



Modelling the effects of human disturbances on the flow and sediment dynamics of a large river floodplain.

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The flow and sediment dynamics of large river floodplains can be substantially affected by human disturbances like bridges and embankments. These effects are difficult to predict, mainly due to extent of the domain over which they can be important. In this contribution we present the application of a quasi-2D unsteady flow and sediment transport model of a large lowland river system, including its floodplain. We study the potential impact of a 56-km long road embankment constructed across the entire floodplain. The study area comprises a 208-km reach of the Paraná River between the cities of Diamante and Ramallo (Argentina) representing total a river-floodplain area of 8,100 km². The model uses an unstructured cells scheme to solve the water flow and sediment equations, relying on different simplifications of the 1D de Saint Venant equations to define the discharge laws between cells. The simulations allow for the analysis of the spatially-distributed transport and deposition of fine sediments throughout the river-floodplain and the backwater effects introduced by the structures. These dynamic changes are quantified for different extraordinary flood events.