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1	REPORT	5/10/1986	INTRODUCTION TO SPECIAL SECTION ON THE RIO GRANDE RIFT BY G R KELLER N/A N/A N/A	1633	



Introduction to Special Section on the Rio Grande Rift

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With the aid of a Penrose Conference in 1974 and an international rift conference held in 1978 in Santa Fe, New Mexico, the Rio Grande rift has become widely recognized as a major Cenozoic continental rift zone. As a result of the 1978 Santa Fe meeting, the American Geophysical Union published a special volume of papers concerned with the Rio Grande rift [Riecker, 1979], and the New Mexico Geological Society recently published another volume focused on this rift [Baldrige *et al.*, 1984]. These volumes are a manifestation of the research activity which lead to the formation of the Rio Grande rift consortium whose purpose is to foster rift-related research and communication. This organization has sponsored several special sessions at geological and geophysical meetings and has generally increased the awareness of this important feature. The purpose of this special section is to present the results of the considerable geophysical research conducted on this rift in recent years. No attempt was made to focus the section, and no effort was made to insure comprehensiveness in the subject matter covered. Thus, readers desiring more general background information should refer to Cordell [1978], Riecker [1979] and Baldrige *et al.* [1984].

One motivation for this volume was the fact that the results of the 1981 Caldera and Rift Deep seismic Experiment (CARDEX) were available. This cooperative experiment was sponsored by the National Science Foundation (University of Texas at El Paso (UTEP) and Purdue University) and the Department of Energy (Los Alamos National Laboratory (LANL)). In addition to UTEP, Purdue, and LANL, the Lunar and Planetary Institute, New Mexico State University, the U.S. Geological Survey, the University of Wyoming, Lawrence Livermore National Laboratory, the University of Arizona, Texas Tech University, the University of Utah, the Air Force Weapons Laboratory, and the Microgeophysics Corporation provided manpower and/or equipment to help with this experiment. Over 40 individuals participated in the field work. During this experiment, a series of refraction/wide-angle reflection profiles were recorded in the southern Rio Grande rift (Sinno *et al.*) and an array of seismographs were deployed in and around the Valles caldera (Olsen *et al.* and Ankeny *et al.*). Approximately 85 seismograph systems were used to record shots detonated at White Sands Missile Range, the Nevada Test Site, and several mining operations. In addition, eight shots were detonated as part of this experiment.

The results of this experiment and the complimentary gravity (Daggett *et al.*) and surface wave results (Sinno and Keller) provided a much improved picture of crustal structure in the southern Rio Grande rift. The crustal thinning observed in the central

portion of the rift extends to the south with a minimum crustal thickness of about 26 km being found near El Paso, Texas. These results suggest that the rift is associated with a crustal structure anomaly which is distinct from the anomaly associated with the adjacent Basin and Range province. The Valles caldera portion of this experiment (Olsen *et al.* and Ankeny *et al.*) established the presence of a low-velocity body beneath this feature.

The tectonic history of the Rio Grande rift and models to explain its development are of much current interest, and recent studies suggest that there have been two episodes of extension in this rift. Aldrich *et al.* document the temporal variations in the direction of extension which have occurred in the rift region as well as the episodic nature of the associated volcanism. Henry and Price address similar questions for the West Texas-northern Chihuahua portion of the rift. Heat and uplift studies play an important role in the development of tectonic models, and Reiter *et al.* have added significantly to our knowledge of heat flow in the southern rift, while Kelley and Duncan provide an analysis of the uplift history of the northern rift. Morgan *et al.* propose a thermal/mechanical model which explains many of these results.

The Socorro, New Mexico, area has received considerable recent attention because of the geophysical evidence for a mid-crustal magma chamber in the area. An analysis of surface wave dispersion across the rift basin north of Socorro (Schlue *et al.*) also suggests the presence of a midcrustal chamber. The studies of Larsen *et al.* and Jaksha and Sanford attest to the continued tectonic activity in these areas. The structural style of extension in the Socorro is addressed in a reanalysis of COCORP data (de Voogd *et al.*) and Wannamaker presents an analysis of electrical conductivity as a function of water saturation which has implications for the detection of magma chambers by electrical measurements.

Finally, the evolution of the Latir volcanic field in the northern rift and its implications for the tectonic history of the region are the subject of a paper by Lipman *et al.*

REFERENCES

- Baldrige, W. S., P. W. Dickerson, R. E. Riecker, and J. Zidek, Rio Grande Rift: Northern New Mexico, *Field Conf. Guide. N.M. Geol. Soc.*, 35th, 1984.
- Cordell, L., Regional geophysical setting of the Rio Grande rift, *Geol. Soc. Am. Bull.*, 89, 1073-1090, 1978.
- Riecker, R. E. (ed.), *The Rio Grande Rift: Tectonics and Magmatism*, AGU, Washington, D. C., 1979.

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