GEOMORPHOLOGICAL CONTROLS ON THE SEDIMENTOLOGY OF LARGE BRAID-BARS IN THE RIO PARANÁ, ARGENTINA

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Alluvial facies models assume that river channel deposits can be represented by characteristic assemblages of sedimentary structures. The validity of these models depends on the variability in sedimentary facies within and between bars, and alongstream over 10s of km. This paper reports on ~40 km of Ground Penetrating Radar (GPR) data from seven sandy, mid-channel bars in a 100 km-long reach of one of the World’s largest multi-channel rivers: the Paraná River, Argentina. The investigated bars differ in size, shape, evolutionary history and location relative to the fine-grained Rio Paraguay tributary.

Spatial variation in radar facies within bars (st.dev. up to 31%) relates to differences in flow and sediment transport over the bars themselves and results in spatially uneven distributions. Variation in average proportions of radar facies between bars (st.dev. 10-20%) was related to differences in historical development and the channel-scale geomorphological setting. At a reach scale, the radar facies proportions differ between the sandy upper reach and the lower finer-grained reach of the Paraná. Fewer large-scale high-angle structures (4%) are found in the finer-grained downstream reach in comparison to the upstream reach (20-58%). This is attributed to differences in the ratio between bedload and suspended load.

Thus, the internal composition of channel deposits of large sandy braid-bars is closely linked to the geomorphology: at a (sub-)bar scale, at a channel scale, and at a reach-scale. These findings suggest that representative facies models can be defined for channel deposits at a range of spatial scales in geomorphologically uniform settings.