

# **Deepwater Depositional Phase Diagram: A Strategy for Predicting the Architecture of Deepwater Reservoirs Considering Slope Gradient and Clay Percentage**

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Deep water reservoirs can be organized into architectural phases which are defined by element stacking patterns. Based on detailed analysis of many deep water systems, depositional phases are positioned within a field that compares slope gradient and the percentage of clay in flows during deposition. On this Depositional Phase Diagram, each reservoir phase is represented by a separate stability field. In the preliminary form presented here, gradient and clay percentage are the only considered variables. Based on these two critical parameters, the phase diagram is a useful tool for predicting changes in reservoir element stacking pattern both temporally and spatially.

The effect on reservoir architecture of local changes in slope gradient is predicted by the Phase Diagram. For example, the effect of increasing gradient in a sand-rich complex of amalgamated sheet elements is to change phase to multi-lateral erosional channel elements and then to erosional bypass; this is predicted by a leftward, horizontal path through the diagram. Conversely, the effect of decreasing gradient produces the opposite response.

The effect of changing clay percentage in average flows is predicted by a vertical path through the phase diagram. In many deep water systems, flow volumes decrease with time through a depositional cycle while clay percentage increases. Consequently, the stacking pattern in an area of high gradient may change from erosional bypass, through multilateral erosional channel elements, to multistory channel-levee elements; this is predicted by a vertical path upward through the diagram.