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Multichannel seismic-reflection profiles collected in 1979
aboard M/V SEISMIC EXPLORER on the western Florida Shelf

M. M. Ball¹ and N. K. Soderberg²

In August 1979, the U.S. Geological Survey (USGS) aboard the M/V SEISMIC EXPLORER of Seismic Explorations International (SEI), ran 17 lines (1,270 km) of multichannel, seismic-reflection profiles on the western Florida Shelf (fig. 1). The main features of the SEI system were (1) a digital recorder with an instantaneous-floating-point-gain constant of 24 dB, (2) a 64-channel hydrophone streamer, 3,200 m long, and (3) a 21-airgun array that had a total volume of 2,000 in³ and a pressure of 2,000 psi. Sampling interval was 4 ms. Record length was 8 s. The distance from the center of the airgun array to the center of the farthest phone group was 3,338 m and to the nearest phone group, 188 m. Shotpoints were 50 m apart to obtain a 32-fold stack. Navigation was by an integrated satellite/Loran/doppler-sonar system.

The SEI data were processed by Geophysical Data Processing Center, Inc. of Houston, Texas. Processing procedures were standard with the following exceptions: (1) a deringing deconvolution that had a 128-ms operator length was done prior to stacking. (2) a time-variant predictive deconvolution that had a filter operator length of 100 ms and automatic picking of the second zero-crossing was applied after stacking to further suppress multiple energy. (3) Velocity analyses were performed every 3 km, using a technique that included the determination and consideration of both the amount and direction of apparent dip. (4) Automatic gain ranging using a 750-ms window was applied pre- and post-stack. (5) Lines affected by sea floor's angle of slope were deconvolved again before stacking and time-variant filter parameters were adjusted to follow the sea-floor geometry.

The data taken with the 3,200-m streamer and 2,000 in³ airgun array, aboard M/V SEISMIC EXPLORER (Arabic numerals, fig. 1) are vastly superior to those obtained by R/V GYRE using a much smaller streamer and source (Roman numerals, fig. 1). The former consistently show coherent primary events from within the units underlying the Mesozoic section on the western Florida Shelf, while the latter tend to do so only in the inshore area where pre-Mesozoic basement occurs at depths of less than 2 km. The R/V GYRE data were open filed previously (Ball and others, 1987). A synthesis of both sets of data is included in Ball and others (1988).

Reflectors correlate to the full 8-s duration of recording time. A number of lines were restarted due to equipment failure; no areas were omitted, however, shotpoints overlap. The original records may be seen at the USGS branch of Atlantic marine geology offices in Woods Hole, Mass. Copies of the multichannel data may be purchased only from the National Geophysical Data Center, NOAA, Code E64, 325 Broadway, Boulder, CO 80303 (tel. 303/497-6345).

This report is preliminary and has not been reviewed for conformity with the U.S. Geological Survey editorial standards and nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

¹USGS, Denver, CO 80225

²USGS, Woods Hole, MA 02543

References

- Ball, M. M., Soderberg, N. K., Nichols, D. R., O'Brien, T. F., Dodd, J. E., and Irwin, B. J., 1987, Multichannel seismic-reflection profiles collected in 1982 aboard R/V GYRE cruise G82-12 on the western Florida Shelf: U.S. Geological Survey Open-File Report 87-372, 2 p., 1 fig.
- Ball, M. M., Martin, R. G., Foote, R. Q., and Applegate, A. V., 1988, Structure and stratigraphy of the western Florida Shelf, Part I, Multichannel Reflection Seismic Data: U.S. Geological Survey Open-File Report 88-439.

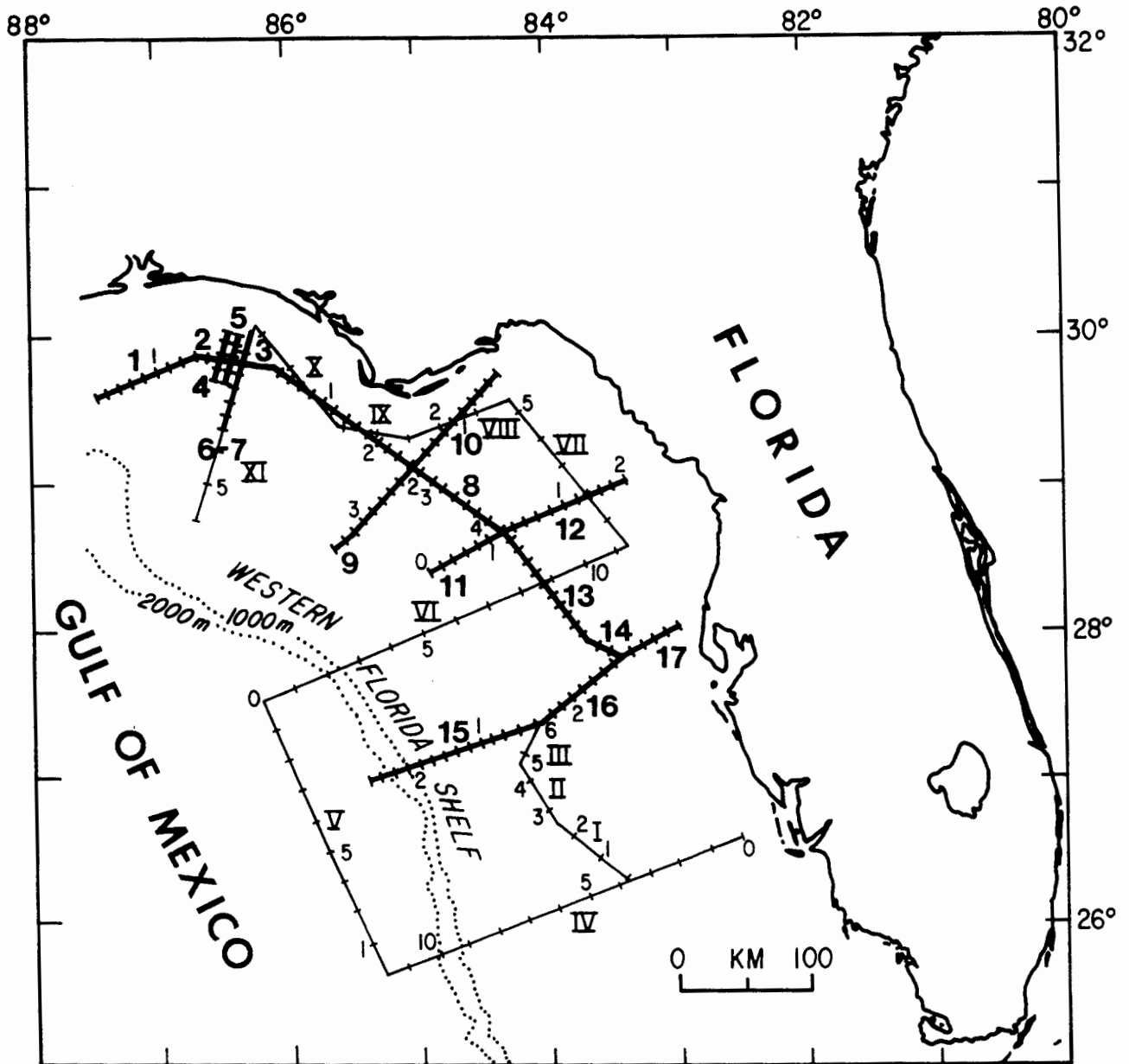


Figure 1. Index map. Bottom contours in meters. M/V SEISMIC EXPLORER 32-fold seismic coverage obtained with 3,200 m streamer and 2,000 in³ airgun-array source indicated by heavy lines with Arabic numerals and cross-hatches at 200 shotpoint (SP) intervals. Arabic numerals indicate SP in thousands at 1,000 SP intervals. R/V GYRE 24-fold seismic coverage obtained using a 1,200 m streamer and 550 in³ airgun source indicated by thin lines numbered in Roman numerals, with cross-hatches at 1,000 SP intervals. Arabic numbers indicate shotpoints in thousands at 5,000 SP intervals.