



Tectonic map of Rio Grande region from New Mexico-Colorado Border to Presidio, Texas

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1975, pp. 239. <https://doi.org/10.56577/FFC-26.239>

in:

Las Cruces Country, Seager, W. R.; Clemons, R. E.; Callender, J. F.; [eds.], New Mexico Geological Society 26th Annual Fall Field Conference Guidebook, 376 p. <https://doi.org/10.56577/FFC-26>

This is one of many related papers that were included in the 1975 NMGS Fall Field Conference Guidebook.

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TECTONIC MAP OF RIO GRANDE REGION FROM NEW MEXICO-COLORADO BORDER TO PRESIDIO, TEXAS

Compiled by

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The idea of compiling a tectonic map of the Rio Grande region was stimulated by the Geological Society of America Penrose Conference on the Rio Grande rift in August 1974. During the course of the conference it became clear that many geologic problems related to the rift were being studied: the origin and extent of the rift, geomorphic and tectonic evolution, relationships of volcanism, mineral deposits, geothermal energy and seismicity, the quality and supply of groundwater, and many more. It seemed to us that an up-to-date tectonic map of at least part of this region would be useful to these investigators. The location of the Las Cruces Country at the debatable southern end(?) of the rift and the number of guidebook papers dealing with various aspects of the rift made the 1975 guidebook an appropriate place to publish the tectonic map (in pocket).

Among the variety of topics debated at the conference was the extent of the rift. Some geologists considered the rift to end at Socorro; others maintained that it extended southward to Hatch, while still others believed that it widened in southern New Mexico to include all of the basins and ranges between the Florida and Guadalupe Mountains. A few suggested that in southern New Mexico it extended all the way to the Sierra Nevada and Big Bend country, essentially becoming inseparable from the Basin and Range province. Hopefully, the new tectonic map will help geologists to better assess the dimensions of the rift. However, the map's coverage of structural features in southern New Mexico, Mexico, and West Texas is not intended to imply that the rift extends into these areas; it is left to the reader to judge the southern extent of the rift for himself, using this and other data.

The quality of the map varies considerably from place to place. Detailed mapping is available in many areas, but large areas, particularly in Mexico, are known only from reconnaissance studies. The new geologic map of northeastern Chihuahua by Jorge Tovar R. and Arsenio Navarro G., published by the El Paso Geological Society, is a compilation of both the detailed and reconnaissance studies of that region, and is the first readily available high quality map of the area. Its timely printing greatly improved the quality of tectonic data in Mexico portrayed on our map. In the United States, unpub-

lished gravity data were used in many places to help delineate basin margins or buried fault blocks. Scattered well data were also used for this purpose and to locate structure contours. Despite this, perhaps the most subjective and inconsistent aspect of the map is our estimation of thickness of bolson-fill and alluvium.

We tried to distinguish areas where alluvium was "thin," perhaps 1,000 ft or less, from important basins containing "thick" synorogenic deposits, generally more than 1,000 ft thick and usually more than 3,000 ft thick. Again, this was most difficult in Mexico where little well-control or gravity data were available to us. A related problem, especially in parts of Chihuahua, is distinguishing Laramide basins, with comparatively thin bolson-fill, from late Cenozoic fault-block basins, and recognizing those basins whose origins may have involved both Laramide and late Cenozoic deformation. We have made little attempt to distinguish these types, and the reader using our tectonic map should be aware that many of the basins in Chihuahua probably are Laramide in age, not late Cenozoic.

More than 350 references were used in compiling this map. The interested reader may obtain a list of references for the area north of about 33 degrees from L. A. Woodward, Dept. of Geology, University of New Mexico, Albuquerque, N.M. 87131; for the Socorro area, from C. E. Chapin, New Mexico Bureau of Mines and Mineral Resources, Socorro, N.M. 87801; for the area between 31 and 33 degrees, from W. R. Seager, Earth Sciences Department, New Mexico State University, Las Cruces, N.M. 88003; and for the area south of 31 degrees, from John Gries, Department of Geology, Wichita State University, Wichita, Kan. 67208.

The map was prepared with the cooperation of the New Mexico Bureau of Mines and Mineral Resources. We are grateful to Robert Kelley, Bureau Editor, for his help in editing the map, and to William Arnold, Scientific Illustrator, for drafting the map. We also wish to thank E. M. P. Lovejoy, University of Texas at El Paso for his review of the El Paso area of the map and Robert Bieberman, Bureau of Mines, for supplying well data.