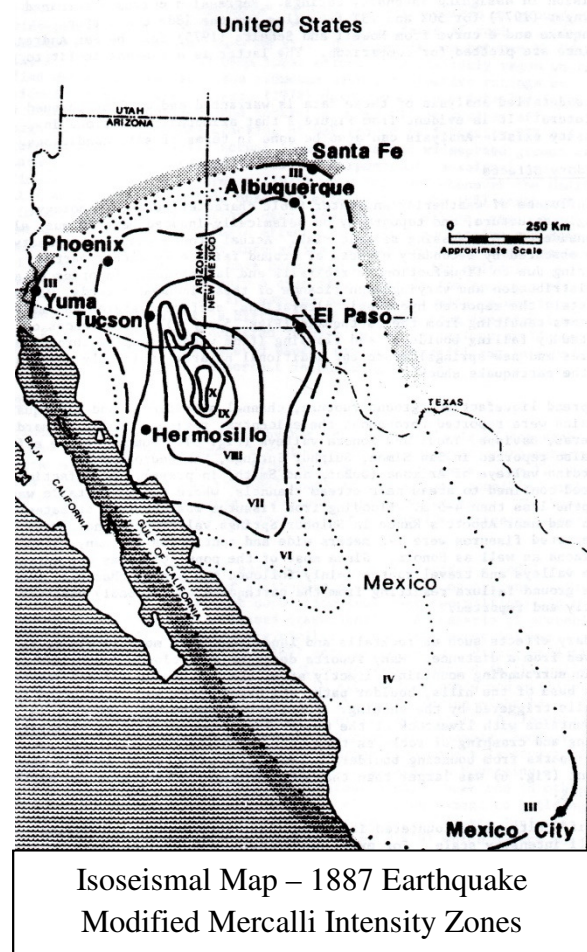


## THE EARTHQUAKE OF 1887

On the afternoon of 3 May 1887 a strong earthquake shook the area of southern Arizona, southeastern New Mexico and northern Mexico. The time of the quake varies from location to location because of the different time standards in use at different locations. Many towns, and in some cases businesses, developed their own time standards. Tucson time was about 2:00 PM. Although the Richter scale had not yet been developed, a subsequent analysis conducted by Susan Duboise of the Arizona Bureau of Geology and Mineral Technology and Marc L. Scar of the University of Arizona Department of Geoscience assessed it at about 7.25. Other geologists have estimated the magnitude at 7.6 (Wikipedia summary) and 8.1 (John S. Sumner of the U of A Dept. of Geo-Sciences). The epicenter of the quake was in the Batepito Valley, Sonora Mexico about 15 miles northwest of Bavispe and 40 miles south of Douglas Arizona.

The primary fault zone was in the Teras Mountains of the Sierra Madre Mountain Range along a south trending fault line about 30 miles long. The shock area was elliptical in shape, extending in an elongated fashion in a Southeasterly direction. The shock area was generally bounded in the north by Phoenix and Santa Fe, in the west by the Gulf of California, in the south by Mexico City and in the east by a line drawn between Santa Fe and Mexico City.

To properly appreciate the strength of the Sonoran Earthquake of 1887, a rough comparison with the Nepal earthquake of 25 April 2015 might be helpful. The Nepal earthquake was rated at 7.8 on the Richter scale, had a maximum Mercalli intensity of IX, killed over 8,000 people and injured more than 21,000. Entire villages were destroyed and hundreds of thousands of people made homeless. The Sonoran Earthquake had an estimated rating of between 7.25 and 8.1 on the Richter scale (depending on the source), an estimated Modified Mercalli intensity of X and resulted in 51 deaths (Forty-two in the Sonoran town of Bavispe and nine in the town of Oputo). The number of people injured is unknown except that 29 were injured in Bavispe. Even though the shock waves from the Sonoran earthquake were extremely strong and essentially equivalent to the Nepal quake, the damage from the Sonoran quake was relatively modest because of the sparse population that existed in the area at the time. Most of the structures in Bavispe were



destroyed, particularly those of adobe construction. Also, many Arizona towns reported damage to their buildings. Almost every building in the mining town of Charleston was damaged, several buildings in Benson developed large cracks and in St. David, several buildings collapsed and the schoolhouse was wrecked. In Tucson, numerous homes and businesses were damaged

Because of the sparse population in southern Arizona, most of the impact was of a geological and hydrological nature. Rock slides were common in many of the mountain ranges. Cascading boulders in the Catalina Mountains caused large clouds of dust to rise several thousand feet above the mountains. In some mountain ranges, boulders striking each other caused sparks that ignited fires. Liquefaction, ground rupture, channel subsidence and earthquake fountains were reported throughout the region. Some of the fissures were reported to be 3 to 6 feet wide. The water line running between the Huachuca Mountains and Tombstone was ruptured. The quake also affected water flow and the water table. New springs emerged and others dried up. Dragoon Springs, where General Howard and Cochise signed the treaty ending Cochise's war against the Americans, dried up forever. Wells also dried up when the water table was lowered. Wells in Tucson were normally about 30 feet deep before the Quake. After the quake they had to be dug much deeper. However, in St. David, stagnant pools and swampy marshland were flushed out and replaced by fresh water artesian ponds that still exist today. It is felt that if an earthquake of similar intensity occurred today, it would result in a tremendous impact to the current population centers of southeastern Arizona, southwestern New Mexico and northern Sonora .

Summarized by T. Johnson from the following sources:

1. The 1887 Earthquake in Sonora: Analysis of Regional Ground Shaking and Ground Failure by Susan M DuBois and Marc L. Sbar.
2. An Afternoon of Terror: The Sonoran Earthquake of May3, 1887 by E. Fay Bennett.
3. Wikipedia Article: 1887 Sonoran Earthquake.
4. Wikipedia Article – April 2015 Nepal earthquake
5. The 1887 Quake and the Hydraulic Lessons it Taught: Arizona Daily Star article of 5 May 2015 by Mary Reynolds
6. Remembering the 1887 Quake that Shook Arizona: Green Valley News Article by Pat O'Hare
7. The Isoseismal map was reproduced from Reference 1.

**Additional Material:** GVRHC Library File 100