Evaluation of Facies Controls on Distal Fine-Grained Chalky Facies in the Miocene Agua Amarga Basin, SE Spain: An Analog for Fine-Grained Reservoirs

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ABSTRACT

There is increasing economic interest in fine-grained carbonate rocks, both as conventional and unconventional reservoirs. The depositional controls on the character of such facies are poorly understood. As they have permeability and porosity that is difficult to predict, there is a need to evaluate depositional and diagenetic controls on reservoir quality. This study focuses on depositional controls on rock properties in a basin well-known for a mix of pelagic components and sediment gravity flows with known paleotopographic dispersal and sea level history.

In the Agua Amarga Basin of SE Spain, 3D exposures of Upper Miocene carbonates allow for preservation of paleotopography and shelf-basin correlation. Prior investigation indicates a mixture of laminated hemipelagics, bioturbated hemipelagics, and low-density sediment gravity flows, with indications of variable reworking by bottom-hugging currents and varying oxygenation. In this study area, the local sea level history and sediment dispersal controls are known, making this an ideal location for the evaluation of sequence stratigraphic and paleotopographic controls on basin-centered carbonates. During a two-month field season, stratigraphic sections will be measured, and correlations traced laterally. Ichnofossils and microfossils will be analyzed as proxies for environmental factors. In the lab, thin sections will be used to create a detailed petrographic, paleontologic, and ichnologic characterization. Quantitative measurements of rock character such as elemental composition from X-Ray Florescence, total organic carbon content, and siliciclastics to carbonate ratio will be used to enhance correlations and interpretations. Hypotheses for sequence stratigraphic and paleotopographic controls on fine-grained carbonate sedimentation will be tested. Variables evaluated will include sea-level, climate, nutrients, and paleotopography.

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