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Marshall Reiter, Glen Jones, and Teresa Schmiedlin

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by *Marshall Reiter, Glen Jones,* and *Teresa Schmiedlin,*
New Mexico Bureau of Mines and Mineral Resources, Socorro, NM 87801

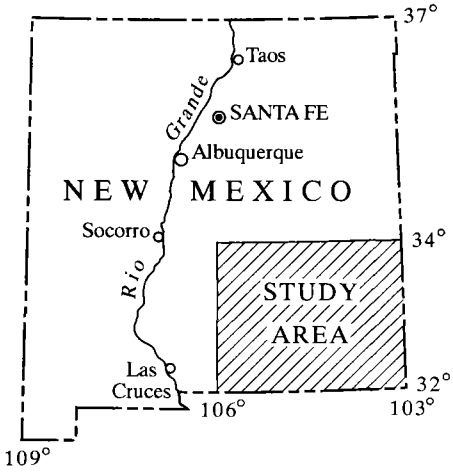

FIGURE 1—Location map of study area.

As part of an investigation of the deep hydrogeology of southeastern New Mexico (Fig. 1), we have compiled elevations of Precambrian and Ordovician tops from drill records obtained at the Library of Subsurface Data, New Mexico Bureau of Mines and Mineral Resources. These data were used to illustrate Precambrian elevations in two and three dimensions (Figs. 2 and 3, respectively); 700 ft, the approximate depth between the top of the Ordovician and the top of the Precambrian, was subtracted from the Ordovician top to obtain the Precambrian top at sites where only the former was available. The data were plotted using "Surfer" software on an IBM-compatible PC; the program uses a gridding algorithm and the inverse distance squared method.

Fig. 2 shows the elevation of the Precambrian surface and the data coverage. Fig. 3 helps one to better appreciate the three-dimensional nature of the Precambrian surface, and the resulting influence this surface is likely to have on regional ground-water flow. One may notice the subsidence of the Precambrian in the Delaware Basin, the relative uplift on the Central Basin platform in the extreme southeastern corner of New Mexico, and the uplift in the Sacramento Mountains. Note the differences in the illustrated Precambrian surface by changing the vertical exaggeration from 10:1 to 15:1 to 20:1 (Fig. 3, top, middle, bottom).

For other references concerning the Precambrian elevation in southeastern New Mexico, see Foster and Stipp (1961) and Keller et al. (1980).

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References

Foster, R. W., and Stipp, T. F., 1961, Preliminary geologic and relief map of the Precambrian rocks of New Mexico: New Mexico Bureau of Mines and Mineral Resources, Circular 57, 37 pp.

Keller, G. R., Hills, J. M., and Djeddi, R., 1980, A regional geological and geophysical study of the Delaware Basin, New Mexico and west Texas: New Mexico Geological Society, Guidebook 31, pp. 105–111. □

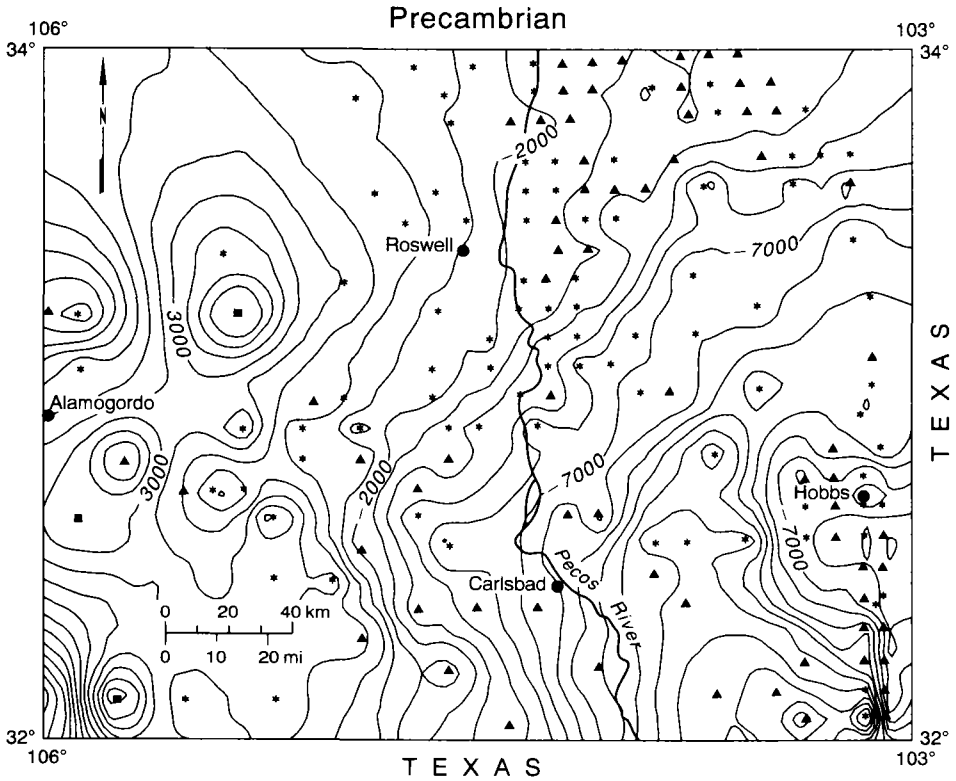
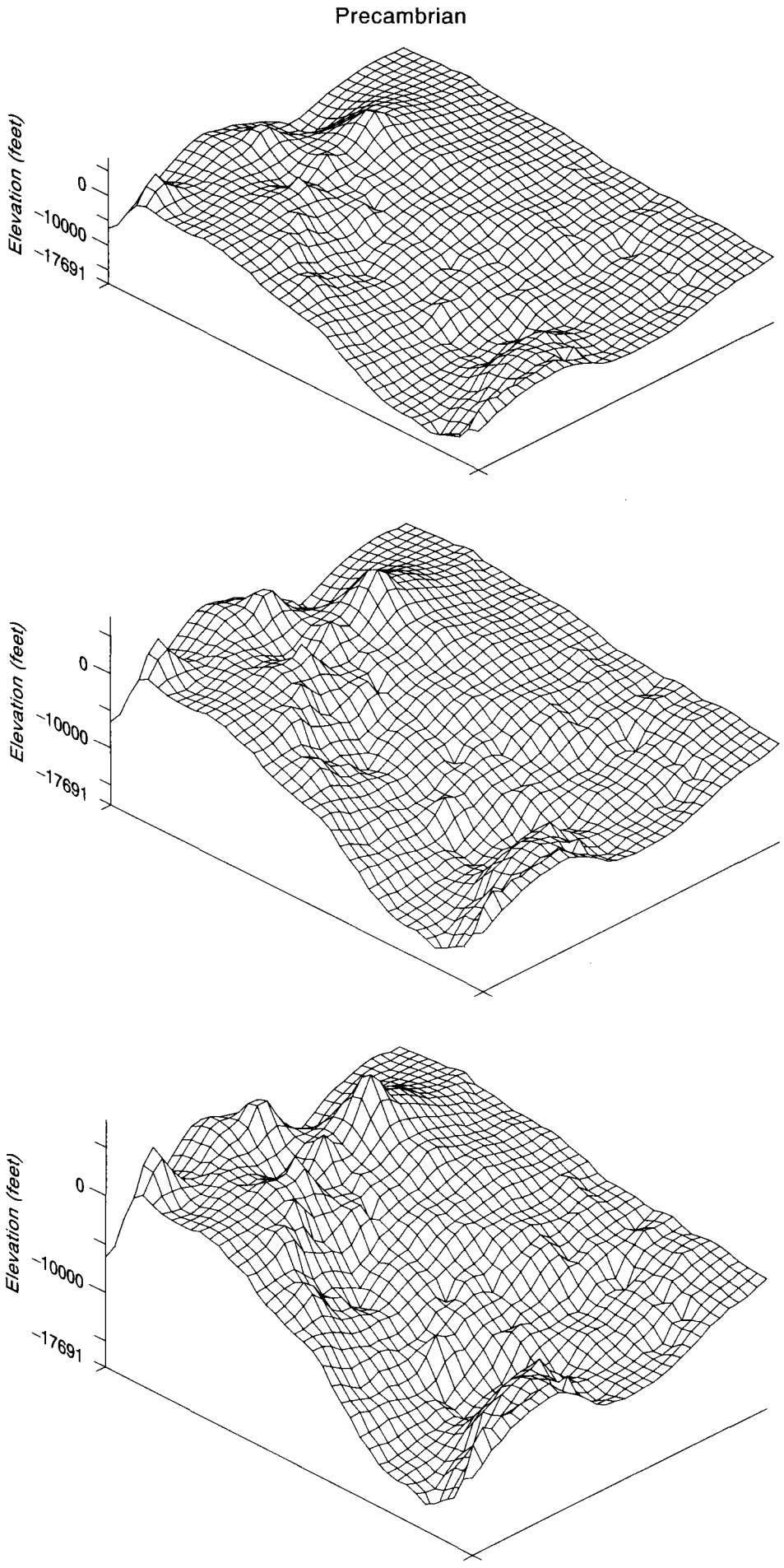


FIGURE 2—Contour map of Precambrian surface elevation. *, sites where Precambrian depth was reached; ▲, sites where Ordovician depth was reached and 700 ft was subtracted to estimate Precambrian depth; and ■, three Precambrian outcrops. All sites are used for contours and surfaces in Fig. 3.

FIGURE 3—Precambrian surface in southeast New Mexico, angle of observation 335°, 30° above horizontal plane. **Top**, vertical exaggeration 10:1; **middle**, vertical exaggeration 15:1; **bottom**, vertical exaggeration 20:1.



New Mexico Geological Society

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The 43rd Field Conference will be held September 30–October 3, 1992. The conference will be headquartered in Cuba for three days of field trips in east-central and south-central San Juan Basin focusing on Cretaceous sequence stratigraphy, the Cretaceous–Tertiary boundary, coalbed methane, and Laramide tectonism. For more information contact Spencer G. Lucas, New Mexico Museum of Natural History, 1801 Mountain Road NW, Albuquerque, NM 87104, (505) 841-8837.

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The 44th New Mexico Geological Society Field Conference will be held in the Carlsbad area of southeastern New Mexico and western Texas on October 6–9, 1993. Field conference planning is being coordinated with the West Texas Geological Society and the Roswell Geological Society. The conference will focus on the geologic evolution of the Pecos Valley–Guadalupe Mountains–Salt Basin region. The broad scope of papers and roadlog contributions being solicited includes reviews of: the Permian geology of the Delaware Basin–Guadalupe Mountains–Northwest shelf region; advances in sequence stratigraphy; regional structural setting; mineral resources (oil, gas, potash, sulfur, water); carbonate and gypsum karst and related cave resources and environmental concerns; and radioactive-waste management (Waste Isolation Pilot Project–WIPP).

Articles for inclusion in the 1993 guidebook (Barry Kues, Managing Editor) must be submitted by **February 15, 1993**. If you would like to contribute an article, please send a tentative title and estimate of manuscript length to: **NMGS—1993**, John W. Hawley, David W. Love, New Mexico Bureau of Mines and Mineral Resources, Socorro, NM 87801, (505) 835-5420.