

**TOWARDS A PALEOEARTHQUAKE CHRONOLOGY FOR THE NEW MADRID
SEISMIC ZONE: Collaborative Research, M. Tuttle & Associates and
Eastern Region Hazards Team, U.S. Geological Survey**

Final Technical Report

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The Earthquake Potential of the New Madrid Seismic Zone

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Abstract The fault system responsible for New Madrid seismicity has generated temporally clustered very large earthquakes in A.D. 900 \pm 100 years and A.D. 1450 \pm 150 years as well as in 1811-1812. Given the uncertainties in dating liquefaction features, the time between the past three New Madrid events may be as short as 200 years and as long as 800 years, with an average of 500 years. This advance in understanding the Late Holocene history of the New Madrid seismic zone, and thus the contemporary tectonic behavior of the associated fault system, was made through studies of numerous earthquake-induced liquefaction features throughout the New Madrid region. We have found evidence that prehistoric sand blows, like those that formed during the 1811-1812 earthquakes, are probably compound structures resulting from multiple earthquakes closely clustered in time, or earthquake sequences. From the spatial distribution and size of sand blows and their sedimentary units, we infer the source zones and estimate the magnitudes of earthquakes within each sequence and thereby characterize the detailed behavior of the fault system. It appears that fault rupture was complex and that the Reelfoot fault produced very large earthquakes during the A.D. 900 and A.D. 1450 events as well as in 1811-1812. Assuming a minimum recurrence rate of about 200 yrs, we are now entering the period during which the next 1811-1812 -type event could occur.