

Doc# 28514 2/8/01

**Earthquake Triggering and Spatial-Temporal Relations in the Vicinity of Yucca Mountain, Nevada. David von Seggern, Nevada Seismological Laboratory, U. Nevada, and Chang-Eob Baag, School of Earth & Environmental Sciences, Seoul National U., Korea**

It is well accepted that the 1992 M 5.6 Little Skull Mountain earthquake, the largest historical event to have occurred within 25 km of Yucca Mountain, Nevada, was triggered by the M 7.2 Landers earthquake that occurred the day before. On the premise that earthquakes can be triggered by applied stresses, we have examined the earthquake catalog from the Southern Great Basin Digital Seismic Network (SGBDSN) for other evidence of triggering by external and internal stresses. This catalog now comprises over 12,000 events, encompassing five years of consistent monitoring, and has a low threshold of completeness, varying from M 0 in the center of the network to M 1 at the fringes. We examined the SGBDSN catalog response to external stresses such as large signals propagating from teleseismic and regional earthquakes, microseismic storms, and earth tides. Results are generally negative. We also examined the interplay of earthquakes within the SGBDSN. The number of "foreshocks," as judged by most criteria, is significantly higher than the background seismicity rate. In order to establish this, we first removed aftershocks from the catalog with widely used methodology. The existence of SGBDSN foreshocks is supported by comparing actual statistics to those of a simulated catalog with uniform-distributed locations and Poisson-distributed times of occurrence. The probabilities of a given SGBDSN earthquake being followed by one having a higher magnitude within a short time frame and within a close distance are at least as high as those found with regional catalogs. These catalogs have completeness thresholds two to three units higher in magnitude than the SGBDSN catalog used here. The largest earthquake in the SGBDSN catalog, the M 4.7 event in Frenchman Flat on 01/27/1999, was preceded by a definite foreshock sequence. The largest event within 75 km of Yucca Mountain in historical time, the M 5.7 Scotty's Junction event of 08/01/1999, was also preceded by foreshocks. The monitoring area of the SGBDSN has been in a long period of very low moment release rate since February of 1999. The seismicity catalog to date suggests that the next significant (M > 4) earthquake within the SGBDSN will be preceded by foreshocks.