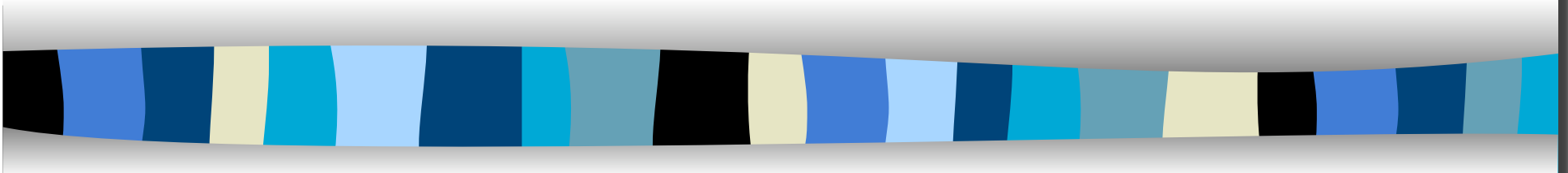


New Madrid Earthquakes



By Mary Jean Spadafora



Background

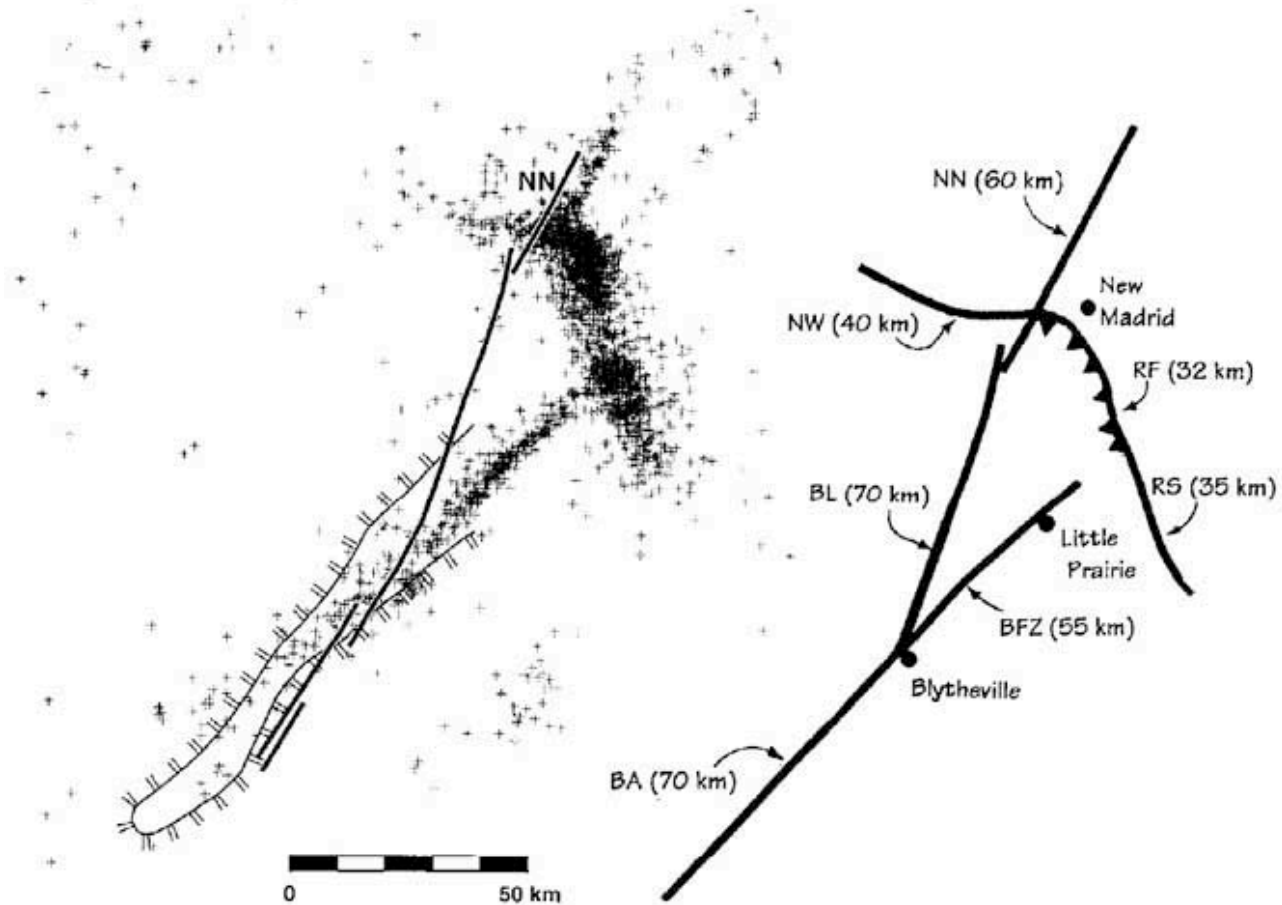
- Most intense intraplate earthquakes to happen within the United States
- Large area of damage (600,000 square kilometers)
- Happened along the Reelfoot Fault



Intraplate Tectonics

- The easiest way to imagine this is to think of one side of the continent being strong while the other side is weaker
- The weaker side will give way to tectonic strain on that plate
- During the New Madrid earthquakes in 1811 and 1812, the Reelfoot Fault caused the plate in the Northeast to slip down and the part of the plate to the Southwest to slip up

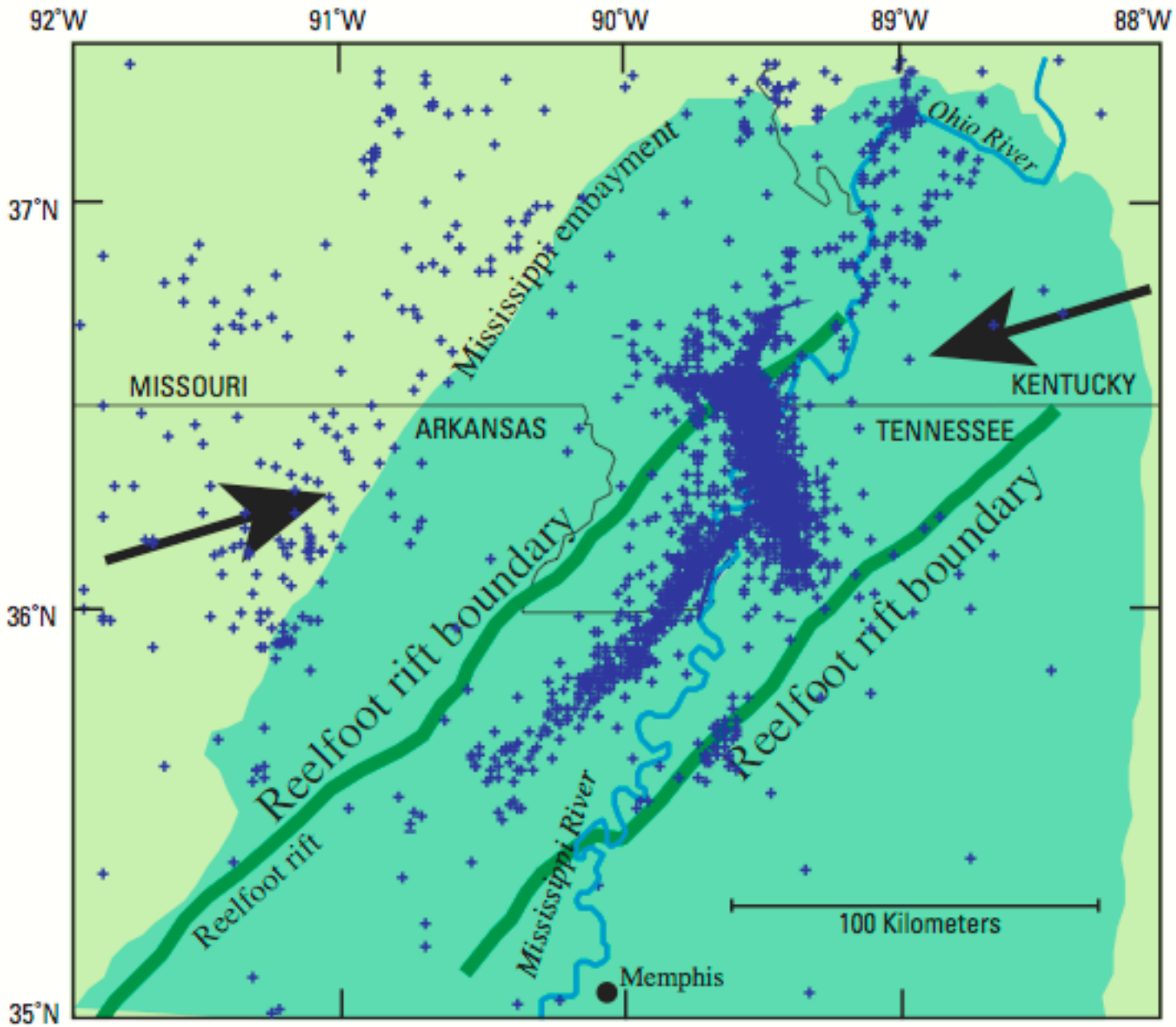
(a) Fault segmentation of the NMSZ. Seismicity of the NMSZ, the Blytheville arch, and the Bootheel lineament/NN fault (*left*) yield the seven segments (*right*) identified as: BA, Blytheville arch; BFZ, Blytheville fault zone; BL, Bootheel lineament; NW, New Madrid west; NN, New Madrid north; RF, Reelfoot fault; RS, Reelfoot south. Segments NW and RS are defined solely from seismicity.





Reelfoot Fault

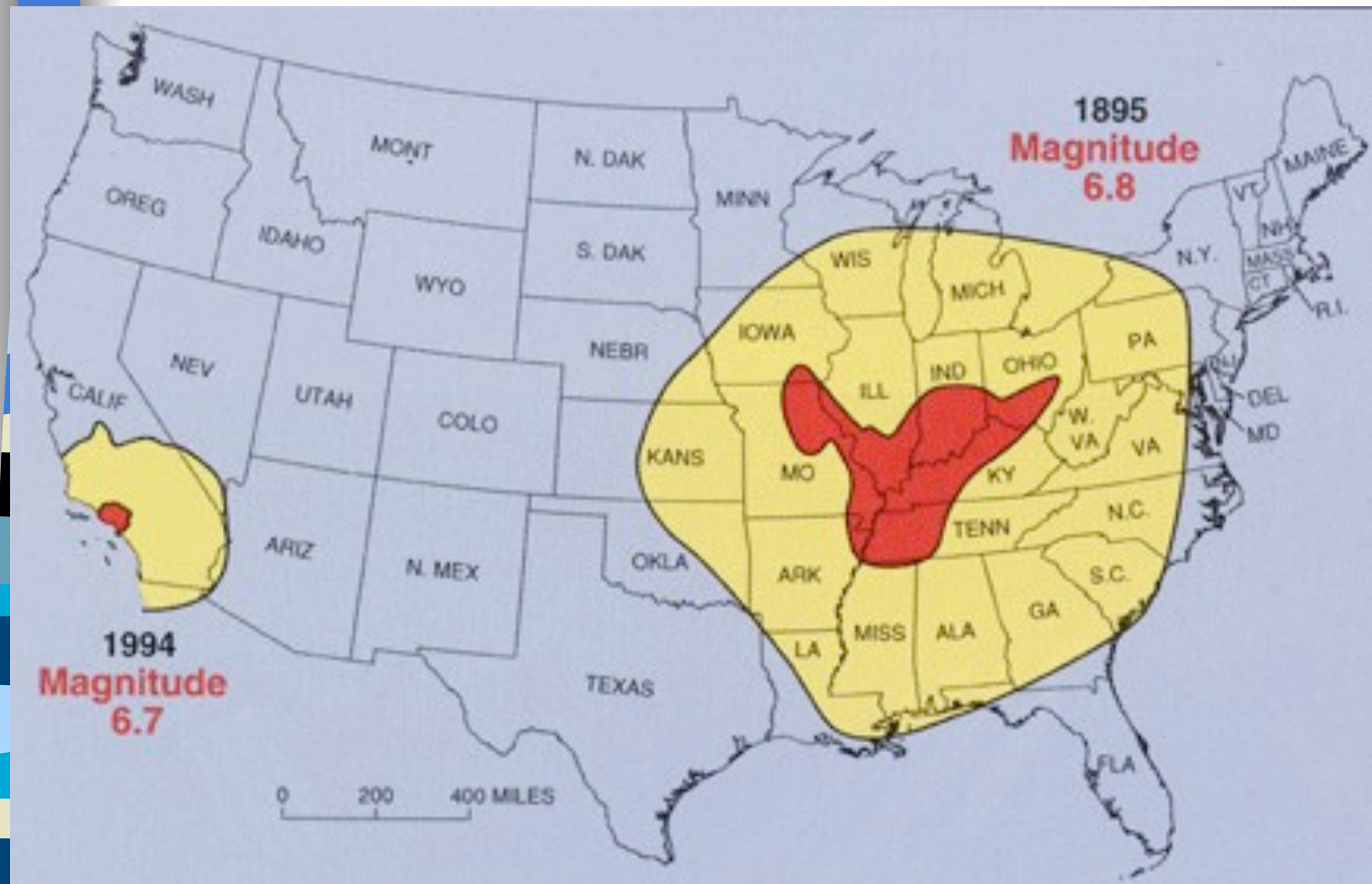
- Reelfoot Fault goes back 750mya when the entire earth constituted the super-continent Rodinia--it was a failed rift zone
- At 550mya during the time of Pangea, the fault became active again but not as a constructive plate (rift zone)
- The earthquake activity roughly parallels the Reelfoot rift, an ancient break in the Earth's crust
- Millions of years ago the crust began to pull apart, or rift, but failed to break apart
- Instead, a long shear zone of intense faulting formed
- Today the crust is being compressed or pushed in on the west and east side of the Reelfoot Rift zone





Damage Assessment

- The earthquakes caused
 - Soil liquification
 - General ground warping
 - Ejections
 - Fissures
 - Severe landslides
 - Caving of stream banks
- It changed the course of the Mississippi and formed Reelfoot Lake





Economic Impact

- The situation of having an earthquake along Reelfoot fault is more precarious than in 1811
- The area is more densely populated and the zone remains active
- Active research is focusing on defining the risks of another earthquake
 - Emergency Funds have been created
 - Steps to mitigate natural disasters have been taken in areas such as
 - Construction of dams, bridges, highway
 - Earthquake safety has been taken into account



Lesson Learned

- Understanding of this type of fault zone is growing much slower than regular transform faults (such as the San Andreas)
- Earthquakes of this nature tend to be strong and unpredictable
 - Earthquakes of this nature tend to come from faults that are deeply buried and hard to find
 - Therefore, prediction is difficult
- Nevertheless, steps have been taken to reduce the economic impact if an earthquake does happen