

Deepwater clastics of the Permian Basin: Outcrop analogs for the Gulf of Mexico and North Sea

The Permian Basin of West Texas has been a testing ground for numerous geologic concepts about both the surface and the subsurface. Deepwater Permian clastics, which infill the Midland and Delaware basins, are significant reservoirs, estimated to contain more than 10 billion barrels of oil in place. Outcrops in the arid Guadalupe and Delaware mountains provide excellent exposures that can be compared to the subsurface. Geologists use these exposures as analogs for subsurface models in the Gulf of Mexico and North Sea.

The Permian Brushy Canyon Formation, one of the clastic units, is superbly exposed over a fairway 25 miles long and 7 miles wide, with more than 1,000 feet of vertical exposure. The arid climate and the canyons that dissect the terrain provide a three-dimensional view of both the resistant and nonresistant strata, sand/silt ratios, and the depositional mechanisms that operated from the basin margin outward into the basin. Proximal deposits are highly channelized with a net/gross ratio of 25–30 percent;

the distal net/gross ratio is nearer to 60–70 percent. Channel geometries and high-energy depositional mechanisms are visible 15–20 miles into the basin before planar bedforms become predominant. This photo essay illustrates these processes, from which it is possible to discuss their applications to other areas.

Biography

Brad Macurda is a geologist and seismic interpreter. A graduate of the University of Wisconsin, he was a professor at the University of Michigan (1963–1978) before joining the oil industry. He worked 3 years for Exxon Research and 18 years with The Energists. Brad has conducted many industry training seminars on the stratigraphic interpretation of seismic data and worked on interpretation projects in more than 40 countries. Recently, his projects have focused on deepwater exploration in the Gulf of Mexico, North Sea, and South Atlantic. Brad is a firm believer in making reality checks by spending time on the outcrop. □

HGS North American Dinner Meeting • Monday, November 29 • Westchase Hilton, 9999 Westheimer • Social 5:30 p.m., Dinner 6:30 p.m.