ANALYSIS OF HISTORIC SEISMICITY IN THE TRANSITION ZONE AND SOUTHERN BASIN AND RANGE OF SOUTHEASTERN ARIZONA

by

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ABSTRACT

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Cenozoic extension in the southwestern United States has been accommodated by several tectonic provinces, such as the Basin and Range and the Arizona and New Mexico Transition Zones. Previous workers have concluded that the Basin and Range is a result of east-west extension. The role of the Arizona and New Mexico Transition Zones in southwestern United States tectonics is relatively unknown. First-motion analyses were done to determine focal mechanisms for two earthquakes that were located in southeastern Arizona. The focal solutions were analyzed to better understand the role of the Arizona and New Mexico Transition Zones in southwestern United States tectonics.

A member of a swarm of earthquakes that occurred on 21 December 2003 and an earthquake that occurred on 11 September 1963 were analyzed to obtain the first fault plane solutions in southeastern Arizona. The 2003 swarm focal solution indicates that pure normal faulting, with northeast-southwest extension, occurs in the Datil-Mogollon section of the Transition Zone. Comparison to the solution for the 1976 tremor in the Central Basin Section of the Transition Zone shows similar style and orientation for faulting. The 1963 focal solution shows oblique faulting, with a principal strike-slip and a minor normal component. The 1963 fault plane solution is the only known solution from first-motion analysis in the southern Basin and Range of Arizona. Further first-motion studies will be needed in order to better understand the tectonic regime of southeastern Arizona.

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