

PBS-SEPM JANUARY LUNCHEON

Tuesday, January 17, 2023 – 11:30AM

Bush Convention Center - 105 N Main St, Midland, TX 79701

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Integrating 100 Years of Research in the Mesaverde and upper Mancos Groups, Piceance Basin, Colorado, USA

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ABSTRACT

Like much of the Western Interior Basin, the Mesaverde Group of the Piceance Basin, Colorado has been highly studied for over 100 years by academia, geological surveys, government, and industry. Ongoing digitization efforts make this data much easier to access than before; however, utilization is still difficult due to the text- and figure-based nature of geologic data. As a result, researchers are often left with highly fragmented datasets of varying quality and often reproduce previously published work without realizing it. To highlight these problems and illustrate the power of data mining, a work-



flow has been created and applied to the Mesaverde Group of the Piceance Basin, Colorado. Through an extensive literature search, ammonite fossil localities, stratigraphic sections, subsurface correlations, and geologic maps for ten chronostratigraphic units were tabulated and integrated using spreadsheets and a business analytics software package. These units included: (1) Desert Member, Blackhawk Fm/B sandstone of Dyni (1968)/Morapos Sandstone; (2) Castlegate Sandstone/Mancos A; (3) Loyd Sandstone/Buck Tongue Sandstone; (4) Upper and Lower Segoo Sandstone; (5) Corcoran Sandstone; (6) Cozzette Sandstone; (7) Rollins Sandstone/Trout Creek Sandstone; (8) Middle Sandstone; (9) Upper Sandstone; and (10) Lion Canyon Sandstone. The data was then overlain to define an initial area-of-interest (AOI) per unit and a subsurface geological model was created by replicating previously published well log correlations. The correlations were then integrated with outcrop data by creating a cross section grid tied to stratigraphic sections. Geologic maps were utilized simultaneously to guide well log correlations, and ammonite fossil localities were employed to troubleshoot incorrect correlations and standardize interpretations. Once a satisfactory answer was reached, the AOI was infilled and expanded with additional data. Gross sandstone thickness maps based on the newly created chronostratigraphic framework reveal a complex history of sandstone distribution over 5 My. Apparent shoreline rotation and compensational deposition superimposed on conventional transgressive/regressive cycles suggest irregular movement from early Laramide structures as early as the Campanian. This interpretation is further supported by eastern Cretaceous-aged intrusions and their cross-cutting relationships, possibly associated with the Colorado Mineral Belt.

BIOGRAPHY: *Bryan McDowell is a geologist/reservoir engineer specialized in integrating geologic and petroleum engineering datasets for multi-disciplinary assessments in oil & gas reservoirs. He was an engineering/geoscience technical advisor for asset development at Discovery Natural Resources before starting Sabata in 2020. Bryan received his B.Sc., Geology at Texas A&M University in 2010 and his M.Sc., Petroleum Engineering at Colorado School of Mines in 2018. He finishing his Ph.D., Geology at Colorado School of Mines and has worked in the oilfield since 2011.*