UAV-assisted Mapping of a Cambrian-Ordovician Reef Margin Complex: An Exceptional Analogue to Fore-Reef Carbonate Reservoirs in Yukon Territory, Canada

James Busch[1]
[1]Dartmouth College, Sedimentology, Hanover, NH USA
James.F.Busch.GR@dartmouth.edu

ABSTRACT

During the summer of 2017, I discovered a spectacularly exposed and previously undocumented succession of early Paleozoic reef margin and fore-reef carbonate facies near Nadaleen Mountain in the southern Wernecke Mountains of Yukon, Canada. The preliminary identification of these features in outcrop provides an excellent opportunity to carefully examine rarely-exposed reef margin sedimentation, carbonate sequence stratigraphy, and Cambrian-Ordovician reef paleontology using cutting edge UAV-assisted 3-D mapping; however, due to time constraints last season I was unable to document the stratigraphy other than at the reconnaissance level. There are many instances of hydrocarbon reservoirs associated with reef margin carbonate sedimentary systems (e.g. Poza Rica trend, Upper Cretaceous, Mexico), but relatively few outcrops provide appropriate ancient analogues for Paleozoic reef systems and only a handful of global localities offer the same 3-D exposure of reef margin stratigraphy from our discovery this summer. The study will make use of thin section and SEM petrography of carbonate samples, UAV-acquired imagery and elevation data, and measured stratigraphic sections to construct a 3-D depositional model that fully captures the heterogeneity of porosity and permeability, distribution of carbonate facies, and sequence stratigraphic boundaries within the reef margin depositional system. Importantly, the establishment of a detailed sedimentological and sequence stratigraphic interpretational framework for this early Paleozoic carbonate succession also has significant implications for Carlin-type gold mineralization in the same region.

AAPG Search and Discovery Article #90321 2018 Grants-in-Aid Projects