MARIANNA ZONE, ARK.

- Geologic record of earthquake induced liquefaction older than NMSZ features
- Northwest-trending lineament defined by (1–4-m-wide) sand blows near Daytona Beach
  • Possibly fault controlled 17 km (M6.5)
- 3 or 4 Holocene earthquakes between 5 and 9.6–10.2 ka
- Some sand blows are comparable to NMSZ
- M6.7–7.7
- Default to background 0.5
Recent Publications

Recent abstracts

2010s

2000s
PRELIMINARY CONCLUSIONS

- Five generations of sand blows and related feeder dikes in Marianna area
- Weathering characteristics, stratigraphic and structural relations of features, and dating of buried soils suggest that liquefaction features formed during paleoearthquakes ~ 4.8, 5.5, 6.8, 9.9, and 9.9–38 ka
- Marianna sand blows are likely due to local, not New Madrid, earthquakes:
  - Very large size of liquefaction features
  - Lack of similarly large features that formed in AD 1811–1812, 1450, and 900
DAYTONA BEACH LINEAMENT

- many large sand blows
- severe ground failure
- may be surface expression of fault at depth; perhaps western member of White River FZ

Fig 6.1.7-3
CEUS SSC report
PRELIMINARY CONCLUSIONS

- Marianna sand blows are likely due to local, not New Madrid, earthquakes:
  - Very large size of liquefaction features
  - Lack of similarly large features that formed in AD 1811–1812, 1450, and 900
- Some liquefaction evidence of complex faulting perhaps involving White River FZ and Eastern Margin Reelfoot Rift FZ
- Marianna paleoearthquakes were probably very large (M ≥ 7); but warrants further study
- Findings suggest max average recurrence time of ~1.7 k.y. and clustered behavior with minimum active period of ~5 k.y.
- Implication – currently “quiet” members of Reelfoot Rift fault system may produce very large earthquakes in future
MARIANNA PALEOLIQUEFACTION

- Five generations of sand blows and related feeder dikes in Marianna area
- Field identification degree of weathering stratigraphic & structural relations dating of buried soils
- Paleoliquefaction formed about 4.8, 5.5, 6.8, 9.9, and 9.9–38 ka

Fig E–15
CEUS SSC report
ESTIMATED TIME OF PALEOLIQUEFACTION FORMATION

Figure E-17
GIS map of Marianna, Arkansas, area showing preferred age estimates of liquefaction features; features whose ages are poorly constrained are excluded. Map projection is USA Contiguous Albers Equal Area Conic, North America Datum 1983.

Explanation
Estimated feature age in years BP, relative to 1950 AD (1)
- 4650-4950
- 5350-5650
- 6650-6950
- 9550-10150
+ CEUS dependent catalog, M>2 (2)

Sources: 1. CEUS SSC paleoliquefaction database; 2. CEUS SSC earthquake catalog. Basemap: SRTM Shaded Relief, USGS (2005)
Figure E-17 GIS map of Marianna, Arkansas, area showing preferred age estimates of liquefaction features; features whose ages are poorly constrained are excluded. Map projection is USA Contiguous Albers Equal Area Conic, North America Datum 1983.

Explanation
Estimated feature age in years BP, relative to 1950 AD (1)
- Yellow: 4650-4950
- Light Blue: 5350-5650
- Red: 6650-6950
- Black: 9550-10150
- CEUS dependent catalog, M>2 (2)

Sources: 1. CEUS SSC paleoliquefaction database; 2. CEUS SSC earthquake catalog. Basemap: SRTM Shaded Relief, USGS (2005)