

### **Strike Variability Within a Wave-influenced Delta, the Gallup Sandstone, Shiprock, New Mexico**

Krueger, Ryan <sup>1</sup>; LoParco, Michael <sup>1</sup>; Bhattacharya, Janok <sup>1</sup> (1) Earth and Atmospheric Sciences, University of Houston, Houston, TX.

The Upper Cretaceous Gallup Sandstone Formation in the San Juan Basin, New Mexico has been interpreted as an amalgamated wave-dominated barrier-shoreface, and strand plain deposit. Reassessment of outcrops near Shiprock, New Mexico show elements of river- and wave-influenced deposition varying laterally along depositional strike. River-influenced deposition is restricted to the west side of the area which includes upward-coarsening heterolithic facies, with soft sediment deformation, allocthonous plant and coal fragments, Bouma-sequences, and parallel laminated to cross-bedded sandstones with scours. Rare burrows include Arenicolites and Planolites, suggesting a stressed environment. These coarsening upward successions are interpreted as storm-influenced, river-dominated delta front and terminal distributary channel deposits. Wave-influenced deposition predominates on the east side of the area and comprises homogeneous sandy shoreface deposits, with alternating bioturbated to hummocky-cross stratified sandstones that pass into dune-scale cross-bedded sandstones. Abundant Asterosoma, Ophiomorpha, and Chondrites suggest a wave-influenced shoreface.

Paleocurrent measurements were taken from the shoreface, totaling 792. Trough cross-beds indicate NW to SE longshore currents, which we interpret to represent the overall shoreline orientation. NNW to SSE wave-ripple crest orientation indicates wave approach was oblique to the shoreline. Dominant longshore drift direction appears to be to the southeast, which is the dominant direction of marine circulation currents in the Western Interior Seaway. However, there were a significant number of northwest directed currents that are more compatible with the oblique wave approach determined from wave-ripple crest measurements.

Petrographic analysis of the updrift and downdrift areas was conducted to determine relative textural maturity. Higher amounts of silt and sedimentary rock fragments were found in the downdrift facies in the west side, while higher porosity sandstones characterize the updrift facies. Grain size, roundness, and sorting show no distinct trends, which suggests some mixing of updrift and downdrift sediments.

We suggest the Gallup sandstone is an asymmetric, wave-influenced delta. An asymmetric delta forms under the influence of oblique wave action, resulting in muddy river sediments being deposited downdrift of the river, while updrift sediments form the homogenous sandy shoreface.