The Impact of Extensional Tectonics on the Evolution of Lacustrine Successions During the Early Stages of Rifting: The Western Snake River Basin, Idaho

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Abstract

The impact of extensional tectonics on the evolution of lacustrine successions during the early stages of rifting: the Western Snake River Basin, Idaho.The Western Snake River Plain of southwestern Idaho is underlain by up to 2 km of lacustrine and perilacustrine related siliciclastic sediments that rest on top of a thick succession of mid-Miocene Columbia River Basalts (CRB), with a significant portion of the fill contained within a large Neogene-age rift basin. Data from outcrops, subsurface wells, and 2D seismic from the Western Snake River Plain of southwest Idaho illustrate the impact of contemporaneous extensional tectonics on the evolution of fluvial and nearshore lacustrine systems during the initial stages of rifting. Moderate-to-small scale grabens or structural lows (1-5 kms in scale) associated with the initial phase of rifting are filled by laterally confined fluvial-overbank systems dominated by braided channels and bars. As rifting continues a lacustrine system develops and expands with structural lows transformed into protected quiet water embayments. Embayments attached to fluvial systems are filled with a variety of river-dominated shoreline deposits including Gilbert deltas, channelized sheets, and subaqueous lobes. Local rifting subsides as small-to-moderate scale structures merge into large basin scale structures. The infilling of localized structural lows results in a dramatic increase in fetch length and wind generating capacity with resulting waves reworking available sediment into strike-aligned shoreline deposits. Structural stratigraphic models such as this enhance

future exploration and development activities by improving the link between regional observations and local predictions of reservoir presence and effectiveness.

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