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Sequence Stratigraphy and Incised Valley Architecture of the Domengine Formation, Black Diamond Mines Regional Preserve and the Southern Sacramento Valley

The middle Eocene Domengine Formation crops out at Black Diamond Mines Regional Preserve on the flanks of Mount Diablo and can be traced eastward into the subsurface where it forms a prolific gas reservoir in the southern Sacramento Basin. Historically, the Domengine has been interpreted as a mixture of lagoonal and barrier-beach strata deposited along a north-south trending shoreline. Integration of outcrop and subsurface data indicate that the Domengine was deposited in at least two northeast-southwest trending incised valley systems which were cut by fluvial incision during relative lowstands in sea level and back filled primarily with estuarine sandstones and mudstones. This revised interpretation shows that the Domengine Formation can be regionally subdivided into two sequences. Thickness trends observed within the Domengine Formation are interpreted as the product of variable incision associated with the incised valley systems and not the result of depositional thinning in a basinward (westwardly) direction suggested by previous models. The turbiditic sandstones of this age, seen on Mount Diablo, are further interpreted to be the slope/basin equivalents of the Domengine incised valley deposits on the shelf. The importance of this reinterpretation of the Domengine Formation within a sequence stratigraphic framework is that it provides a predictive model for both understanding the thickness trends and facies distribution of the Domengine. It also potentially provides a more accurate depositional model for exploration and development of this important hydrocarbon reservoir.