Predicting Earthquakes
* Forecasts – uses statements “where and how frequently” and “how large it might be”
* Predictions – uses statements “when and where” an earthquake is expected
* __________ – swarms of minor quakes that can sometimes lead a larger event
  * Used to predict 7.3 event in China in 1975
* Unusual observations:
  * Swelling of the surface
  *
  * Changes in Earth’s magnetic field
  *
  * Increasing radiation levels within wells
* __________ – segments along a fault zone with few or no historic earthquakes
  *
* Migrating earthquakes – events move chronologically along the fault
  * North Anatolian Fault in Turkey
* Earthquakes don’t appear to occur in regular patterns
  *
  * Water could act as a slipping agent
  * Injecting high pressure water deep into faults has revealed an increase in earthquake activity
  *
Surviving Earthquakes
* Unfortunately, we are not doing much better at surviving earthquakes over the years (Table)
San Andreas Fault System
* Zone of parallel faults 30 miles wide
* Ruptures near San Francisco
  * 1868 (Hayward)
  * 1906 (San Francisco)
  * 1989 (Loma Prieta)
* Probability Risk Maps
  * Uses percentages to estimate the best chance for near term event
* Ruptures near Los Angeles
  * 1857 Fort Tejon
  * 1971 (San Fernando Valley)
  * 1994 (Northridge)
Tectonics of Major Earthquakes
* Transform Boundaries
  * North Anatolian Fault (Turkey)
  * San Andreas Fault (California)
* Subduction Zones
  * Santiago, Chile (9.5 magnitude)
* Alaska 1964 (9.4 magnitude)
* Blind Thrust Faults over Active Subduction Zones
  * Seattle, Washington
* Continent-continent collisions
  * Bam, Iran 2003
* Continental Spreading Zones
  * Wasatch Front, Utah
* No plate boundary
* New Madrid Fault
  * Missouri (1811/1812)
* East Coast Fault System
  * Charleston, SC (1886)
* Potential larger events
  * A quakes magnitude is limited to the length of the fault system.

End of Chapter 4
Earthquake Prediction and Tectonic Environments