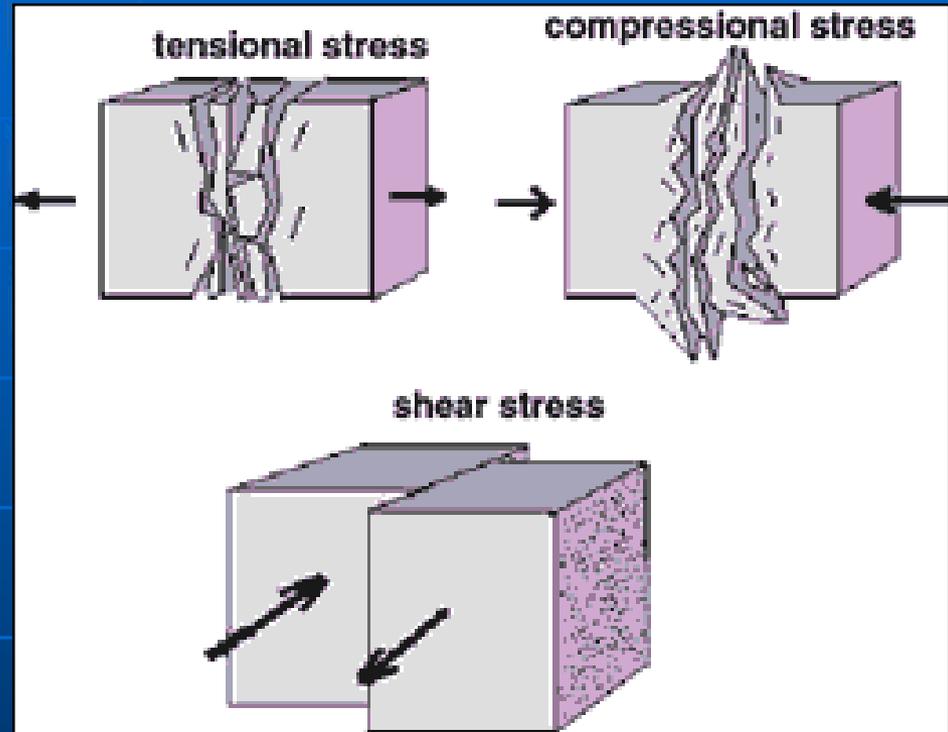


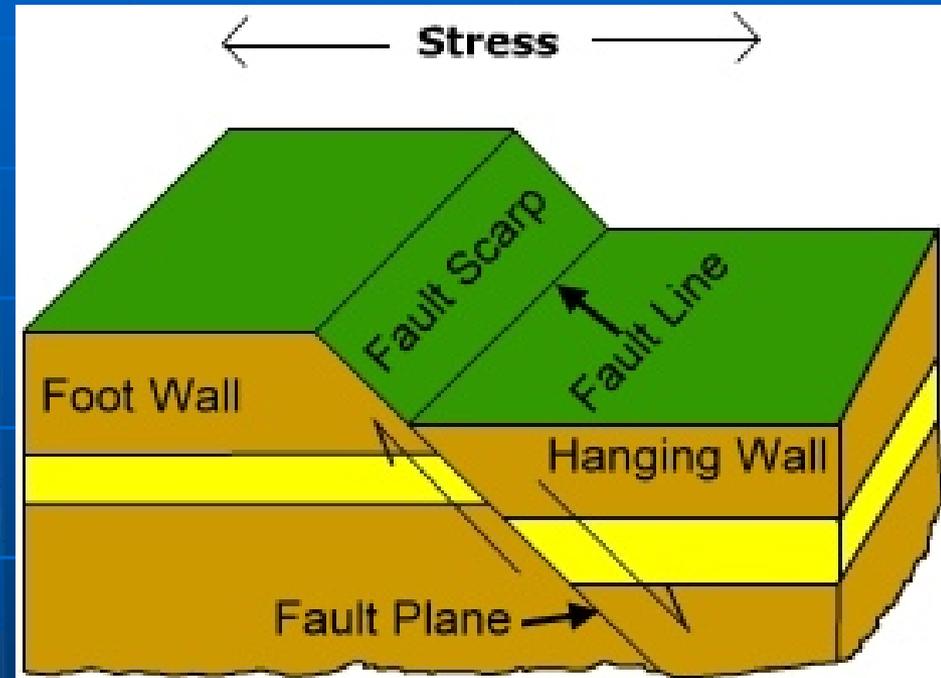
Stress types

- Primarily 3 types of stress
 - Compressional
 - Tensional
 - Shear



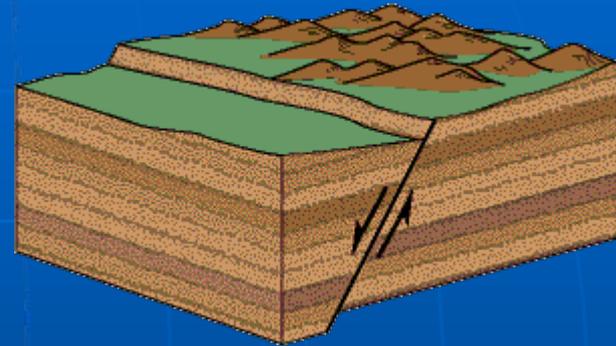
Fault block terminology

- Block above the fault plane called the hanging wall
- The block beneath the fault plane is called the foot wall
- Newly exposed face of block called the fault scarp

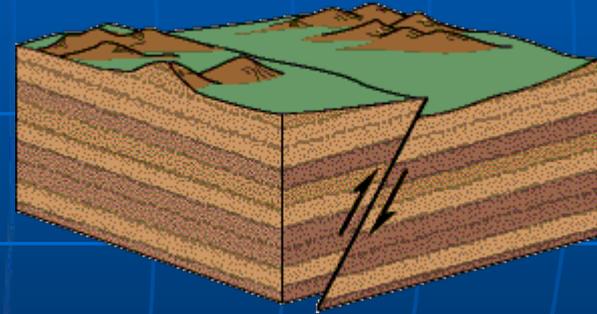


Basic Types of Faults

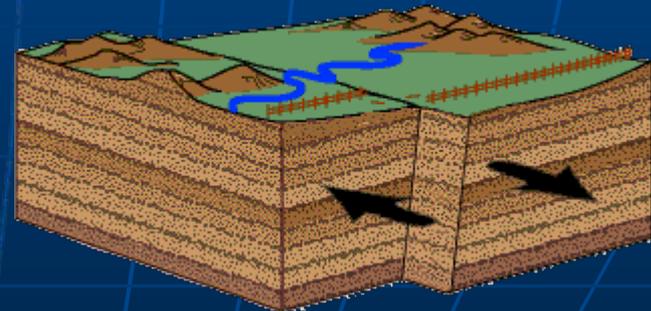
Hanging wall moves down relative to foot wall = Normal Fault



Hanging Wall moves up relative to foot wall = Reverse Fault



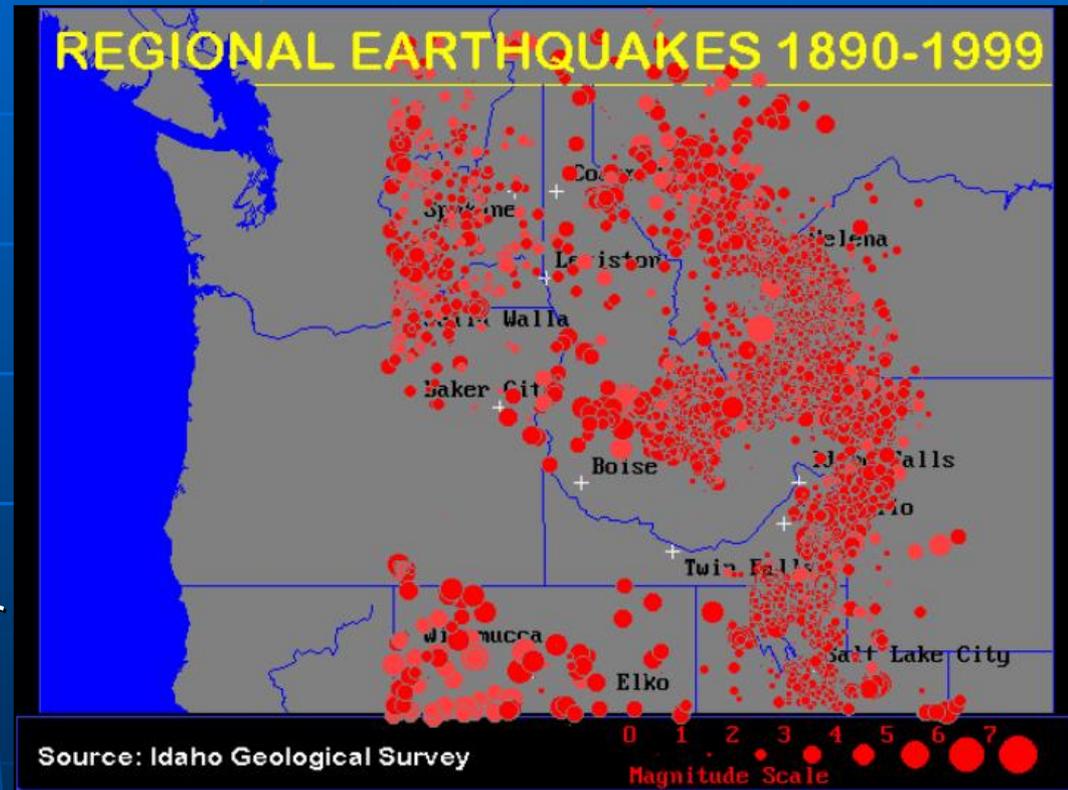
Blocks move horizontally relative to each other = Strike-slip Fault



Hebgen Lake Earthquake 1959

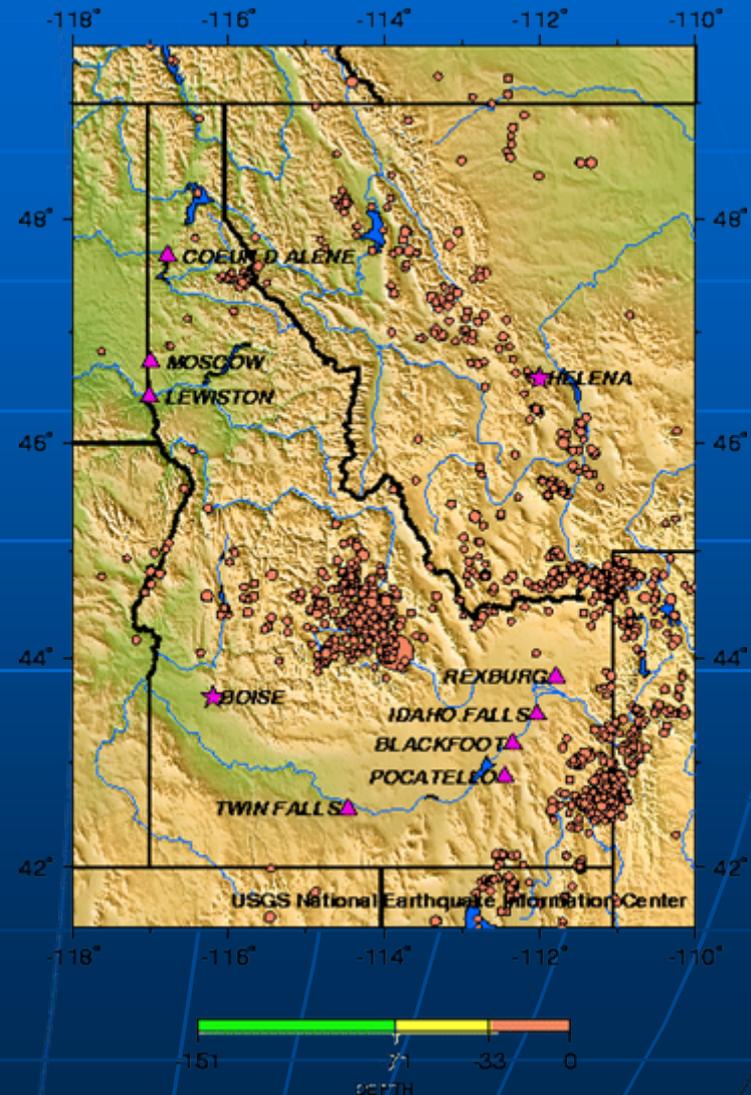
Seismic History of Idaho

- Idaho lies in a seismically active region
- Note that most earthquakes have relatively low magnitudes
- Earthquakes with magnitudes greater than 7 have been damaging

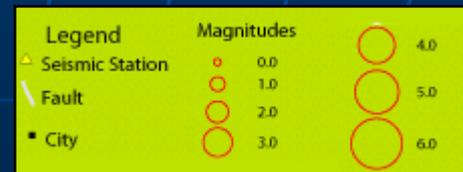
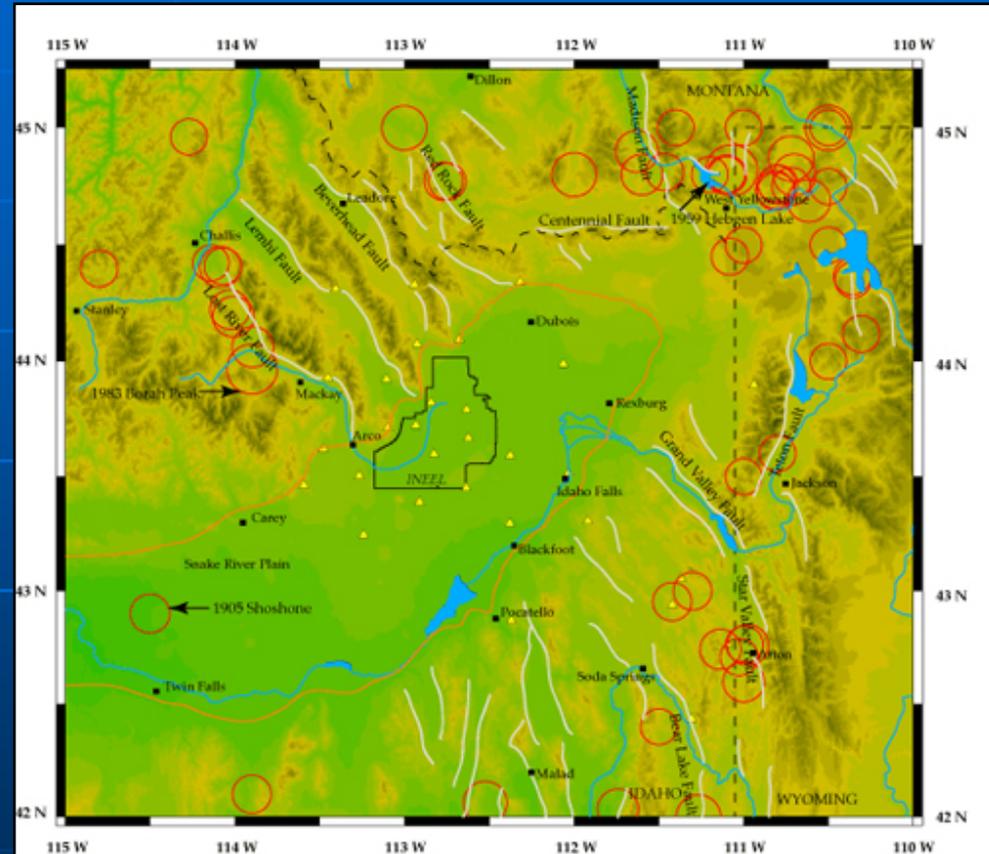


- In last century, Borah Peak Earthquake was largest earthquake with epicenter in Idaho
- Magnitude 7.3, 1983
- Shown as largest circle in picture

Seismicity of Idaho 1977 - 1996



- Epicenters of earthquakes mostly occur along fault lines (shown as gray lines)
- Note epicenter location of Hebgen Lake Earthquake



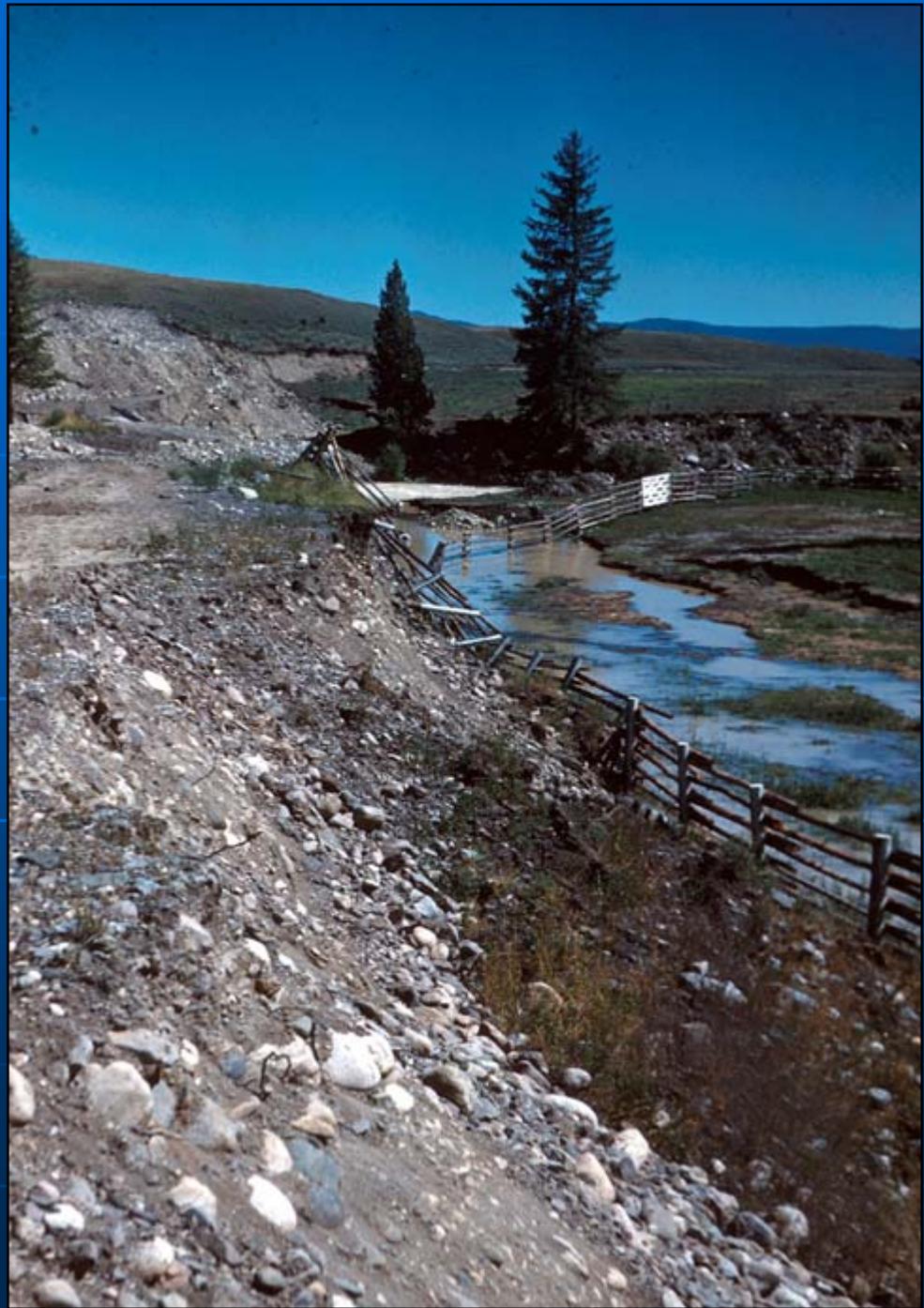
Hegben Lake Earthquake 1959

- Occurred on August 17, 1959
- Magnitude - 7.3 on the Richter Scale
- Intensity – X on the Modified Mercalli Scale
- 28 fatalities
- \$11 million in damage to highways and timber
- Produced Quake Lake

View of Hegben Lake Fault Scarp



- Red Canyon fault scarp near Blarneystone Ranch



Red Canyon fault scarp – 19 foot displacement



Hebgen Lake fault scarp



Local Damage to Masonry Structures

- Damage to spillway of Hebgen Lake Dam



- Damage to Blarneystone Ranch built on Red Canyon fault
- House is on down thrown block, shed (green roof) on upthrown block



- Damage to foundation of main residence of Blarneystone Ranch



- Cabin near mouth of Red Canyon Creek
- Cabin located on down thrown block
- Windows and logs intact



Sand Volcano



- Fracture opened up
- Water/sand mixture ejected through cracks

Damage to roads



- Damage to Highway 298 near Hebgen Lake

Debris slump

- Debris slump offset and compressed fence



Created seiche damage in area surrounding Hebgen Lake



- Seich marks on wall inside Hilgard Lodge
- Marks represent number and height of waves



Created Quake Lake



- Massive debris slide dammed Madison River which created Quake Lake



- Lake level lowered when Army Corps of Engineers created spillway for Quake Lake
- Trees below high water mark died leaving a maximum elevation for Quake Lake



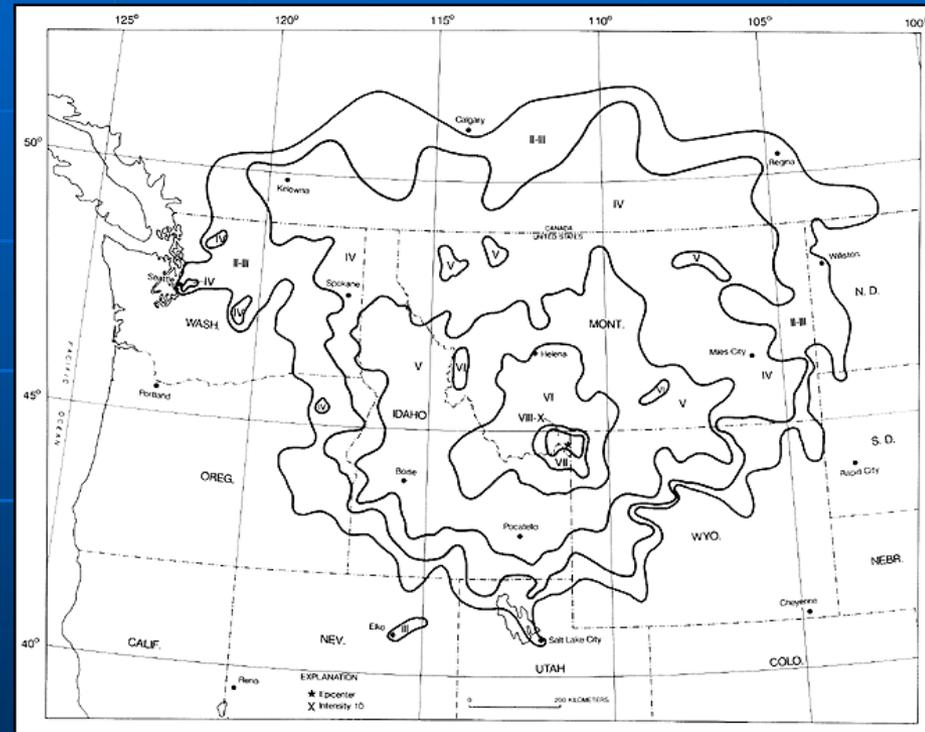
- Highway 287 blocked by Quake Lake

Created new geyser in Yellowstone



Isoseismal Map of Hebgen Lake Earthquake

- Intensity VII-VIII near epicenter
- Some minor damage in NE Idaho, southern Montana, NW Wyoming
- Felt as far away as Seattle, WA; Banff, Alberta; Dickinson, ND; Provo, Utah



Sources Used

- <http://earthquake.usgs.gov/learning/glossary.php?term=tensional%20stress>
- <http://earthsci.org/processes/struct/fault/fault2.gif>
- http://www.scienceclarified.com/landforms/images/ueol_02_img0053.jpg
- http://libraryphoto.cr.usgs.gov/cgi-bin/search.cgi?search_mode=exact&selection=Hebgen+Lake+Earthquake+1959%7CHebgen+Lake%7CEarthquake%7C1959
- http://serc.carleton.edu/research_education/mtroadlogs/logs/GSA-1987-RMSCFG-20.html

Sources Used

- http://www.bhs.idaho.gov/disaster/earthquake/images/HistoricEpicenters_1890-1999.jpg
- http://earthquake.usgs.gov/regional/states/events/1959_08_18_iso.php
- <http://www.inl.gov/geosciences/earthquakes.shtml>