

Cliff Mapping Of Surface Outcrops In The Powder River Basin Using Unmanned Aerial Systems

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ABSTRACT

As an abundant petroleum producer since the late 1800s, the Powder River Basin continues to be a location of great interest for the oil and gas business. Continual advances in technology allow for enhancements in exploration and production. Formed during the Laramide Orogeny, it is a structural basin with abundant stratigraphic components. During the Cretaceous, the Powder River Basin was filled by the Western Interior Seaway which deposited numerous sandstone-shale sequences corresponding to numerous transgressions and regressions. The unit of interest for this study is the Campanian Shannon Member of the Cody Shale. The Shannon Member is laterally extensive in the Powder River Basin; it is thicker in the west and thins to the east. In the western portion of the basin the Shannon Member has several surface exposures that reach heights of up to 36 meters. These outcrops are steep cliffs of friable sandstone that pose safety risks for detailed mapping in close proximity. Unmanned Aerial Systems, commonly referred to as drones, can allow for detailed imaging of the outcrops without the risk to an individual. This detailed imaging will be high enough in quality to identify facies changes and sedimentary structures. Using a drone to survey these outcrops will produce a map equal to or higher in quality than existing maps. Cliff mapping of the Shannon outcrops in Natrona County, Wyoming near Edgerton, WY, will be performed with a rotor copter during the summer of 2017. After collection of the high resolution imagery, the images will be imported into Agisoft Photoscan which will allow for the creation of a detailed three dimensional map of the outcrops. This can then be compared to existing maps including the United States Geological Survey map MF- 2095 by Margaret Ellis.