

Tectonic Accommodation and a Model for Alluvial Sequence Stratigraphy

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A model is discussed for alluvial sequence stratigraphy. Discharge and sediment supply are considered boundary conditions, subject to feedback effects. Primary control on alluvial facies changes is attributed to the gradient of the alluvial plain. This gradient is determined by the “graded profile”, a topographic profile defined by a graded stream linking a sediment source region to a subaqueous basin. It is proposed that coupled source uplift and basin subsidence result in facies changes that result in the commonly cited upward-fining alluvial sequence. Additionally, these factors provide feedback on sediment supply, grade, and flux that reinforce qualitatively modeled facies changes, in part providing justification of initial assumptions. The model provides a rationalization for a generally upward-fining alluvial sequence that is coeval with a general upward-fining to coarsening nearshore sequence, bridging the theoretical gap between subaerial and subaqueous sequence stratigraphy. It also provides an interpretation of basin-scale stratigraphy based on the tectonic evolution of sedimentary basins, in keeping with genetic models.