EARTHQUAKES

Causes

■ Sudden release of energy stored in rocks
  – Released as seismic waves
■ Elastic Rebound Theory
  – Fault motion
  – Tectonic forces
■ Also associated with volcanic activity

Seismic Waves

– Focus
– Epicenter
– Body waves
  ■ P wave
    – can pass through solids and fluids
  ■ S wave
    – slower
    – can pass through solids only
  – Surface waves- most damaging

Locating earthquakes

■ Seismometer
  – Seismograph; seismogram
■ Determining location
  – Travel-time curves
  – Depth of focus

Measuring size of an earthquake

■ Intensity
  – Modified Mercalli Scale
    ■ I to XII
■ Magnitude
  – Richter Scale
  – Moment magnitude
■ Location & size of earthquakes in U.S.

Earthquake Hazards

■ Ground motion
■ Permanent surface displacement
■ Ground motion
■ Permanent displacement of land surface
■ Fire
■ Landslides
■ Aftershocks
Tsunamis - seismic sea waves

Earthquake Distribution

- Circum-Pacific Belt
- Mediterranean-Himalayan Belt
- Mid-oceanic ridge
- Benioff zones
  - Extend from trenches beneath continents or island arcs

Earthquakes and plate tectonics

Earthquakes at plate boundaries
- Divergent boundaries
  - Along sides of rift valley
  - Indicate horizontal extension
- Transform boundaries
  - Shallow focus
- Convergent boundaries
  - Collision boundaries between continents
  - Subduction

Earthquakes prediction

Scientific techniques being explored
- Microseisms
- Properties of the rock
- Water levels in wells
- Radon emission from wells
- Surface tilts & changes of elevation
- Animal behavior
- Patterns of earthquakes in space & time