

RMS-SEPM talk April 2011

The Role of Avulsion during Valley Filling: examples from the Louisiana and Texas Gulf Coast

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Late Quaternary fluvial deposits in Louisiana and Texas illustrate how changes in accommodation and differences in sediment supply influence alluvial architecture. Holocene transgression produced accommodation space within river valleys that have filled to varying degrees. Rivers with small sediment supplies such as the Trinity and Nueces Rivers represent early stages of valley filling. Valley-fill deposits are thin and consist of channel-belt sands and minor overbank muds. Paleosols are moderately developed. The deposits reflect slow floodplain aggradation, frequent avulsion and channel reoccupation, and rapid sediment reworking.

In contrast, the Mississippi and Colorado Rivers represent late stages of valley filling. These rivers have almost completely filled the accommodation space produced by Holocene transgression. Valley-fill deposits are thick and consist of 3 units: 1) basal channel-belt sands, 2) overlying flood-basin muds that encase isolated sand bodies, and 3) channel-belt sands and overbank muds with weakly to moderately developed soils. The transition from mud-dominated flood-basin sediments with few soil features and isolated sand bodies to overlying channel-belt sands and overbank muds with abundant soil features reflects decreasing rates of accommodation production related to decelerating Holocene sea level rise. Rapid sea level rise caused early Holocene floodplain aggradation and favored flood-basin avulsion. Low accommodation and sea-level highstand conditions favored slow floodplain aggradation, channel-belt stability and the development of broad (10-15 km wide) channel-belt sand bodies, and floodplain soil development.

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