ANALYSIS OF FRACTURE STYLE AND DEVELOPMENT ASSOCIATED WITH DIFFERENTIAL COMPACTION AROUND CARBONATE MOUNDS

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This project seeks to analyze and quantify the effects of differential compaction on mechanical stratigraphy and fracture development in strata overlying both Waulsortian and phylloid-algal carbonate mounds. Importantly, the effects of differential compaction on carbonate mounds have very limited study, especially with respect to fracture development, reservoir quality, and hydrocarbon producibility. Given that many of the world's existing carbonate reservoirs are currently in secondary or tertiary recovery stages, an in-depth characterization and mapping project on carbonate mounds is vital to correctly model hydrocarbon flow and to maximize recovery from these targets.

Outcrops of these two distinct types of mound are exposed in Carboniferous strata in the Sacramento Mountains, New Mexico. Existing ground-based LIDAR datasets of the area will be enhanced by high resolution aerial (UAV) and ground-based Gigapan imagery, allowing the mapping of fracture direction, spacing, and intensity over large areas. Other field mapping will consist of outlining stratigraphic contacts and creating outcrop logs via non-destructive measurements of mechanical properties. Lab work will include UCS measurement and petrographic analysis on facies plugs from mounds and overlying strata. Data will be transferred to a centimeter-scale Digital Outcrop Model created using photogrammetry and ground-based LIDAR. The project will ultimately produce an in-depth characterization of the mechanical stratigraphy of carbonate mounds, including all significant effects of differential compaction. Additionally, the project will build on an existing robust mound facies framework to produce a detailed fracture and compaction analysis, which will be conceptually linked to other carbonate mound reservoirs around the world.

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