

SEDIMENTOLOGY OF THE AGUJA FORMATION
BIG BEND NATIONAL PARK, BREWSTER COUNTY, TEXAS

by

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ABSTRACT

The aguja formation consists of approximately 800 feet of littoral marine and continental sandstones, claystones, and lignitic shales. The abundance of fossils and sedimentary structures makes it ideal for a study of paralic sedimentary environments. The upper part of the underlying Terlingua formation was deposited in a nearshore marine environment; it consists of mottled, silty claystones with marine fossils, and widely separated thin sandstone beds. The lower part of the Aguja formation was deposited in a tidal flat environment. Ripple marks, Lebenspueren, marine fossils, and small channel-fillings are characteristic of the interbedded sandstone and claystone units in this part of the formation. Lignitic shale and coal beds in the middle part of the formation were deposited in a swamp or marsh environment. The homogeneous and laminated claystones with abundant sharks teeth and oysters probably represent a lagoonal environment, whereas sandstones with oysters and crocodile remains come from an estuarine environment. Finally, mottled maroon and green claystones, limestone - pebble conglomerates, and sandstone beds and channel fillings in the upper part of the formation suggest deposition in coastal river flood-plains.

The regional cross-bed dip direction, and thus, the predominant paleocurrent direction, is to the northeast. It is inferred that the regional paleoslope was also in this direction. Local bimodal cross-bed patterns support the interpretation that some sandstone units in the lower part of the formation were deposited by tidal currents.

The abundance of feldspar and volcanic-rock-fragments in the sandstones indicates a source area of mixed lithology, predominantly volcanic and hypabyssal rocks, with minor amounts of sedimentary, plutonic igneous, and metamorphic rocks. The bentonitic composition of the claystones suggests that at times volcanic ash-falls occurred in the source area.

The remarkably uniform fine grain size of the feldspar, quartz, and volcanic rock-fragment grains suggests that the source area of the detritus was a great distance from the site of deposition. The climate seems to have been semiarid as evidenced by the presence of detrital grains of limestone and by feldspar grains that are only slightly altered.