

Transform Plate Boundaries

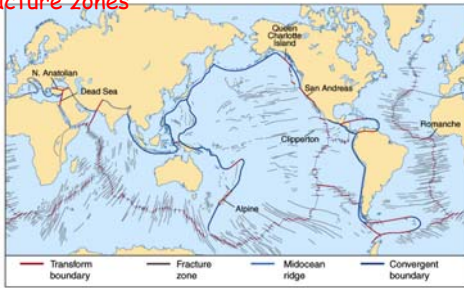


CHAPTER 20

Transform Boundaries

- Strike-slip faults
 - Vertical & parallel to movement
- Plates move laterally
- No lithosphere is created or consumed

- **Fracture Zones**
Oceanic transform boundaries are a small part of fracture zones



- up to 10,000 km long
- 10's of km at most, but many faults that offset oceanic ridges

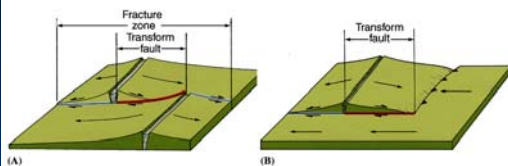
Fracture Zones

- Fractures zones can be large
 - as much as 6 km high in oceans
 - Smaller on continents, erosion

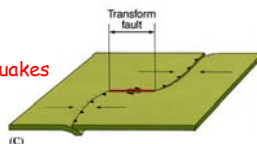
Transform Boundaries

- connect other boundaries

(A) Ridge-Ridge boundaries



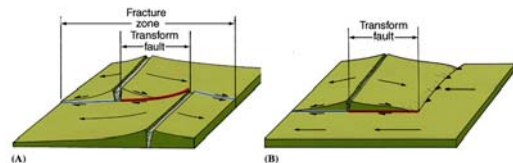
- Most Abundant Type
- High Shear Stress
- Numerous shallow earthquakes



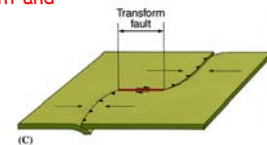
Transform Boundaries

- connect other boundaries

(B) Ridge-Trench boundaries



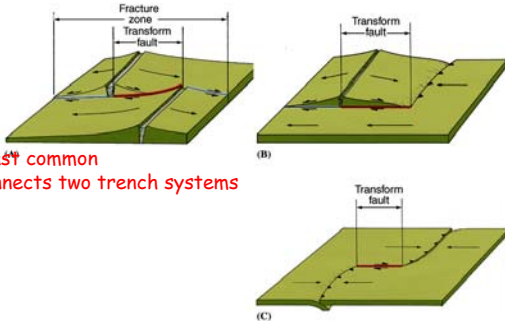
- Uncommon, connects divergent and convergent boundaries



Transform Boundaries

- connect other boundaries

(C) Trench-Trench boundaries



Least common
Connects two trench systems

Oceanic Transform Boundaries

- Major Shear and deformation

- Little igneous activity
- Allows compensation for differential movement

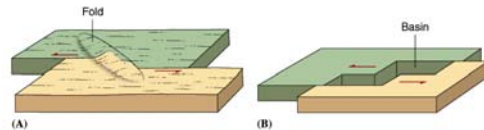
Romanche Fracture Zone

- Separates African and S. American plates

- Active transform is ~ 600 km long
- Fault system is 10's of km wide

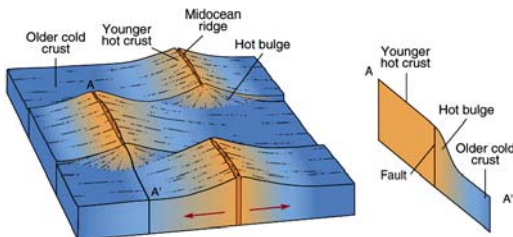
Transform Boundary Processes

- Lateral movement produces areas of (A) contraction and (B) extension
- (A) minor uplift and folding, (B) pull-apart basins



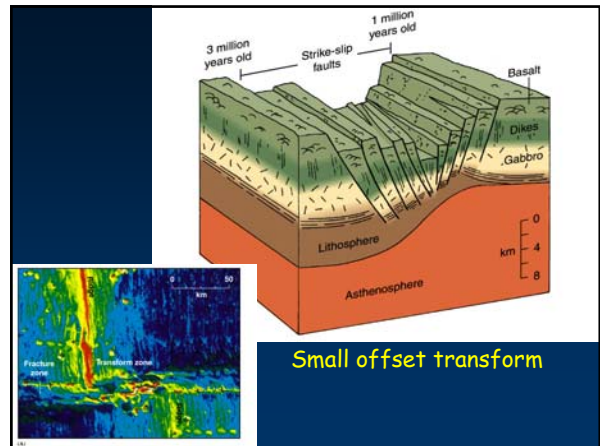
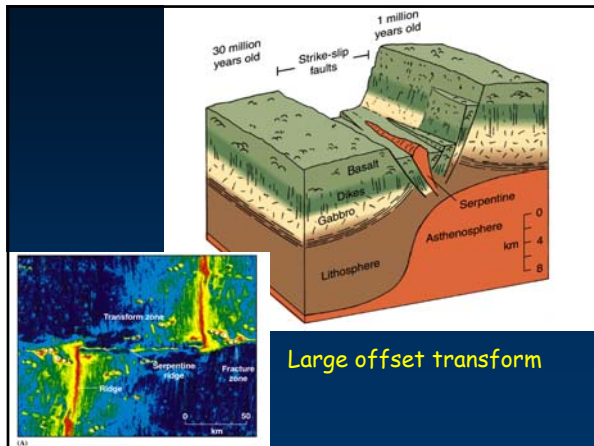
Thermal structure

- At ridge-ridge transforms, cold crust is opposite a hot ridge
- conductive heat effects the cold side - causes bulging

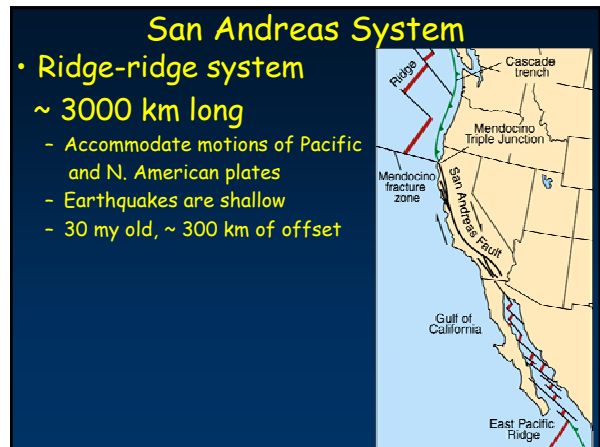
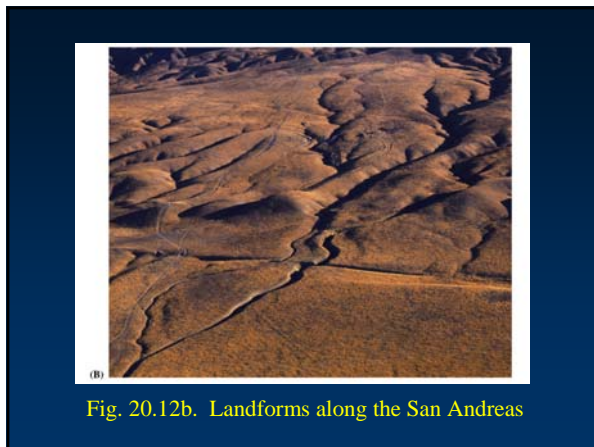
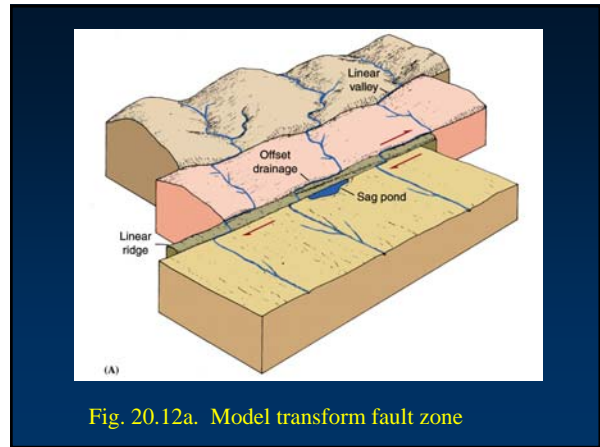


Transform Boundary Processes

- Ridge offset & spreading rate
- Offset controlled by spreading rate
- offset influences temperature contrast



- ### Continental Transform Faults
- Not as common as oceanic transform faults
 - Seismically active
 - Penetrate entire lithosphere
 - Distinct linear features
 - San Andreas, Dead Sea systems



Earthquakes

- Abundant along transforms
 - More abundant in oceanic systems
 - More intense along continental systems
- Little, if any, Volcanism
- Horizontal shearing creates metamorphism
 - Creates fault breccias and mylonites

Magmatism

- Magmatism is decreased along oceanic transforms
- Leaky transforms produce small amounts of basaltic magma in both oceanic and continental environments
 - Pull apart may initiate partial melting

Metamorphism

- Horizontal shearing creates metamorphism
 - Creates fault breccias and mylonites
 - Ductile deformation occurs at higher T
- Contact metamorphism occurs opposite ridge crests
 - Aided by influx of seawater