

GEOL 117 Class 7 web notes: Plate Tectonics I

More on the Sea Floor Spreading Hypothesis (Hess, 1962):

Mid-ocean ridges
Fracture zones
Marginal trenches

Mid-ocean ridges - Origin

Divergent plate boundaries- plates separating there

Spreading centers:

- Creation of new oceanic lithosphere,
- Volcanic activity, Hydrothermal Activity

Earthquakes -- Tensional forces- "crack" at the place where plates move part

Shallow Earthquakes only

Variation in width caused by variation in spreading rates:

Fast spreading = wide ridges (lithosphere still hot and buoyant farther away from plate boundary)

Slow spreading = narrow ridges

Birth of a divergent plate boundary

- Rift forms in a plate: Occurring in East Africa now
- Continent Torn apart (if rifting continues)
- New Ocean forms
- Rift becomes mid-ocean ridge

Fracture Zones: Breaks in the ocean crust connecting the segments of the mid-ocean ridges

= Transform faults- plates slide laterally past each other

Earthquakes along offsetting middle segments only

Trenches: Mostly in the Pacific Ocean, two different types:

All trenches: Zones of deep, strong earthquakes

Western Pacific:

Volcanic island chains

Caused by Ocean-ocean convergence -- as in Western Pacific

Eastern Pacific:

Volcanoes, mountains on continent (Andes, Cascades)

Subduction of the Ocean plate beneath the more buoyant continent OR subduction of an older, cooler oceanic plate beneath a younger oceanic plate

Volcanoes -- melting caused by descent of plate

Earthquakes -- stress in the "cool" brittle subducting plate

Continent-continent collision: Continental plates not subducted -- too buoyant

Huge mountains, earthquakes

Example: Himalayas (India-Asia collision beginning 45 m.y. ago)