Unit 6: Dynamic Planet: Plate Tectonics

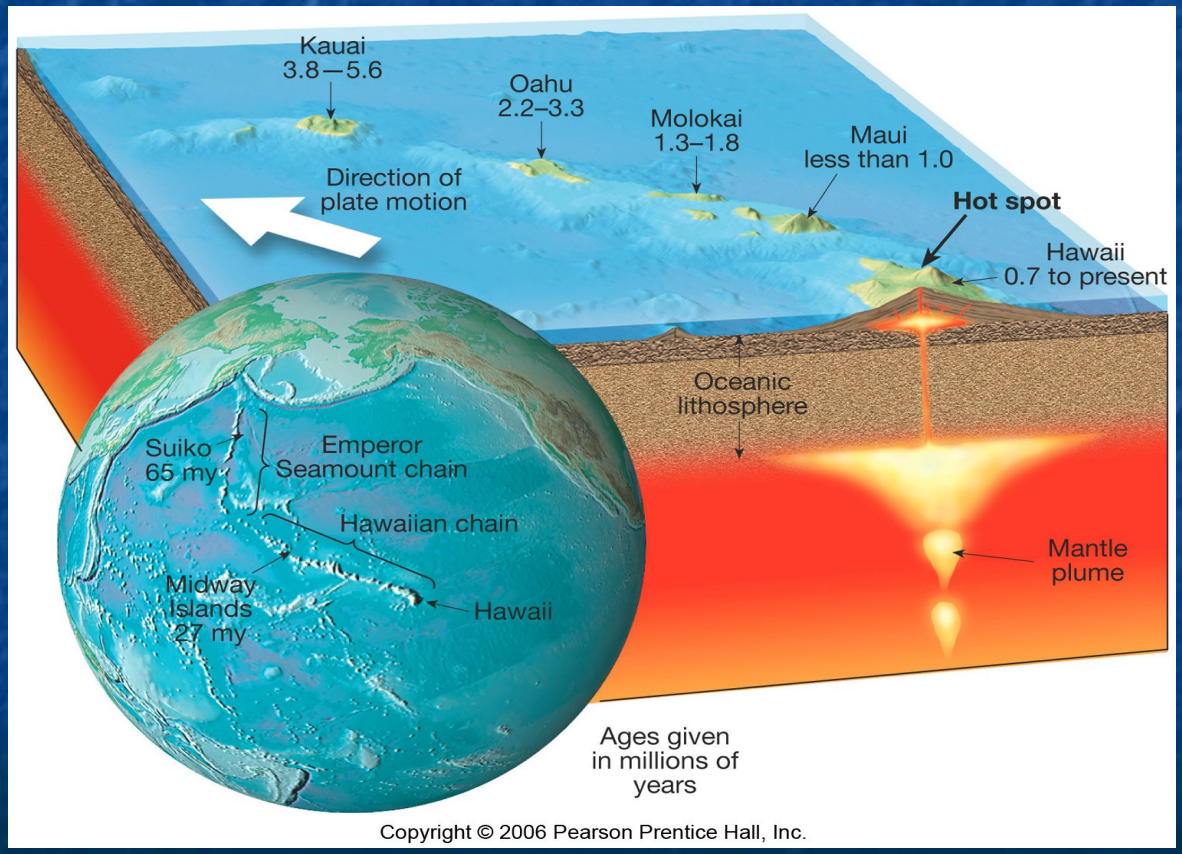
Lecture 4

Objectives:

E3.3C - Describe the motion history of geologic features (e.g., plates, Hawaii) using equations relating rate, time, and distance.

E3.r3f - Describe how the direction and rate of movement for the North American plate has affected the local climate over the last 600 million years.

The Hawaiian Islands have formed over a stationary hot spot



Measuring plate motion

- Measuring plate motion
  - By using hot spot “tracks” like those of the Hawaiian Island - Emperor Seamount chain
  - Using space-age technology to directly measure the relative motion of plates
    - Very Long Baseline Interferometry (VLBI)
    - Global Positioning System (GPS)

How to determine rate of plate motion

Distance (km) / age (ma)

4000 km / 65 million year = 61.53

61.53 x .1 = 6.1 cm/yr

Directions and rates of plate motions

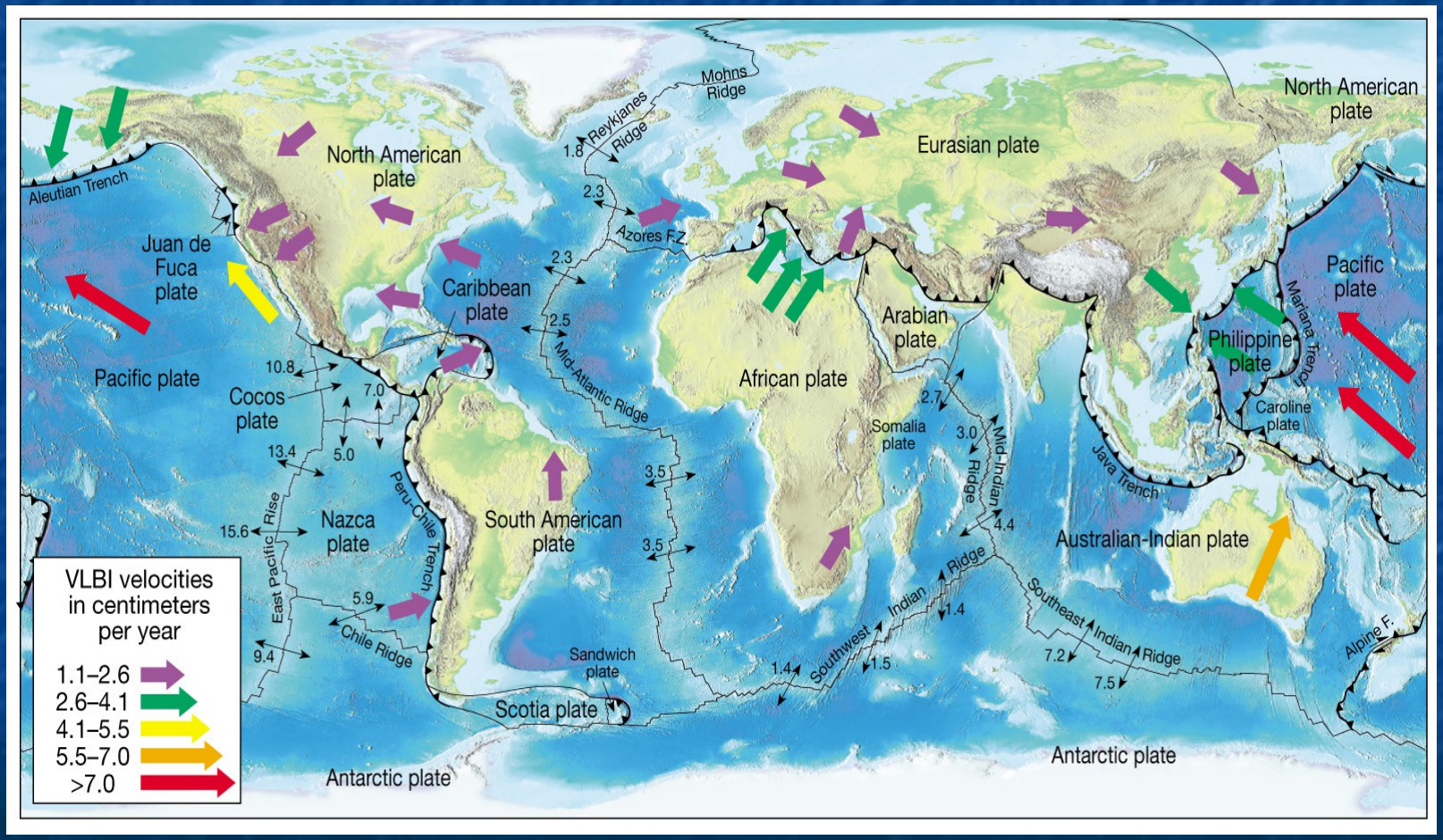


Plate Motion

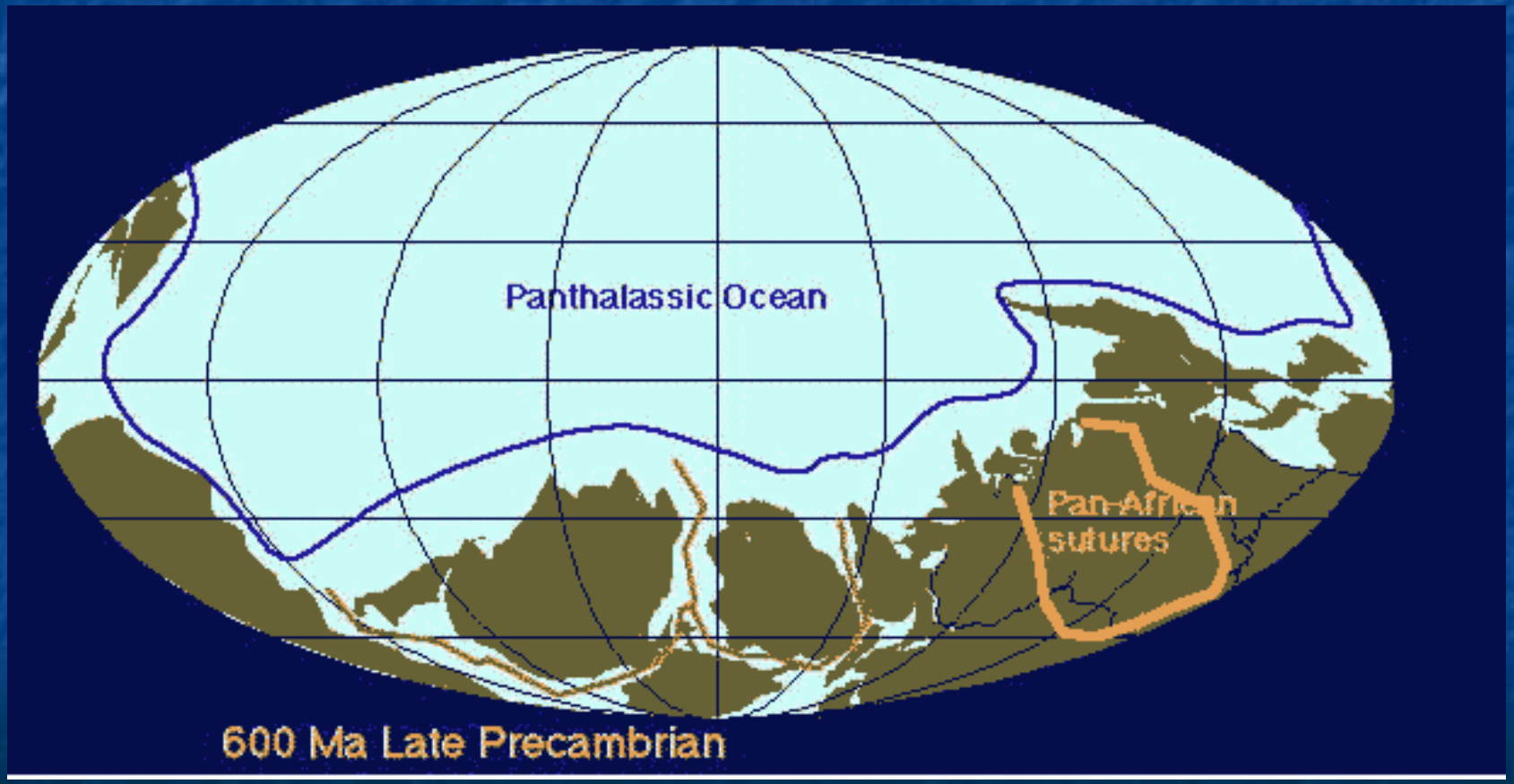


Plate Movement and Climate

- North America moved from near the equator to a more northern location.
- Amount of concentrated solar radiation is less now.
- Ocean currents brought warmer water to farther north latitudes.