

DECADAL TO CENTURY-SCALE SEDIMENT DYNAMICS IN THE RHINE DELTA

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The sedimentary dynamics of a lowland river system can be defined as the whole of processes that involve erosion, transport or deposition of sediment in the system – including the floodplains – on every possible spatial and temporal scale. The sedimentary dynamics of the river Rhine in the Netherlands have been influenced by many human activities in the past. A major human intervention has been the embankment around 1300 AD, by which the so far free meandering river was confined between dikes. Previous studies analyzed the impact of human interventions in the period after the embankment. The present study focuses on the sedimentary dynamics of the natural river Rhine. We reconstructed the amount of sedimentation and erosion that is involved with lateral migration of the river, and estimated the residence time of the sediment on the floodplain. Lateral migration was reconstructed with a one-dimensional bank erosion model. Lateral migration rates of meander bends were modeled based on channel parameters (e.g. bend radius, discharge) and bank material, all derived from detailed borehole reconstructions of sub-recent channel belts from previous studies. Model results will be used to compare the sedimentary dynamics of the natural river Rhine, with dynamics in human-influenced periods, and hence to predict present and future sedimentation and erosion processes. Moreover, results of reworked sediment volumes can be included in existing large-scale sediment budgets of the river Rhine to evaluate the dynamics within these slices.