Transform faults

Heat flow

- Conductive heat flow described by Fourier’s law -- \( q = -k \frac{dT}{dy} \)
- Cooling follows an exponential temperature curve
- Heat flow from ocean floor shows large values on mid-ocean ridges, due to thermal bulge in underlying mantle
Thermal subsidence

- As plate spreads laterally from ridge crest, it cools and contracts; result is subsidence of ocean floor
- Ridge flanks show exponentially diminishing subsidence rate to c. 80 m.y.
Fracture zones

- Recognized first in Pacific by bathymetric mapping -- zone forms sharp boundary between regions of different depth
- Typical features of fracture zones
  - Escarpment
  - Ridge
  - Trough
  - Line of volcanoes
  - Offset of magnetic anomalies

Transform faults

- Fracture zones seismically active only between offset ridge crests
- Structural features generated by opposed motion of two adjacent lithospheric blocks
- Spreading carries features passively for thousands of km across the ocean floor
- Fracture zones mark past spreading directions
Euler rotations

- All plate motions on a sphere are rotations around an imaginary axis (Euler pole)
- Transform faults are segments of circles, analogous to latitude lines around the Euler pole