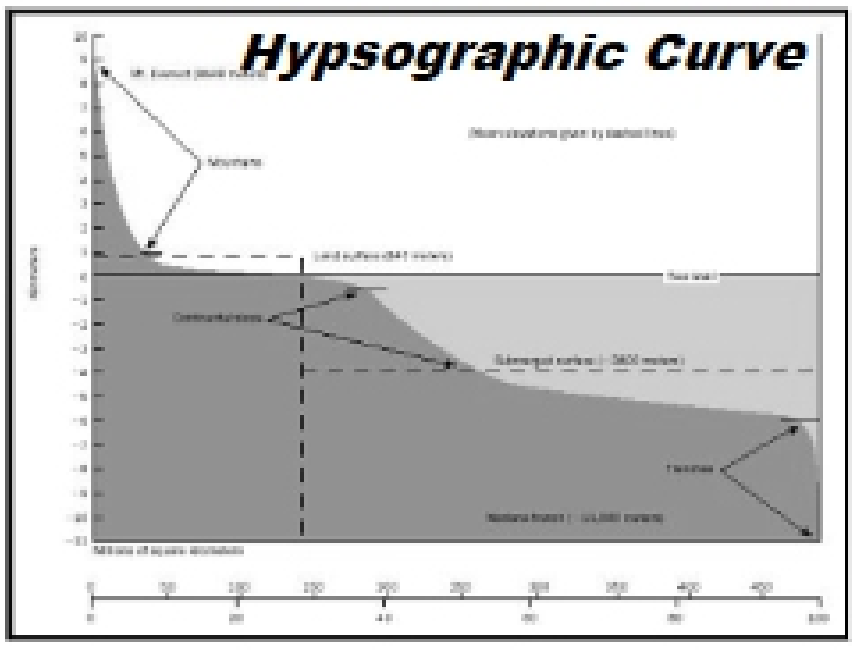
Chapter 10

Evolution of Continental Crust



Continental Crust Terms

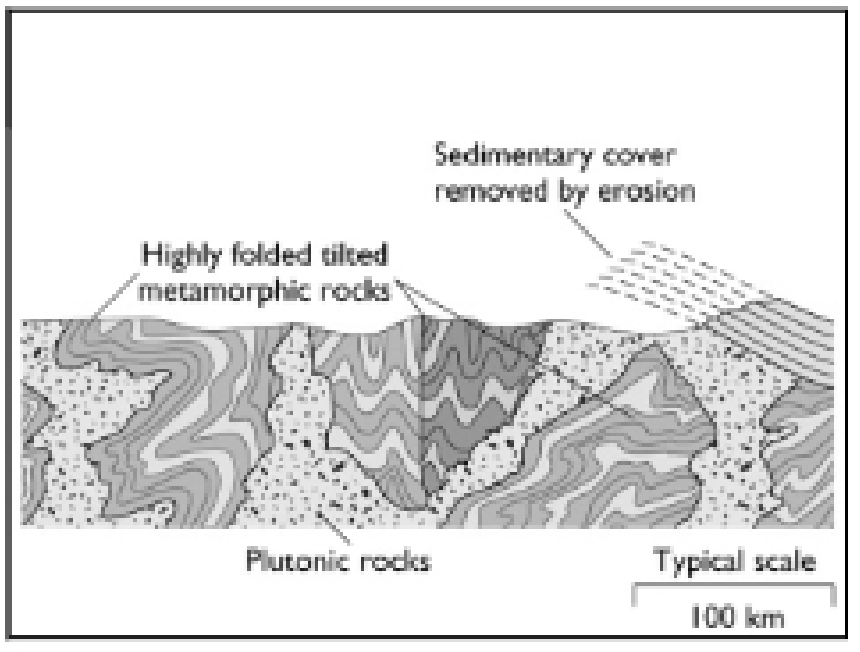
- Orogeny
- Epeirogeny
- Terrane
- Accreted Terrane
- Mantle Plume
- Hot Spot Volcanism
- Wilson Cycle
- Basin
- Dome
- Accretion
- Craton
- Shield

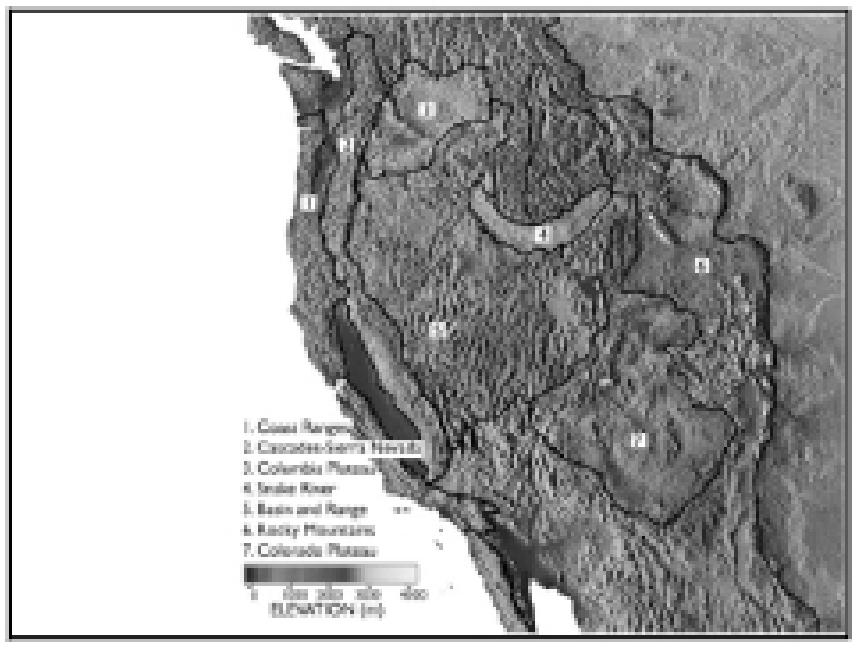
Continental Crust

- It's thick (30-60km),
- It's old (250 - 4000 my),
- It's light (ρ = 2.75 g/cm^3)
- It's silicic (dioritic to granitic in composition).
- It has a stable interior called the craton.
- It grows at active margins.
- It does not subduct.

Continental Crust

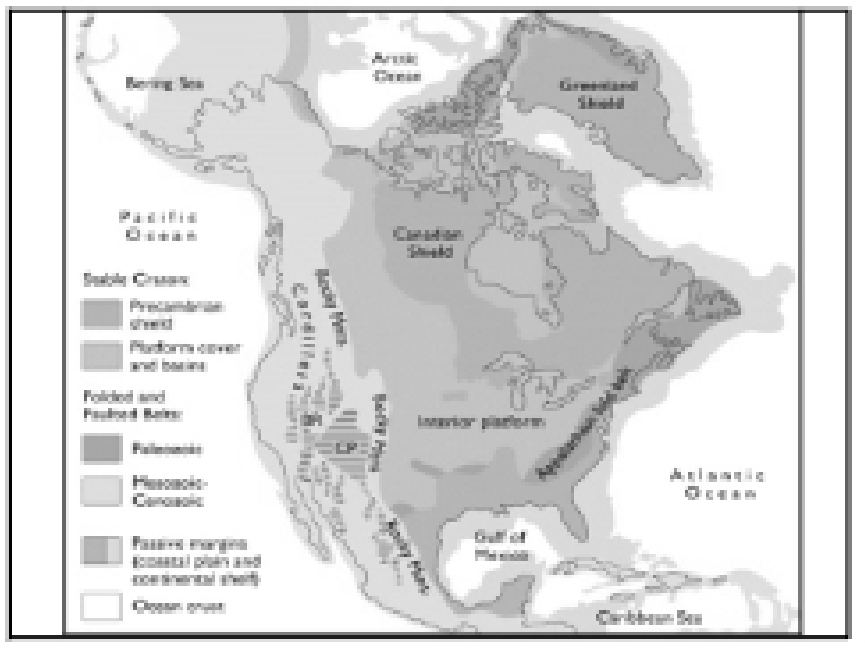
- Because continental crust is thick and old, it has experienced and recorded many orogenic events.
  - It is extremely heterogeneous
  - Oldest continental rocks are about 4 billion years old.
  - The oldest oceanic rocks are only 200 million years old.





Cratons and Shields

- *The craton is the stable interior part of the continent.*
- *The craton may be covered by a thin (<2km) veneer of sedimentary rocks.*
- *The shield is that portion of the craton that is free of sedimentary cover.*
- *Shields occur in Canada, Southern Africa, Western Australia, and Scandinavia.*

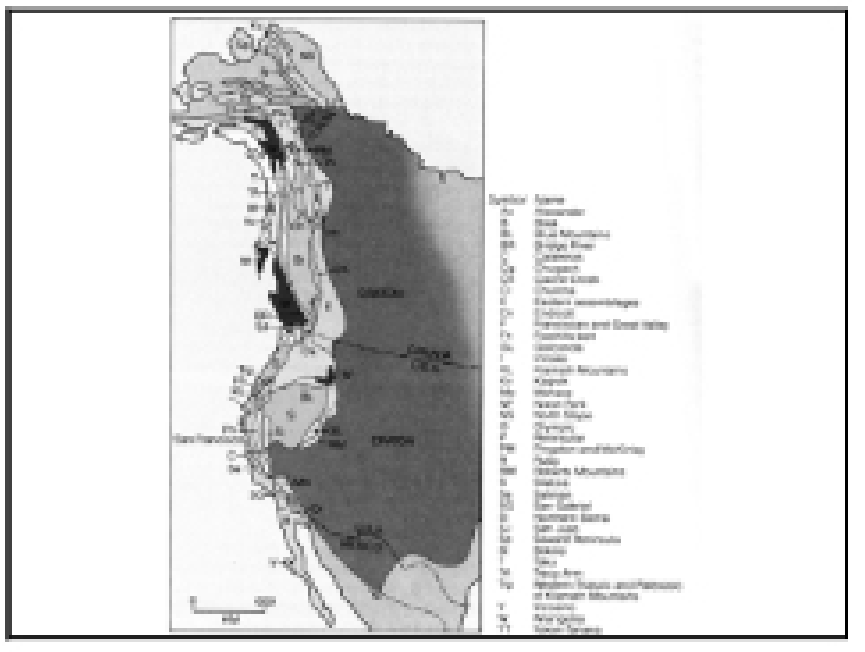


Terranes

- *A terrane is a co-genetic block of crust.*
- *Continents are composed of terranes or blocks of similar age and origin.*
- *The terrane we are on gives a metamorphic age of 1800 my.*
- *The CO-WY border is also a terrane boundary*
- *The Wyoming terrane is Archean.*

Growth of Continents

- *Continents grow at active margins*
- *They grow by addition of accreted or exotic terranes.*
- *A exotic terrane (= accreted terrane) is a small block of crust "scraped off" a subducting plate.*
- *Much of SE Alaska and British Columbia is composed of accreted terranes.*

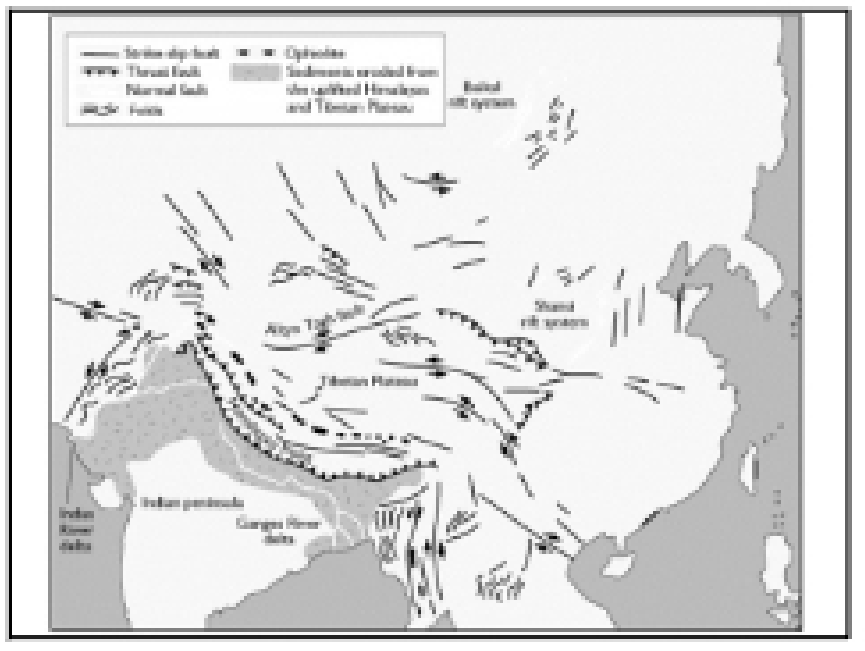


Mountain Belts

- *An orogeny is an episode of mountain building.*
- *An orogenic belt is a co-genetic belt of mountain ranges. (e.g. Alps, Himalayas, Rocky Mountains)*
- *Mountain belts tend to have thicker sedimentary cover (2-10 km).*

Wilson Cycle

- *The cycle of opening and closing of ocean basins is called the Wilson Cycle.*
- *Continents can be rifted by the formation of new ocean crust.*
- *Continents can fuse or collide as in the Alpine-Himalaya orogeny.*



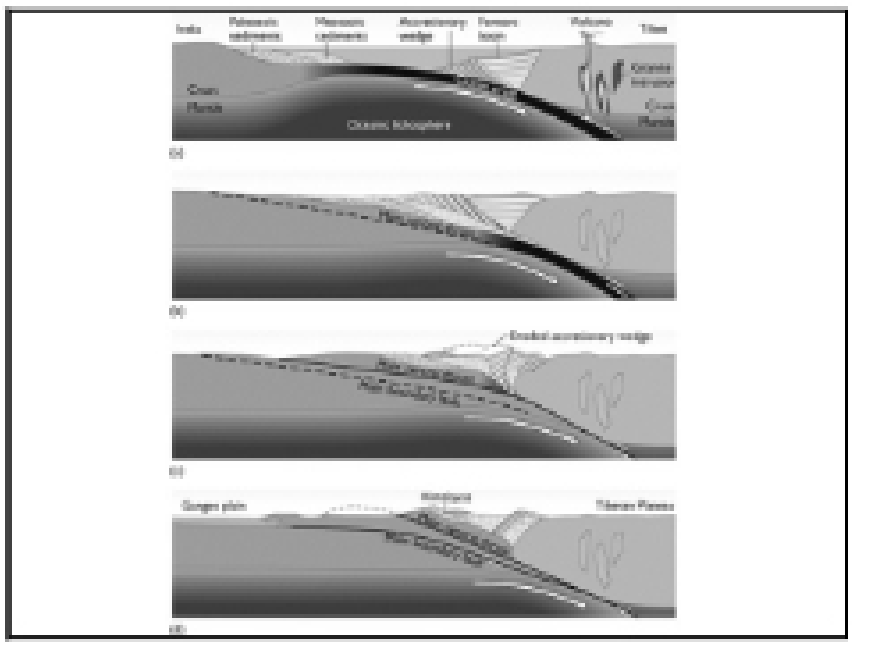
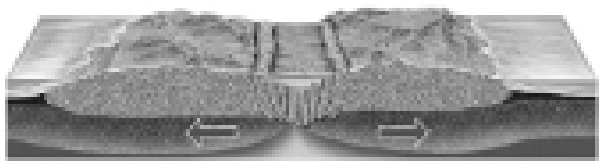


Plate tectonic movements and ocean basins



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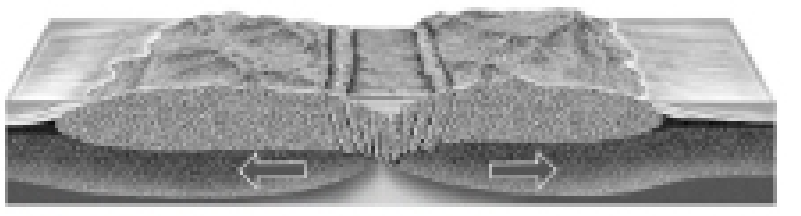

Rifting splits the continent...