
Observation of Anomalous Seismic P-Wave Velocities in Catahoula-Aged Ash, South Texas

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ABSTRACT

The Catahoula Formation of the Texas Gulf Coast is described as a succession of interbedded volcanoclastic sediments, fine grained sandstones and shales. It outcrops about 80 km inboard of the Holocene coastline from Louisiana to Mexico. An anomalous accumulation of massive ash in an arc 90 km x 32 km wide, 20 m thick appears near Rio Grande City, Texas. U–Pb age dating methods indicate the ash to be 27.2 mybp, or equivalent to Catahoula in age.

In one outcrop, some fluvial bedding is noted in the upper 0.5 m of the unit, just below the unconformably-overlying Goliad conglomerate. Some interbedding with the underlying Frio formation is observed in an arroyo in Rio Grande City. The ash bed is otherwise absent of bedding features and is thought to represent a single depositional episode, or via pulses very close in age. Being massive in appearance, it is interpreted that this ash was deposited in a low-energy depositional environment.

This ash has been described elsewhere as being diagenetically altered, with clay as a primary product. It has also been suggested that diagenesis removed bedding features so as to appear massive. We attempted to use seismic refraction to determine if the base of ash, i.e., Frio formation, was acoustically visible. Furthermore, we used this technique to determine if internal acoustic boundaries were observable and related to possible pre-existing bedding. Preliminary results show an absence of any subsurface refractor units including base of ash. Furthermore, anomalously high first break velocities were noted. Possible reasons for this include silicification in the uppermost part of the unit, although this does not completely explain the high values observed. Further hypotheses and testing will be required to answer this question.