Architecture and Construction of a Mega-Scale Point Bar Complex, False River, Louisiana

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ABSTRACT

Although a basic understanding of how point bar deposits accumulate has been clear for some time models have been mostly based on studies of small- and medium-scale systems. In contrast, understanding how the largest-scale point bar depositional packages (25–30 m thick) are assembled is less developed and cannot be readily upscaled to predict observed high degree of lateral heterogeneity. Characterization of equivalent-scaled modern examples of such fluvial systems has the greatest potential to link processes to their true sedimentary products. We have examined the point bar related to the False River oxbow lake on the Mississippi River in Louisiana through a campaign of coring, and electrical conductivity and gamma ray logging, together with reflection seismic profiling in order to characterize the internal architecture and variation in facies. We seek to determine if there are defining characteristics in the sediments that accumulate in different parts of such point bar complexes. Initial results suggest that the head of the bar comprises a large portion of massive sand, while the tail is more heterogeneous in having silt and mud layers interleaved within a sandy background all the way from the top to the base where this bar sits on reworked Pleistocene gravels. This is especially true just before cut-off. Although a number of major reorientation surfaces are visible in the topography these are hard to clearly define in the subsurface. In general the point bar grain sizes fine downstream, like the smaller examples, but may also preserve some deposits related to the abandonment phase close to its final apex. Grain size data largely indicate a coarsening downwards in the bar at all sites, consistent with simple facies models, although in the bar tail area there are also significant intervals of muddy material throughout the section close to the time of cut-off. Expected trends in fining downstream around the point bar are harder to substantiate as there are coarse sandy sediments at the bar head, apex, and tail, although the bar tail does contain the bulk of finer-grained sediments, as does the apex immediately prior to cut-off. The bar head is home to the best sorted sediments, even if the grain size is not much different to other sand-rich sections.

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