



Modelling long-term sediment deposition in a river floodplain during continues flood events

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River floodplains act as a form of storage during high discharges in a river. As a floodplain generally has a lower energy environment, sediment aggradation commonly occurs over the period of time, which will reduce the overall storage capacity of the floodplain. Also, in a river system sediments are generally considered as the carrier of pesticides and metal contamination from the upstream catchment. Hence, studying sediment deposition in a floodplain is not only helpful for local flood risk assessment, but also can improve our understanding of the dispersion of contaminants associated with the transfer of sediment between a river and its floodplain. This study adopts a recently updated two-dimensional hydro-morphodynamic model based on the full shallow water equations to model a long-term spatial migration of Johnson Creek, Portland, Oregon and its floodplain. The 500-year, 100-year, 50-year, 10-year, as well as the recorded flood events during 1941-2014 were simulated. Suspended load with three grain-sizes was transported to the river along with the floods. The results indicate that about 30 - 45% of total sediment load is deposited in the floodplain for the studied return period floods. The spatial distribution and amount of short and long-term sediment deposition on the floodplain is demonstrated, and the resulting potential loss of flood storage capacity is analysed and discussed.