

Mixed Carbonate and Clastic Mass Failures: A Study of the Green River, Uinta, and Bone Springs Formations, Uinta, Piceance, and Delaware Basins, Colorado and Texas

Forrest McFarlin, Lesli Wood

Colorado School of Mines

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Abstract

Mixed carbonate and siliciclastic failures occur prolifically in both submarine and sub-lacustrine settings, acting as reservoir, seal, and source in these settings, and often acting as all of the above. The Green River Formation, one of the largest lake-deposited oil shale deposits in the world, contains frequent and extensive, oil shale debrite beds which are characterized by clasts of oil shale within an oil shale matrix. In contrast, the Uinta Formation, which represents the late phase filling and clastic progradation over the lake deposits of the Green River Fm. contains extensive, large sandy delta-front mass failures. These failures appear analogous to those that can be found in the Bone Springs Formation of the Delaware Basin. Both the Bone Springs and Green River Formations are mixed carbonate and siliciclastic systems; however, their environment of deposition is significantly different. This study aims to characterize and compare mixed carbonate and siliciclastic mass failures found within both submarine and sub-lacustrine setting. These mass failure types outcrop extensively allowing examination in detail of their facies, organic content, organic type, petrography, deformation structures, basal and upper contact nature, as well as healing phase sediments overlying these deposits. Failures that can comprise nearly 60% of some stratigraphic sections/core sections were mapped and characterized throughout the study areas.