Sedimentary Characteristics of Fine-Grained Resurge Facies, Wetumpka Marine Impact Structure, Central Alabama*

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Abstract

Marine impact craters have interior, crater-filling breccias of high permeability and porosity and are potentially self-sealing with the deposition of a resurge facies, a fine-grained unit characteristic of many marine impacts. Therefore, marine impact craters may be an ideal hydrocarbon reservoir within a petroliferous basin. However, the stratigraphic, sedimentologic, and genetic parameters of the aqueous resurge facies in such craters are not fully understood, particularly those formed in shallow marine settings.

Located in central Alabama, the well-preserved and surficially exposed Wetumpka shallow marine impact structure is a good field laboratory to study both the sedimentary crater-filling breccias and fine-grained resurge facies. Formed within the lowermost transgressive systems tract of the Upper Cretaceous Selma Group, during the deposition of the lowermost Mooreville Chalk, the Wetumpka marine impact structure has a mixed-target stratigraphy of pre-Mesozoic crystalline bedrock, Upper Cretaceous unconsolidated sediments, and 30-100 meters of water depth.

Utilizing a shallow drill-core of ~ 100 m, crater-filling mega-slumped sands and their overlying glauconitic, calcareous mudstone resurge unit have been studied in detail. This paper reports on the on-going sedimentologic and stratigraphic investigation based on core description, adjacent outcrop description, thin-section petrography, and x-ray computed tomography (CT). Preliminary results from x-ray CT of cores have revealed internal, inclined bedding structures, and brecciation of penecontemporaneous, transported sea floor mud clasts that are delineated by intact burrows and density contrasts between clasts and a disaggregated mud matrix. The internal sedimentological and stratigraphic characteristics reveal alternation between predominately matrix-supported mud-breccias and uni-directional cross-stratified units. Hydrodynamic genesis of these deposits is thought to be successive muddy debris flows followed by rapid suspension sedimentation. Increased
understanding of the mode of emplacement of the impact-derived, fine-grained capping unit at Wetumpka could help predict the reservoir characteristics of analogous, sub-surface impact structures within petroliferous basins. Supported by NASA grant NNX09AD90G and the Fred A. and Jean C. Dix Named Grant part of the AAPG Foundation Grants-in-Aid program.

References


**Abstract**

Marine impacts can have major societal and ecological effects by altering the natural system. This study examines the role of marine environments in supporting biodiversity and ecosystem services. The results highlight the importance of marine environments in shaping the distribution of marine species and ecosystems. The study also underscores the need for policy and management measures to ensure the sustainability of marine ecosystems.

**Introduction**

Marine systems are characterized by high productivity and diversity, and they are potentially valuable habitats for the deposition of marine debris. However, marine debris can negatively impact marine environments and affect marine biodiversity. This study examines the role of marine environments in supporting biodiversity and ecosystem services. The results highlight the importance of marine environments in shaping the distribution of marine species and ecosystems. The study also underscores the need for policy and management measures to ensure the sustainability of marine ecosystems.

**Target Stratigraphy**

The study examines the role of marine environments in supporting biodiversity and ecosystem services. The results highlight the importance of marine environments in shaping the distribution of marine species and ecosystems. The study also underscores the need for policy and management measures to ensure the sustainability of marine ecosystems.

**Methods**

This study uses observations and field studies from various marine locations to examine the role of marine environments in supporting biodiversity and ecosystem services. The results highlight the importance of marine environments in shaping the distribution of marine species and ecosystems. The study also underscores the need for policy and management measures to ensure the sustainability of marine ecosystems.

**Results**

The study examines the role of marine environments in supporting biodiversity and ecosystem services. The results highlight the importance of marine environments in shaping the distribution of marine species and ecosystems. The study also underscores the need for policy and management measures to ensure the sustainability of marine ecosystems.

**Discussion**

This study uses observations and field studies from various marine locations to examine the role of marine environments in supporting biodiversity and ecosystem services. The results highlight the importance of marine environments in shaping the distribution of marine species and ecosystems. The study also underscores the need for policy and management measures to ensure the sustainability of marine ecosystems.

**Conclusion**

This study uses observations and field studies from various marine locations to examine the role of marine environments in supporting biodiversity and ecosystem services. The results highlight the importance of marine environments in shaping the distribution of marine species and ecosystems. The study also underscores the need for policy and management measures to ensure the sustainability of marine ecosystems.