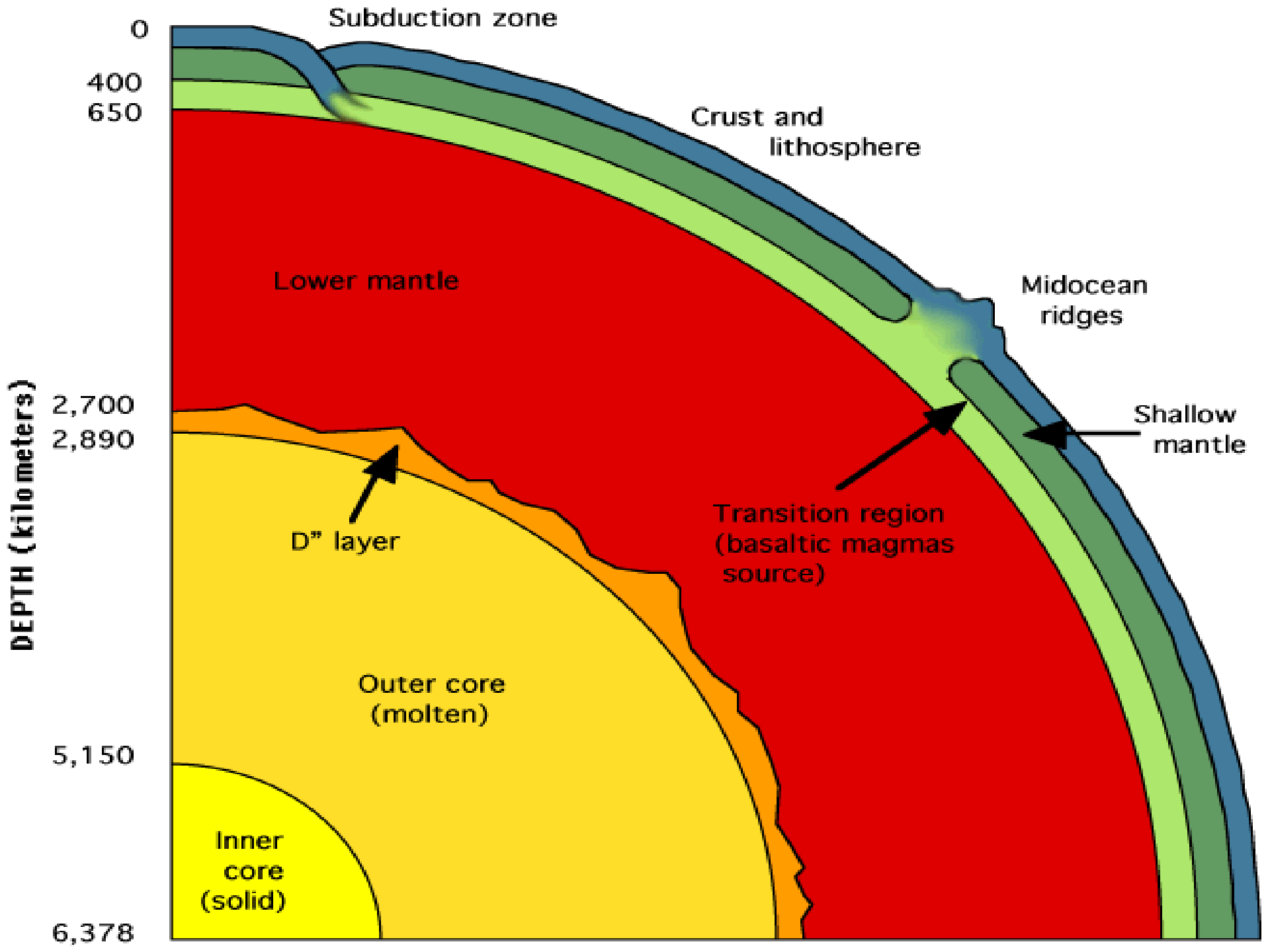
- Mt. Everest – highest point (29,028 ft.)
- Mariana Trench – lowest point (35,000 ft)
- Average height above sea level – 2,800 ft.

Inside the Earth (composed of four layers)

- Inner core – center of the Earth (4,000 miles. below the surface)
- Outer core – made of iron and nickel (begins about 1800 miles below the surface)
- Mantle – a thick layer of dense hot rock
- Crust – a thin layer next to the surface (3 to 30 miles deep)

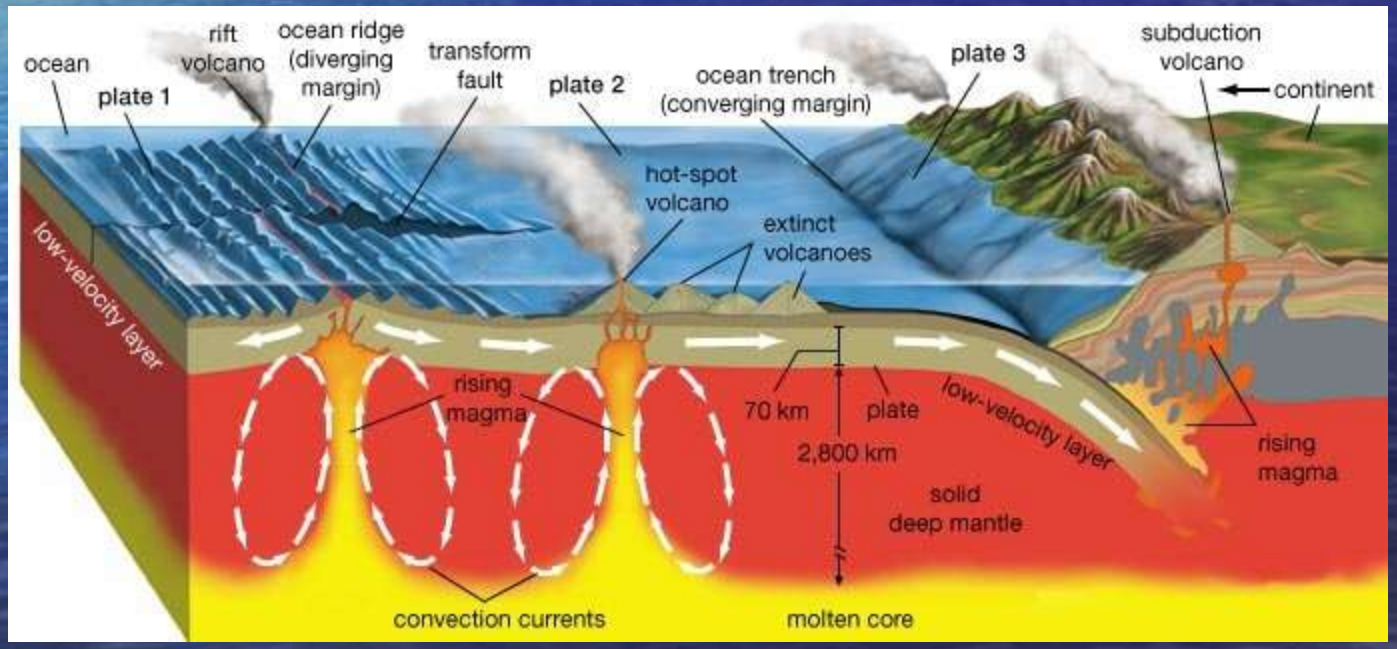
EARTH'S CORE




Subduction zone
0
400
650
Crust and
lithosphere
Lower mantle
Midocean
ridges
2,700
2,890
Shallow
mantle
D" layer
Transition region
(basaltic magmas
source)
Outer core
(molten)
5,150
Inner
core
(solid)
6,378
DEPTH (kilometers)

Earth's changing structure

- Constantly changing due to internal and external forces

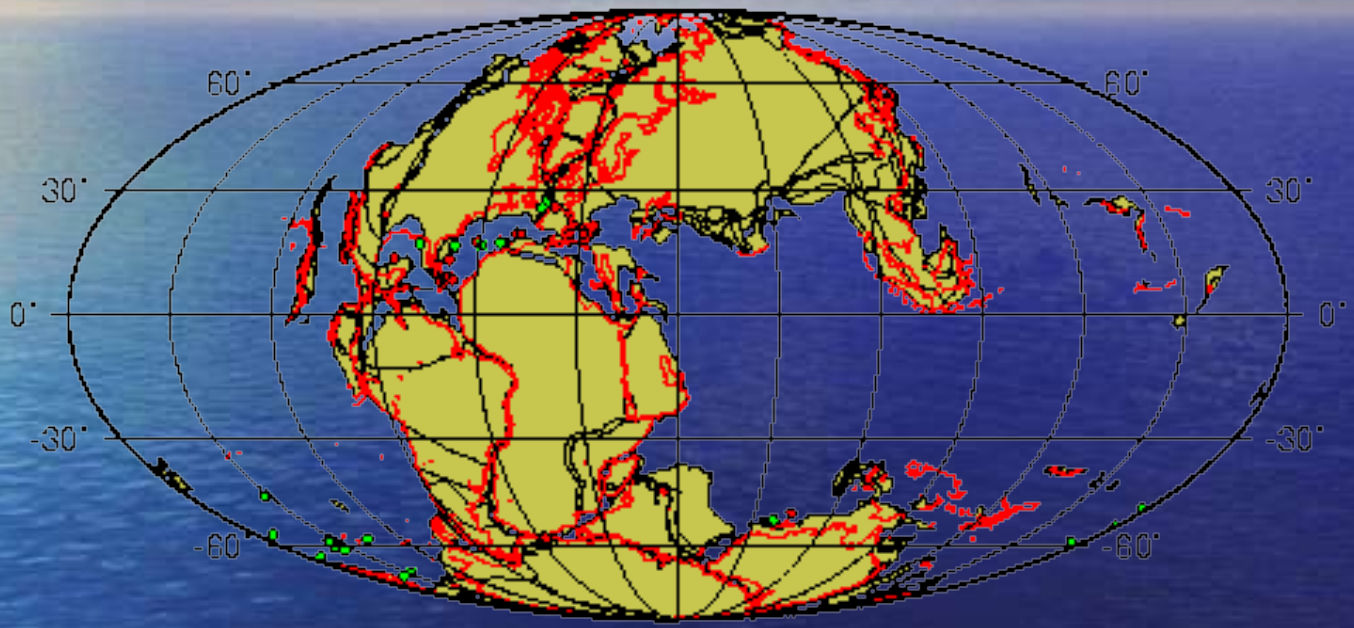


Internal Forces Shaping the Earth

Continental Drift

- The continental drift hypothesis proposes that the earth was once a *supercontinent* that divided and slowly drifted apart over millions of years.
- A geographer from Germany named Alfred Wegener called this supercontinent *Pangaea* (a Greek word that means "all earth").
- Pangaea split into many *continental plates* that drifted, crashed into each other, and split apart several times before they came to their current positions. This took FOREVER! Millions of years!

Pangea



150 My Reconstruction

Landforms

- *Landforms* are naturally formed features on the surface of earth. There are many different types of landforms (pg. 34-35 in Textbook).

- *Relief* is the difference in elevation of a landform from its lowest point to its highest point.

- There are four categories of relief:
  - mountains
  - hills
  - plains
  - plateaus

Topography

- *Topography* is the combination of the surface shape and composition of the landforms and their distribution in a region.

-The seafloor also has landforms similar to those above water.

-The floor of the ocean has *ridges, valleys, canyons,* and *plains.*

-Mountain chains similar to those on the continents cover parts of the ocean floor. The longest continuous underwater range is the *Mid-Atlantic Ridge*, which extends for thousands of miles north to south through the middle of the Atlantic Ocean.

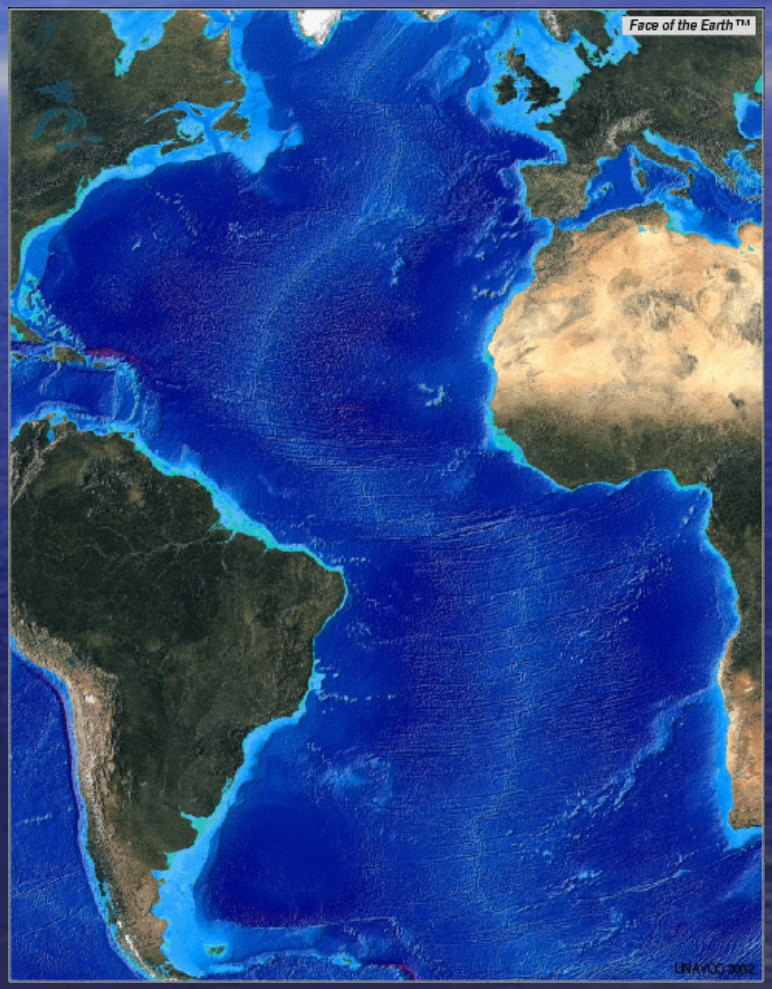


Plate Tectonics

- *Tectonic plates* are enormous moving pieces of the earth's lithosphere.

- Tectonic plates move in one of four ways:

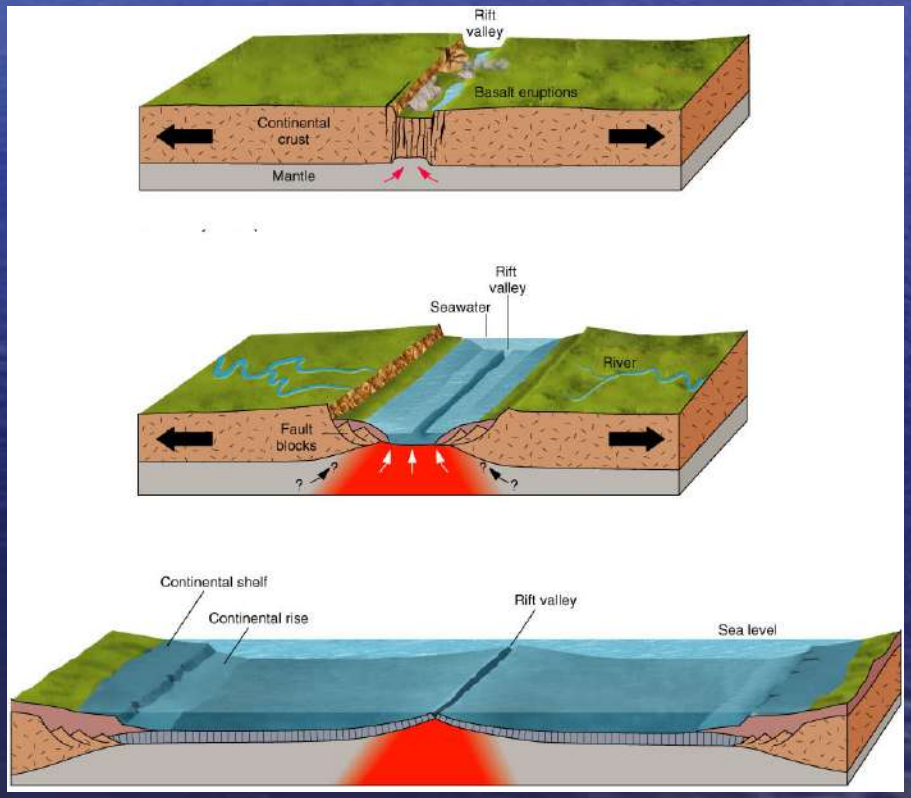
1. spreading or moving apart
2. subduction or diving under another plate
3. collision or crashing into one another
4. sliding past each other in shearing motion


North American Plate
Juan de Fuca Plate
Eurasian Plate
Caribbean Plate
Arabian Plate
Indian Plate
Pacific Plate
Philippine Plate
Cocos Plate
Pacific Plate
Nazca Plate
South American Plate
African Plate
Australian Plate
Scotia Plate
Antarctic Plate

Divergent Boundary

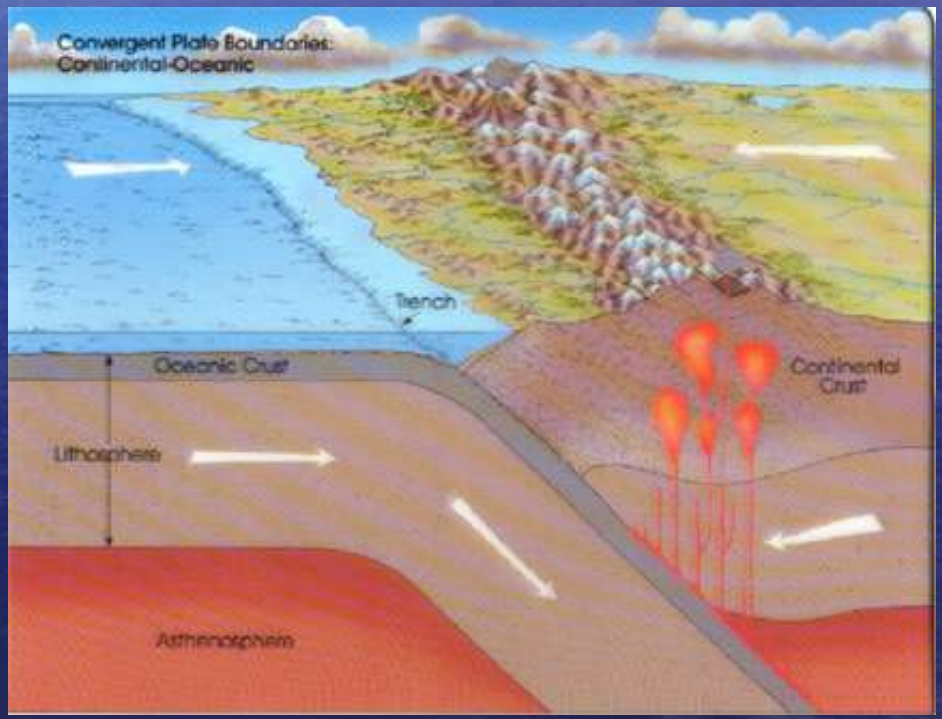
1. Divergent boundary- plates move apart, spreading horizontally

~Example: Between Saudi Arabia and Egypt, these two plates are spreading apart making the Red Sea even wider.



Convergent Boundary

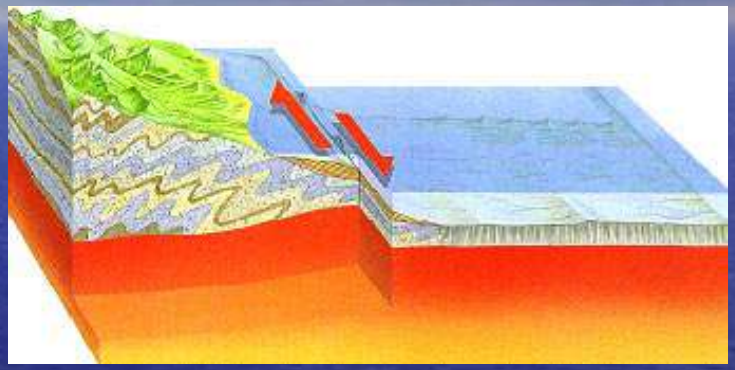
2. **Convergent boundary**- plates collide, causing either one plate to dive under the other or the edges of both plates to Crumple



~Example: In South Asia, India is crashing into the Asian continent and building up the Himalayan Mountains.

Transform Boundary

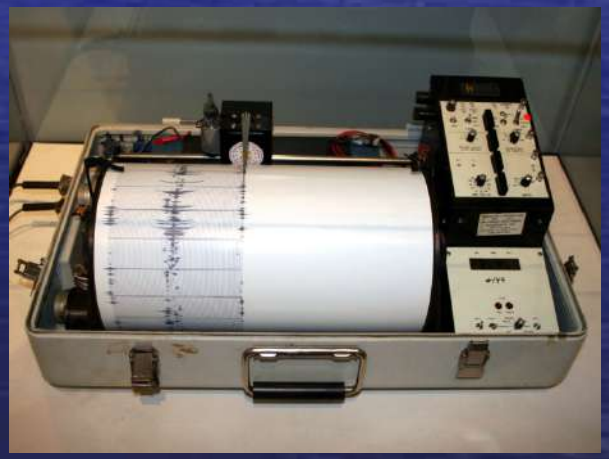
3.**Transform boundary**- plates slide past one another



~Example: In North America the San Andreas Fault in California.

Earthquakes

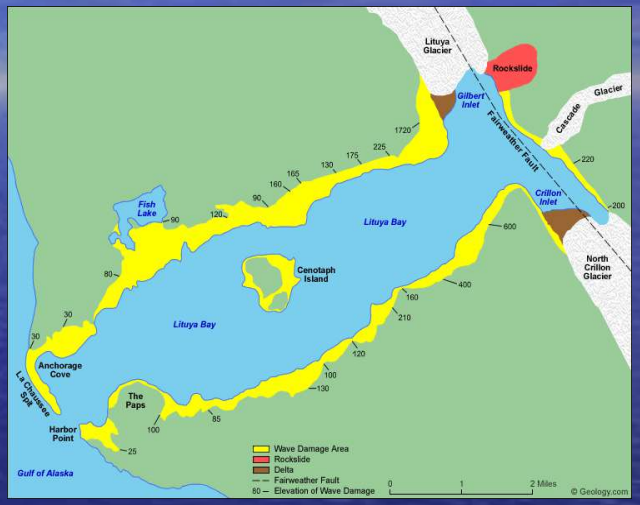
- When two plates meet each other they cause folding and cracking of the rock. This is a very slow process. Only a few centimeters a year.
- This fracture of the earth's crust is called a *fault.*
- As plates grind or slip past each other at a fault, the earth shakes or trembles causing an *earthquake*.
- A special device called a *seismograph* can detect earthquakes. It measures the size of the waves created by an earthquake.



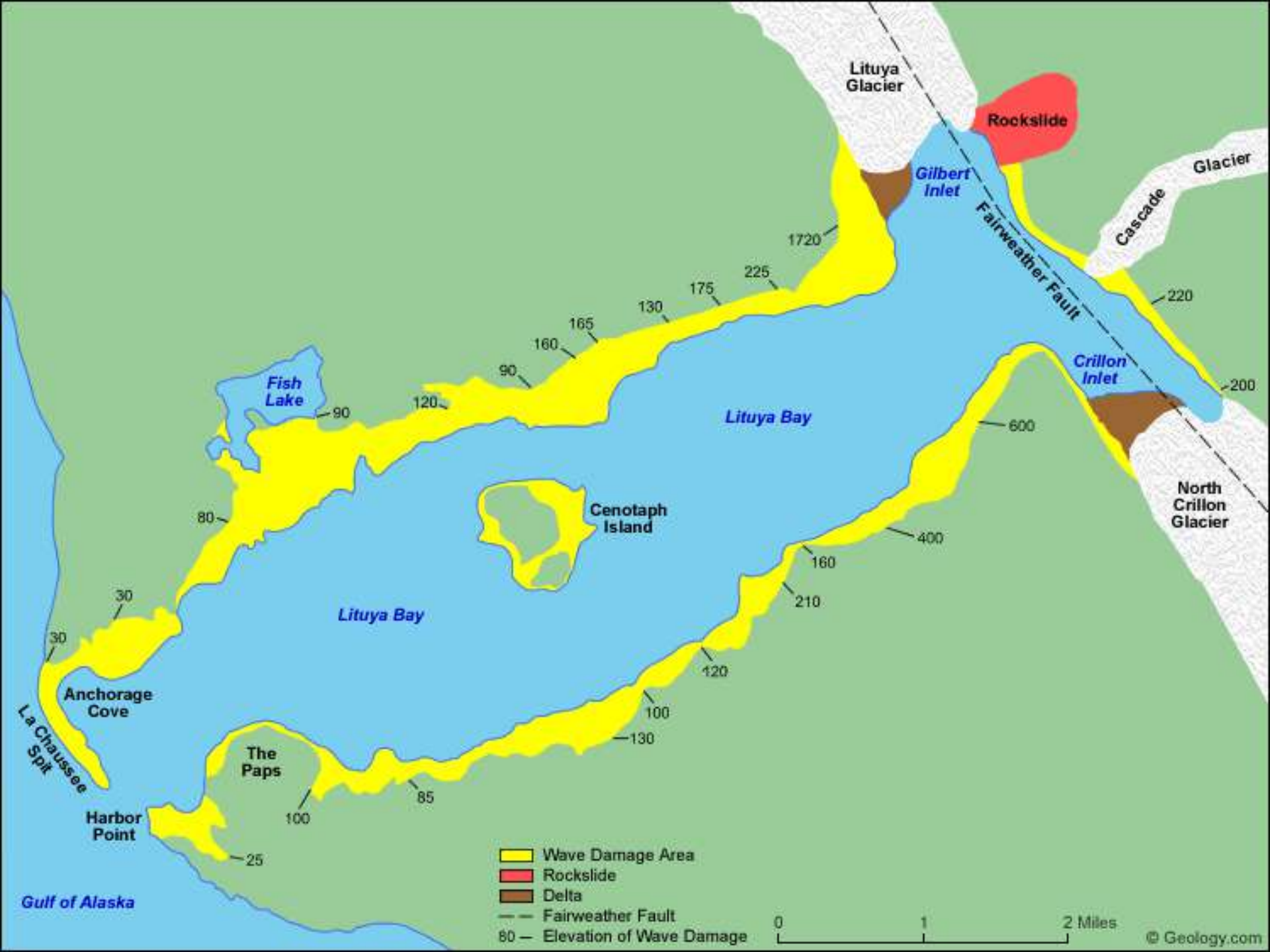
- The *Richter Scale* uses information collected by seismographs to determine the relative strength of an earthquake

Tsunami

- is defined as a series of ocean waves that are generated by large movements or disturbances on the ocean's floor. The causes of these disturbances include volcanic eruptions, landslides and underwater explosions



- The world record for a tsunami was set in July 1958 Alaska. The force of the wave removed all trees and vegetation from elevations as high as 1720 feet (524 meters) above sea level.


Lituya Glacier
Rockslide
Gilbert Inlet
Fairweather Fault
Cascade Glacier
Crillon Inlet
North Crillon Glacier
Fish Lake
Lituya Bay
Cenotaph Island
Lituya Bay
Anchorage Cove
La Chaussee Spit
The Paps
Harbor Point
Gulf of Alaska
1720
225
175
130
165
160
90
120
90
80
30
30
100
85
25
220
200
600
400
160
210
120
100
130
Wave Damage Area
Rockslide
Delta
Fairweather Fault
80 — Elevation of Wave Damage
0
1
2 Miles
© Geology.com


Lituya Bay
Gulf of Alaska
Geology.com / NASA Landsat

Tsunami

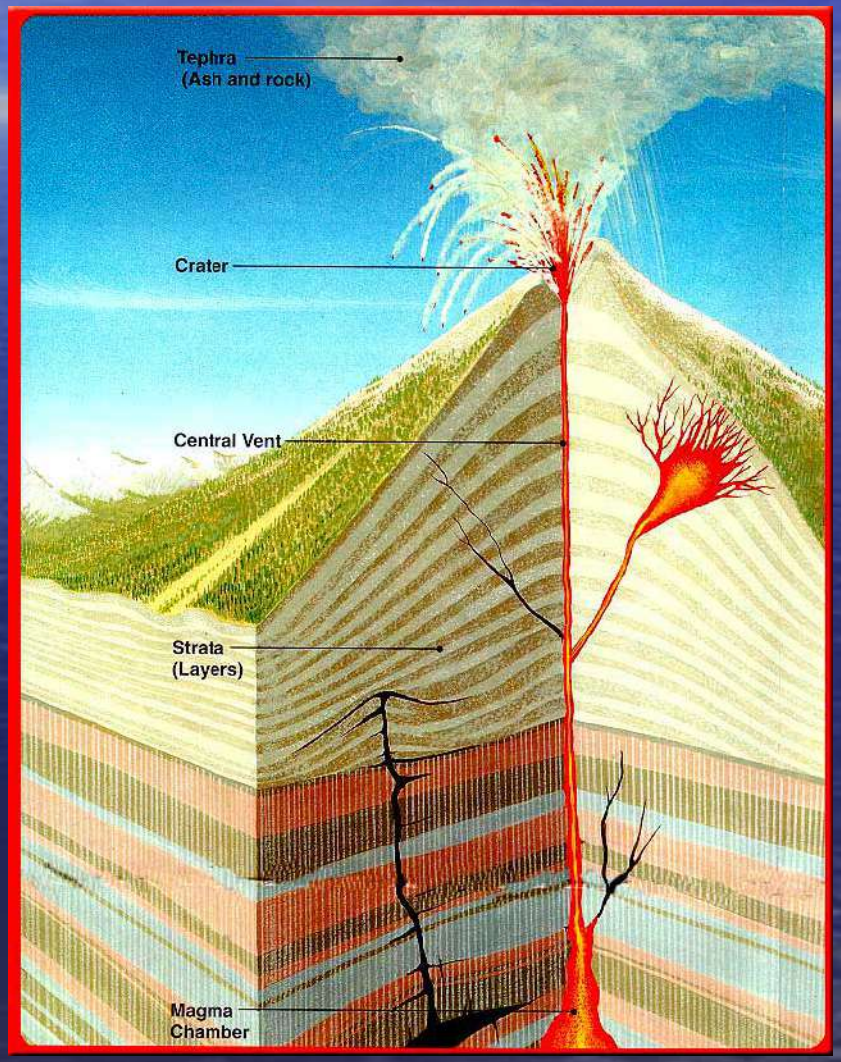
- The World's deadliest tsunami occurred in the Indian Ocean (Sumatra, Indon esia) in 2004 with an estimated number of deaths: 280,000+

Volcanoes

- Magma, gases, and water from the lower part of the crust or the mantle collect in underground chambers. Eventually the materials pour out of a crack in the earth's surface called a *volcano.*

- Most volcanoes are found along tectonic plate boundaries.

- When the magma flows out onto the land slowly it may spread across an area and cool. Magma that has reached the earth's surface is called *lava*.



External Forces Shaping the Earth

External Forces

- Weathering – process that breaks down rocks

  1.Chemical – water dissolves some of the chemicals in rocks. Causes them break apart

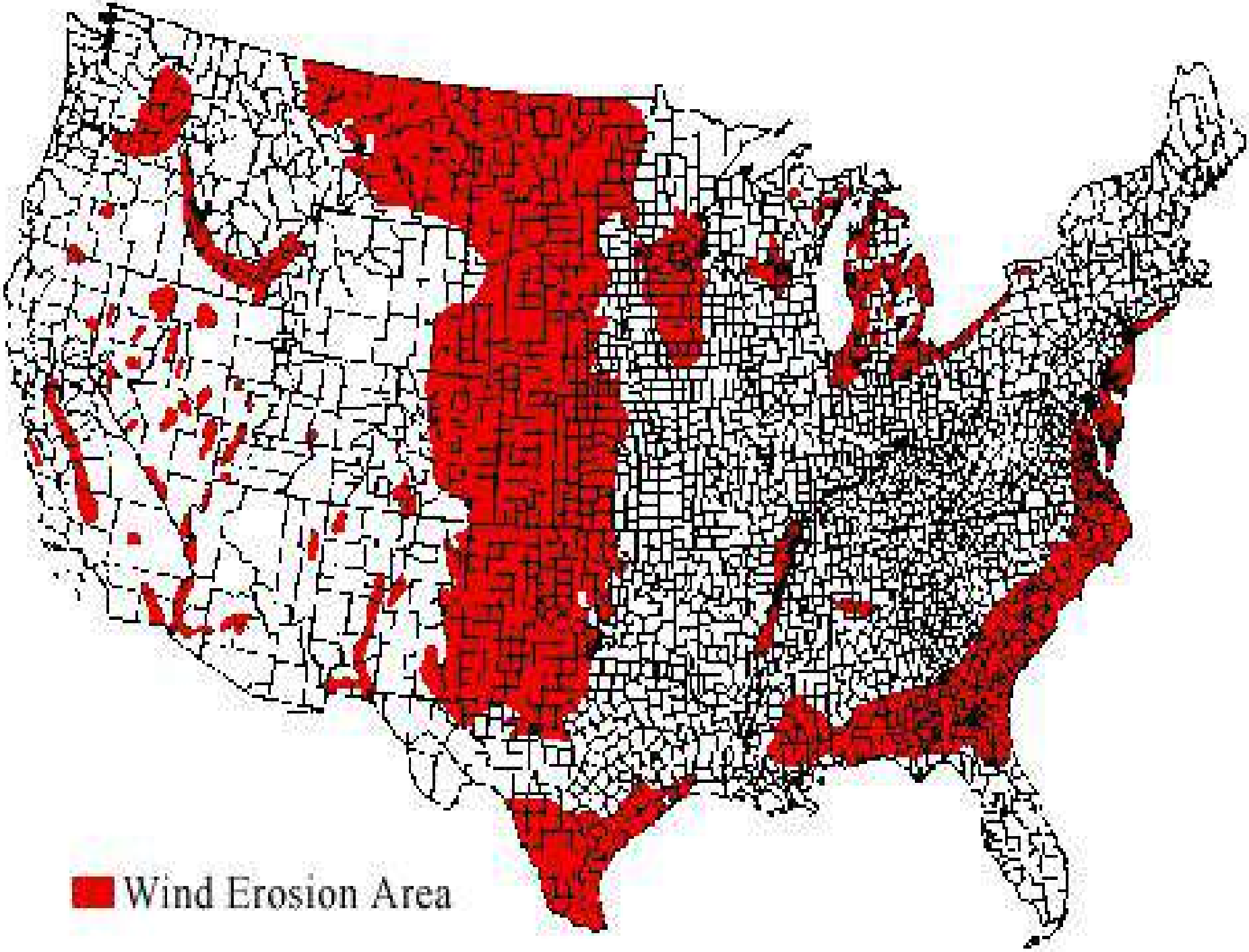
  2. Physical – water seeps into the rocks freezes expands and causes the rocks to break apart

External Forces

- Erosion – wearing away of the Earth's surface

  1. Wind – movement of dust, sand, and soil from one place to another

  2. Water – runoff digs into ground and rocks forms valleys and gullies
- Glaciers – destroy forest and land as they move across land


Wind Erosion Area