

Introduction to Biology. Lecture 5

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Outline

- 1 Where we are?
- 2 Floating continents
 - Continental drift
 - Plate tectonics



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Chemical terms

- Atoms
 - Protons
 - Neutrons
 - Electrons
- Atomic weight
- Isotopes
- Elements and periodic table
- Molecules and molecular weight
- Chemical bonds, valence and group
- Mole
- Molar concentration
- Acids and bases, pH



Chemistry basics (2)

- pH of distilled water is equal to $-\log(10^{-7}) = -(-7) = 7$
- Molar mass is a gram equivalent of molecular mass
- For example, molecular mass of salt (NaCl) is $23 + 35 = 58$.
Therefore, 1 mole of salt is 58 g
- Every mole contains $6.02214078 \times 10^{23}$ molecules (Avogadro's number)
- In water solution, 1 M (1 molar) concentration of salt means in 1 liter of distilled water 58 g of salt was diluted



Floating continents

Continental drift

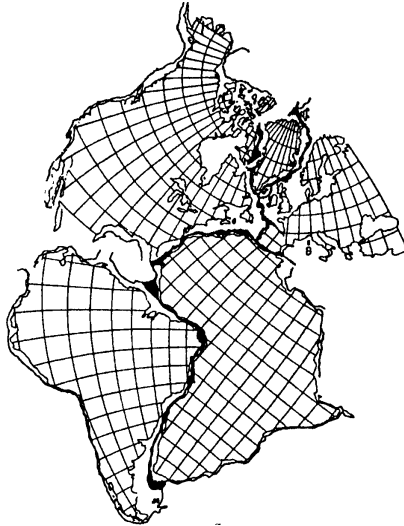


Continental drift

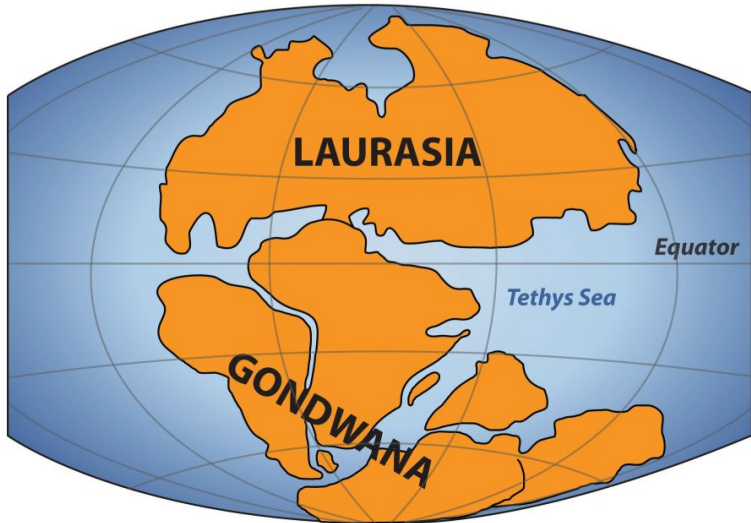
- In 1921, Alfred Wegener invented the idea that South America and Africa were parts of one big continent—Gondwana.
- According to Wegener, in the end of Paleozoic era, there were two big continents—Gondwana and Laurasia separated by Tethys ocean
- Before that, all continents were united in one—Pangaea surrounded by one big ocean.



One of Vegener's arguments



Laurasia and Gondwana



Pangaea



Floating continents

Plate tectonics

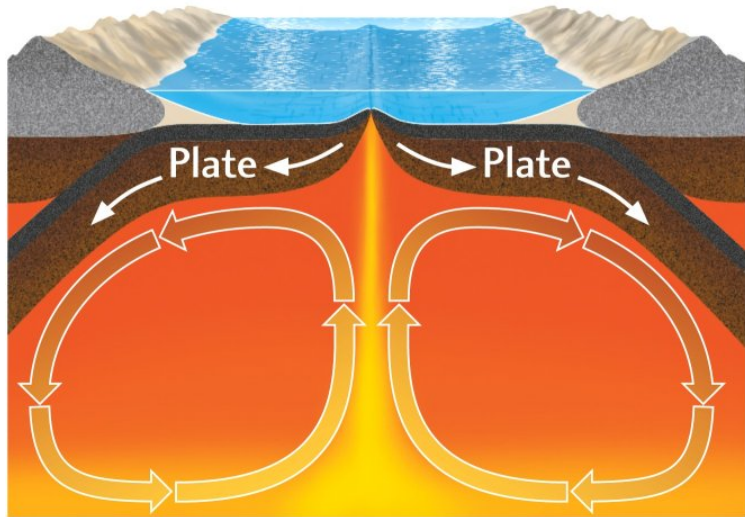


Mantle convection

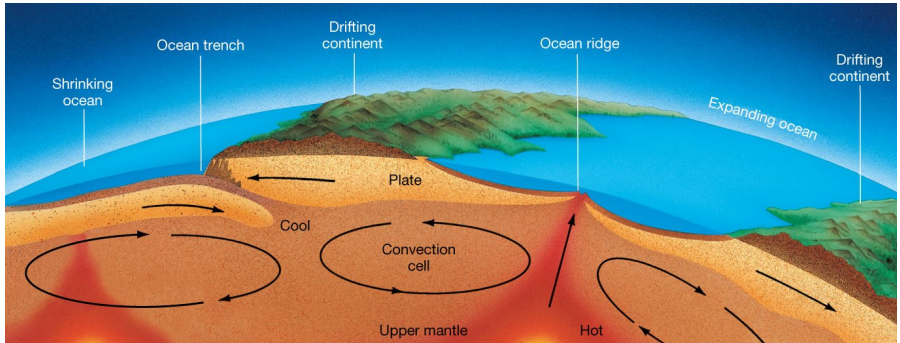
- The driving force of floating continents is a **mantle convection**
- In ocean ridges, new ocean cortex is constantly forming and expanding
- In ocean trenches and continental ridges, different plates are colliding and often forming mountains



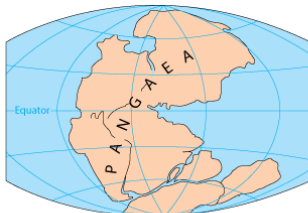
Mantle convection



Mantle convection



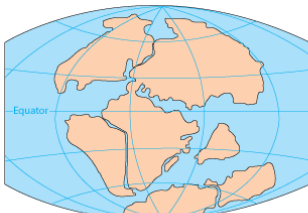
The result of mantle convection



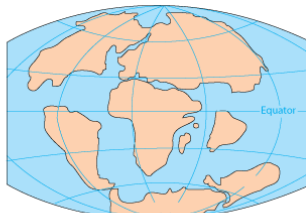
PERMIAN
250 million years ago



TRIASSIC
200 million years ago



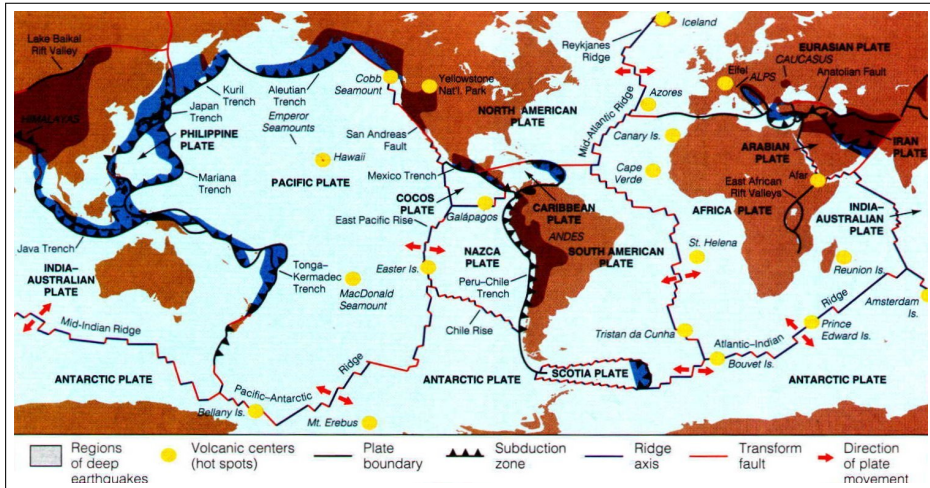
JURASSIC
145 million years ago



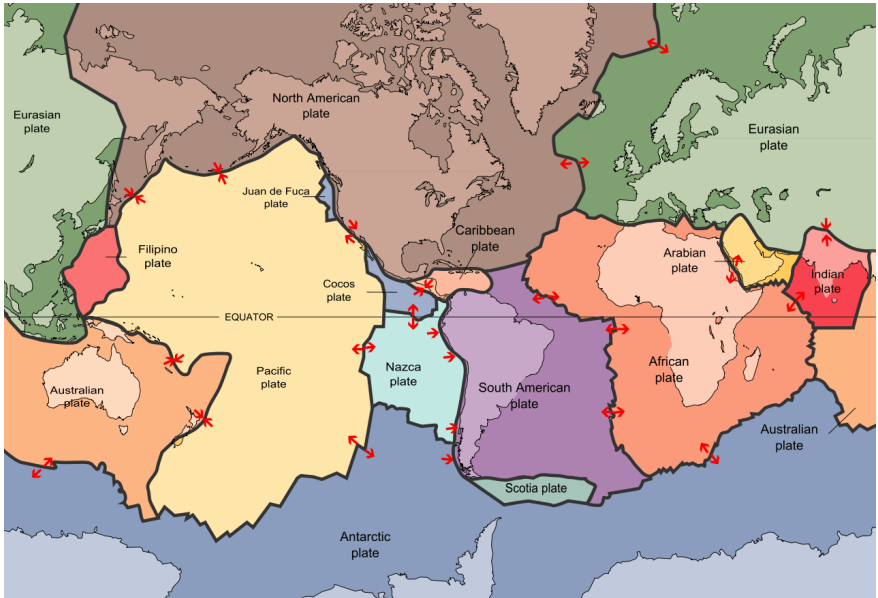
CRETACEOUS
65 million years ago



What is going on now



Another view (from Wikipedia)

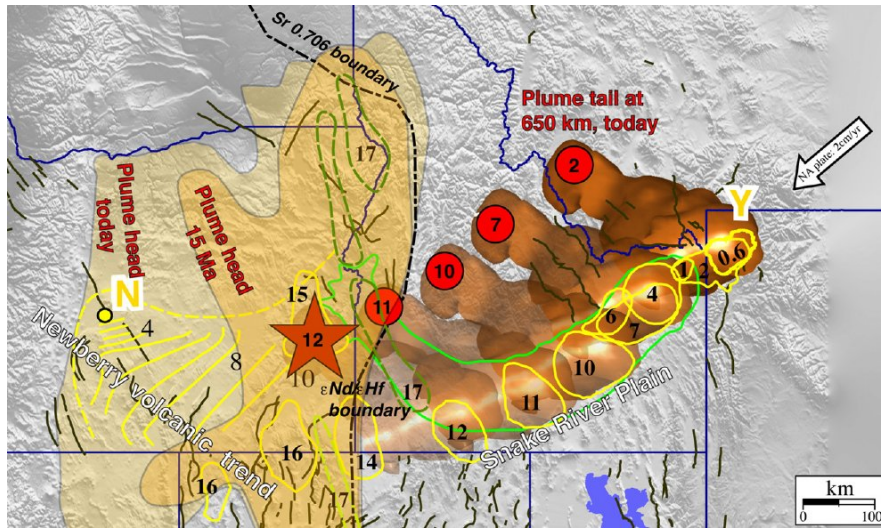


Two living examples of continental drift on U.S. territory

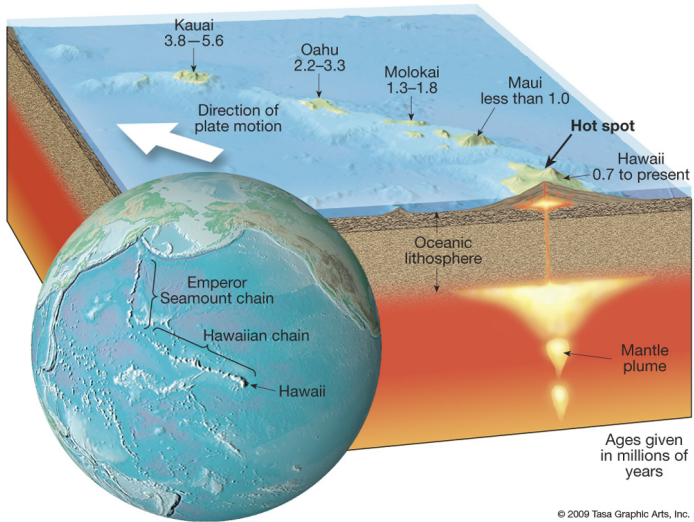
- Yellowstone hotspot
- Hawaiian hotspot



Yellowstone hotspot



Hawaiian hotspot



Summary

- Continents of Earth are constantly changing their position due to the mantle convection (“plate tectonics”)
- In the past (Permian period) all continents formed super-continent Pangaea, which then broke into Laurasia and Gondwana



For Further Reading



Plate tectonics.

http://en.wikipedia.org/wiki/Plate_tectonics

