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Cornel Olariu[1], Xueming Xu[2], Rui Ge[2], Carlos L. V. Aiken[2], Janok P. Bhattacharya[1] (1) University of Texas at Dallas, Richardson, TX (2) University of Texas at Dallas

Digital Mapping of Outcrops, Techniques for Building 3-D Delta Front Architecture. Example from the Cretaceous Panther Tongue Sandstone, East-Central Utah

Photorealistic, or digital mapping of outcrops is a novel tool for 3-D correlation and interpretation of discontinuous outcrops. This technique is most useful in areas where outcrop surfaces have highly variable topography. We used two Leica GPS 500 systems, two ALS Atlanta total stations and a professional high-resolution digital camera, for fieldwork, and CyberMapping (developed at University of Texas at Dallas) and Gocad software for processing the data. Data resolution is limited by the time necessary for scanning outcrops and the quality of digital photographs. The Panther Tongue Sandstone crops out along both sides of Spring Canyon and adjacent valleys along Sow Belly Gulch in East-Central Utah. The outcrops are oriented at distinct angles to the paleoflow. The deposits expose shallow ‘terminal’ distributary channel sandstones interbedded within distal mouthbar sheet sandstone forming a delta front. All data points were connected to the base station coordinates and 3-D bedding diagrams were constructed on the base of photorealistic cliff faces. Photomosaic interpretations are integrated with sedimentological measurements and ground-penetrating radar lines permitting accurate 3-D reconstruction of delta front facies architecture. The 3-D reconstructions can be used in models for fluid flow simulations and for interpretation of morphometric depositional elements.