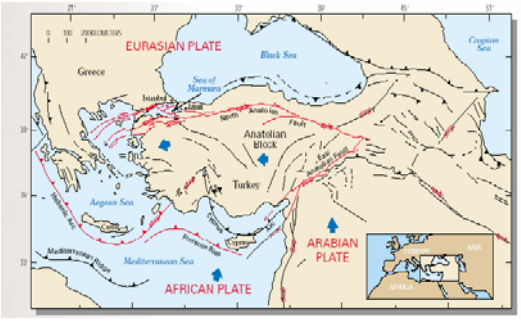
Izmit earthquake

August 17, 1999

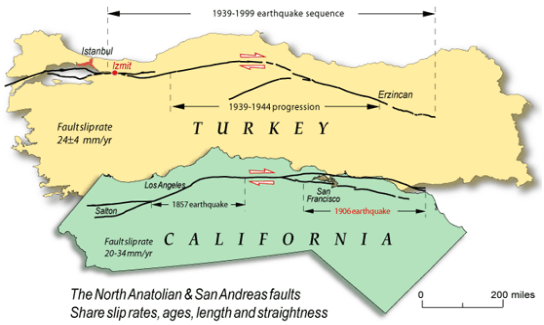
Anja Dosen

9.16.2005

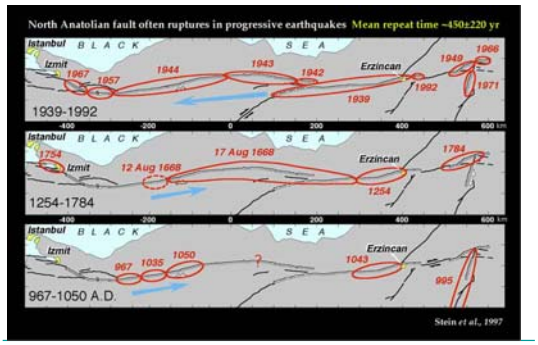
Turkey



Anatolian fault



Anatolian fault



Precursors and Time framework

- Based on the buildup of stress along the fault zone south of Izmit the possibility of a large (Mw>6.7) earthquake was 12 % in the period between 1997-2027
- No reliable precursors
- Geological and meteorological
  - Lights in the sky
  - Small tsunamis in the black sea

Pre-event disaster preparation by authorities and awareness of the population

- Building regulations for the EQ prone areas
  - Not enforced
- People were aware of the possibility of an EQ

Scale of the event and the disaster

- August 17, 1999 at 3:02 a.m. in Izmit EQ
  Mw 7.4 caused by rapture of Earths surface along western part of Anatolian fault
  - 17, 127 dead, 43, 953 injured, 250, 000 displaced
  - 20, 000 buildings destroyed
  - 214, 000 residential units and 30, 500 businesses damaged
- Property losses estimates in 1999 from $3 to $6.5 billion

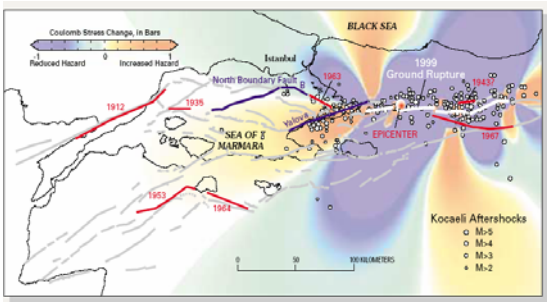
Scale relative to other disasters

Extent of damage

Disaster effects

- Aftershocks
- Liquefaction
- Surface faulting
- 250 000 people lost their homes

Aftershocks



Liquefaction

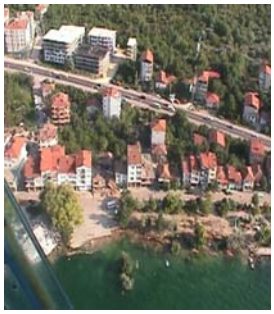
Surface faulting

- Slip right lateral up to 5m (max) normally 2.5-4m;
- At the shore normal faulting with a slip component resulted in subsiding of 2-3m of 4km of the shoreline

Surface faulting

Trans European Motorway

Subsidence of the coast line




Actions that could have reduced losses

- Limit the development in areas along the Anatolian fault
- Enforcing the building code
  - Appropriately reinforced concrete or wood frames
  - Prevent building garages and storefronts on the first floor

References

- http://www.eas.slu.edu/Earthquake_Center/TURKEY/#home1
- http://www.scec.org/earthquakes/trkimages2.html
- http://quake.wr.usgs.gov/research/geology/turkey/
- **Implications for Earthquake Risk Reduction in the United States from the Kocaeli, Turkey, Earthquake of August 17, 1999** http://pubs.usgs.gov/circ/2000/c1193/
- **Hyndman and Hyndman, (2005). Natural hazards and disasters. Thompson Brooks/Cole**
- **Whithead, N. E., Ulsoy, U., Asahara, H., and Ikeaya, M., (2004). Are there any public-reported earthquake precursors valid?. *Natural Hazards and Earth System Sciences., 4:463-468***