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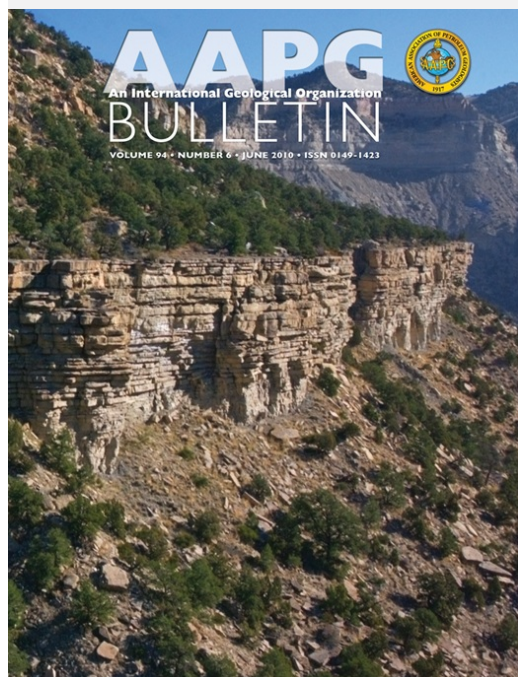
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Delta-front hyperpycnal bed geometry and implications for reservoir modeling: Cretaceous Panther Tongue delta, Book Cliffs, Utah

Cornel Olariu; Ronald J. Steel; Andrew L. Petter

AAPG Bulletin (2010) 94 (6): 819-845.



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Abstract

The Cretaceous Panther Tongue has an upward-coarsening and -thickening pattern and is well exposed in extensive large outcrops in the Book Cliffs area, west-central Utah. The deposits have been interpreted as having formed in a fluvial-dominated river delta environment that generated highly sediment-concentrated sustained (turbidity) flows during flooding, producing hyperpycnal-flow deposits on the delta front despite some resemblance to deep-water turbidites. The facies associations indicate terminal distributary channel, channel mouth, and proximal delta-front and distal delta-front depositional environments. The measured paleocurrents indicate a south-southwest transport of the sediments.

The thickness of the hyperpycnal sandstone beds ranges from centimeters to meters. Sandstones are characteristically parallel laminated, sometimes structureless or rarely display inclined strata of cut-and-fill type. The sandstone hyperpycnal beds dominate the delta-front clinoforms and dip southward, consistent with the other paleocurrent indicators. Individual sandstone beds in the clinoforms have dips that range from 0.1° on the distal delta front (lower part of the outcrops) to 3° in the proximal parts (upper part of the outcrops). The hyperpycnal beds can be traced from a proximal mouth-bar environment to the distal delta front over a distance of hundreds of meters. As individual beds extend from mouth bar to distal delta-front environments, they become systematically finer grained and thinner. Over short distances (hundreds of meters), the beds thin with rates ranging between 0.0001 (i.e., dm/km) to 0.02 (i.e., tens of meters per kilometer). The sandstone beds thin to a greater degree in a dip direction than along strike, indicating a relatively strike-elongate (flow-normal) geometry of the hyperpycnal

flows and of the delta lobes. The wider than longer geometry of the delta-front beds requires that reservoir development be more focused upon the downdip facies changes (heterogeneities) than the lateral (along strike) heterogeneities.

GeoRef Subject

clastic rocks Mesozoic petroleum Book Cliffs bedding plane irregularities sedimentary rocks Cretaceous planar bedding structures sedimentary structures sandstone ripple marks laminations Utah United States Upper Cretaceous

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sedimentary structures

strike

thickness

transport

United States

Upper Cretaceous

Utah

west-central Utah

Panther Tongue

Latitude & Longitude

N37°00'00" - N42°00'00", W114°04'60" - W109°04'60"

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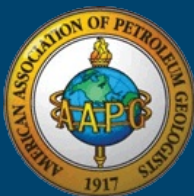
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