



Processes and mechanisms of morphological change in active meandering river channels

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Although several models of evolution and development of meander bends and meander trains have been produced and various theories and mechanisms of meander development have been proposed, the detailed distribution and mechanisms of erosion and deposition over a period of years in a series of bends have rarely been examined in the field in relation to the overall changes in morphology and movement of meanders. The extent to which the processes are systematic or variable needs analysis and the link between variable processes and systematic behaviour of meanders in the longer-term needs to be understood more fully. Models also need further testing.

Changes in meanders have been analysed using data on the River Dane in NW England, an active meandering river for which 25 years of ground data and periodic aerial surveys exist, and results are presented. These indicate that erosion tends to precede deposition in this system, that slow infilling in concave bends, in areas from which bends have migrated, forms a major component of the areas of deposition, but that deposition on mid-channel and point bars is much more rapid. Bars tend to form in relation to the bend morphology in this system and meander change is not due to bars moving through the system. The evidence therefore supports the bend theory of meander development. Although activity varies spatially, mainly with stage of bend evolution and effects of material variability, and temporally, mainly due to magnitude of flow events, overall these spatial and temporal variations become integrated to produce systematic changes in bend morphology that are largely autogenic.