4/26/10

Week 5 (1)

Sedimentary Environments,

Relative Dating and Radiometric Dating

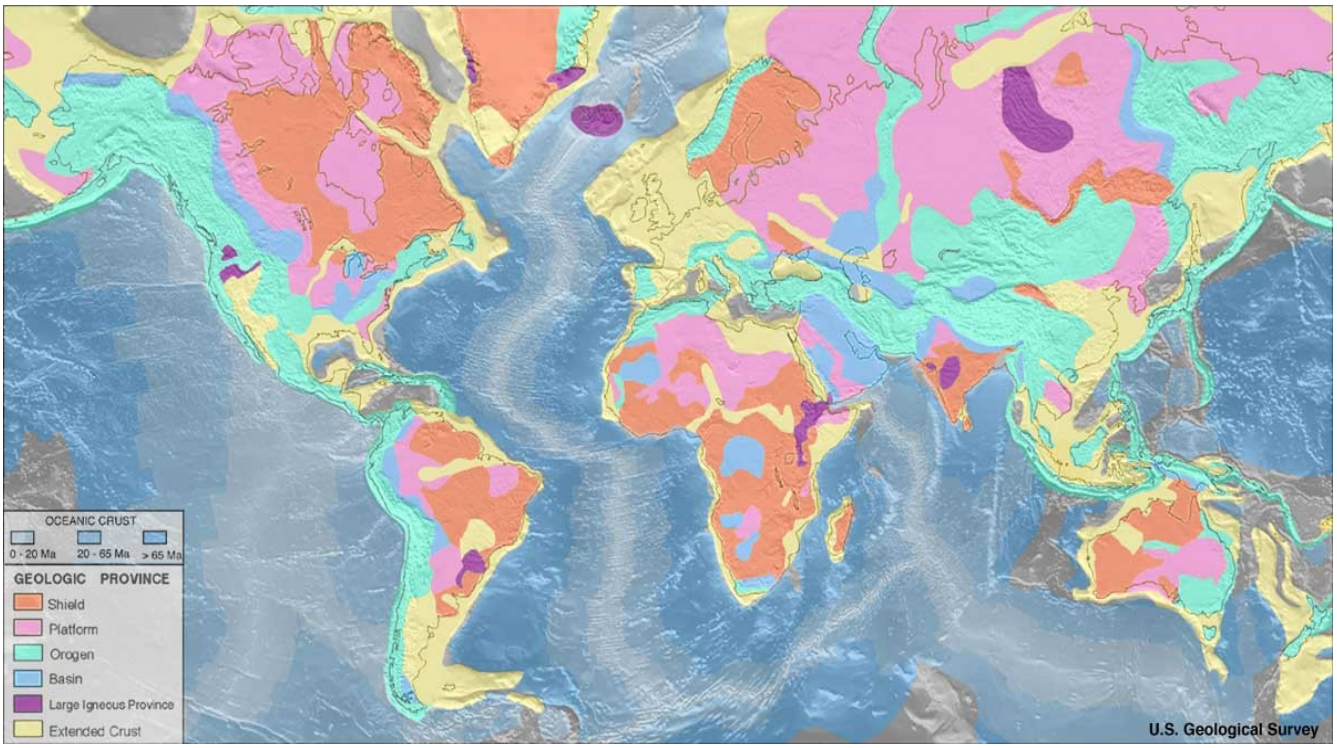
Craton: region of continent consisting of continental shield and continental platform that has been tectonically stable for vast period of time and contains its oldest rocks.

Orogen: elongated belt of deformed rocks at the edge of a convergent plate margin, in broader terms, the region that hasn't been stable for long period of time.

http://upload.wikimedia.org/wikipedia/commons/1/16/North_america_craton_nps.gif

Continental shield: part of craton consisting of exposed crystalline rock (basement rock).

Continental platform: part of craton where continental shield (basement rock) is covered by a veneer of younger (eternally sedimentary) rocks.



http://upload.wikimedia.org/wikipedia/commons/a/a9/World_geologic_provinces.jpg

Marine: Underneath ocean.

Non-marine: not underneath ocean.

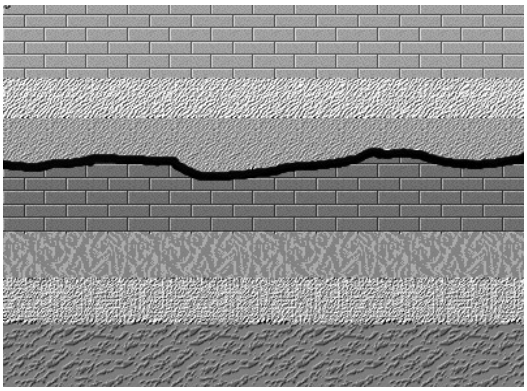
Shallow marine - always on continental crust. (under water at a depth of 200m or less)

Deep marine – always on oceanic crust. (under deep ocean)

Relative Dating

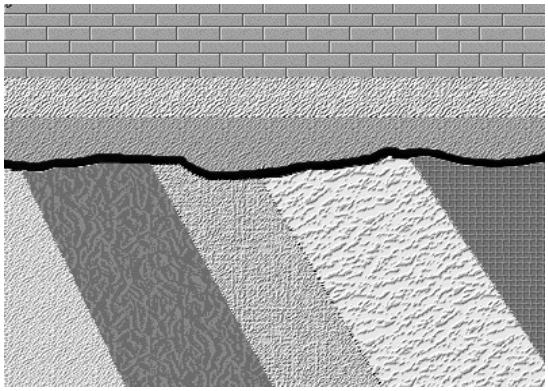
3 types of unconformities

Disconformity: sedimentary rock → erosion → deposition



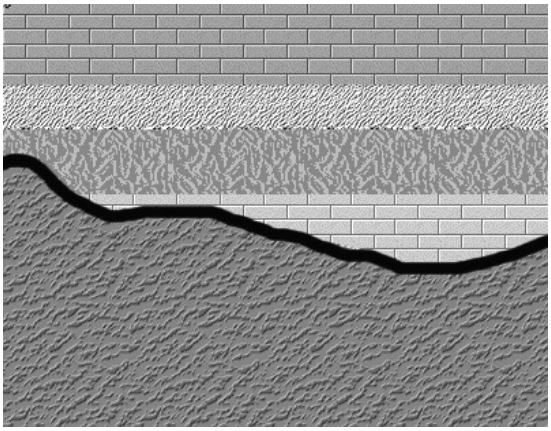
http://en.wikipedia.org/wiki/File:Disconformity.jpg

Angular unconformity: sedimentary rock → tilting/erosion → deposition



http://en.wikipedia.org/wiki/File:Angular_unconformity.jpg

Non-conformity: Igneous or metamorphic rock → uplift/erosion → deposition



http://en.wikipedia.org/wiki/File:Nonconformity.jpg

Correlation: show they are time equivalent.

Criteria:

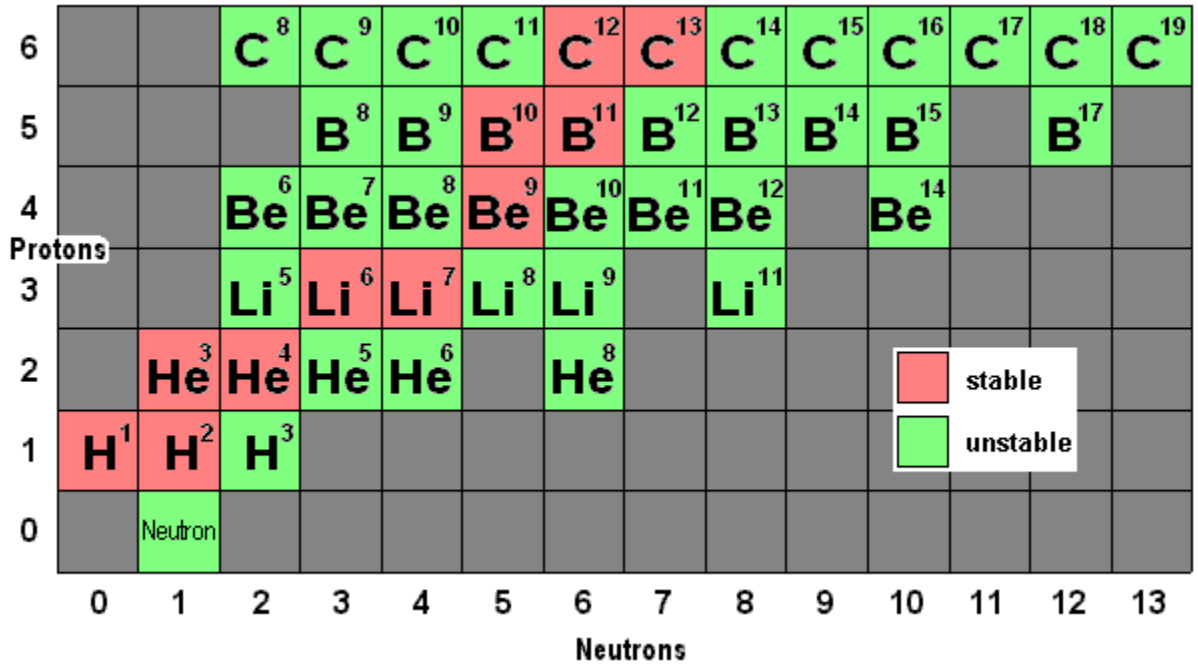
- Trace laterally – if close enough
- Similarity of rock type and position in sequence.
- Key beds - a distinctive layer such as ash or coal that can be traced over long distances.
- Fossils – particularly index fossils (biostratigraphic correlation).

The geologic column (geologic time scale) was constructed by determining the relative ages of stratigraphic columns from around the world.

Radiometric Dating

Radiometric dating determine the absolute dates.

Isotopes of an element have the same number of protons but vary in number of neutrons. Some isotopes are stable, others aren't.



http://www.wordwizz.com/images/isotopes.gif

The unstable atoms are radioactive – they emit energy and particles while they rearrange their protons and neutrons to a more stable configuration. For atoms with small atomic numbers, they are stable with the number of protons equal to the number of neutrons. For larger atoms with lots of protons in its nucleus, they are less stable regardless of the configuration of the nucleus.

Radioactive decay is a conversion of subatomic particles that results in a stable configuration for the nucleus. A neutron changing to a proton and an electron. Energy and heat is released in forms of radioactive radiation. Atoms are not destroyed in the process.

Parent: the original atom before radioactive decay.
Daughter: newly formed atom by the process of radioactive decay.