DEPOSITIONAL ENVIRONMENTS OF ORGANIC-RICH MUDSTONES: COLORADO GROUP, WEST-CENTRAL ALBERTA, CANADA

Emma Percy
University of Calgary, Geoscience, Calgary, AB, Canada
emma.percy@ucalgary.ca

ABSTRACT

Fine-grained sedimentary rocks, commonly known as shales or mudstones, are the most abundant but poorly understood sedimentary rock type. Mudstones are often dismissed as homogeneous rocks that were deposited out of suspension in low energy environments. This notion has undergone radical change after flume experiments demonstrated that mud can be transported and deposited at the same velocities that carry sand. This study addresses the relationship between dynamic depositional processes and organic-rich mudstone distribution for the Colorado Group in west-central Alberta. The hypothesis is that these mudstones were not all deposited in quiescent environments, despite the common belief that organic-rich mudstones are deposited out of suspension. Methods for redistributing mud across large distances on low-gradient ramps are still poorly understood. In this work it will be determining how mudstones of the Cretaceous Colorado Group were deposited within the low-gradient foreland basin of west-central Alberta. Initial analysis of the stratigraphy of the system revealed complex geometries that suggest the processes involved in deposition were more dynamic than previously thought. The objectives of this project is to characterize the processes that deposited the interval of interest, upscale microfacies data to correlate with decimetre scale well logs for regional facies mapping, and refine the paleogeographic model for the Upper Cretaceous Western Interior Seaway. Facies and stratigraphic surfaces have been identified from core and described bedforms indicate that the majority of sediment in the interval of interest was deposited under relatively high energy conditions. This research will advance the understanding of how mud is deposited across shelf environments; a current topic of debate. Mudstones record the bulk of the sedimentary rock record and the results from this study will assist in unravelling the depositional history of these rocks. Knowing the facies distributions within mudstones is imperative for predicting potential hydrocarbon reservoir fairways, seal potential for aquifers and carbon dioxide sequestration targets, and for economic mineral and metals distributions. The principles applied in this study can be applied to both ancient and modern mudstone deposits worldwide.

AAPG Search and Discovery Article #90298 2016 Grants-in-Aid Projects