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Sedimentation patterns in floodplains of the Mekong Delta - Vietnam

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Quantification of floodplain sedimentation during the flood season in the Mekong Delta (MD) plays a very important role in the assessment of flood deposits for a sustainable agro-economic development. Recent studies on floodplain sedimentation in the region are restricted to small pilot sites because of the large extend of the Delta, and the complex channel. This research aims at a quantification of the sediment deposition in floodplains of the whole Mekong Delta, and to access the impacts of the upstream basin development on the sedimentation in the Delta quantitatively. To achieve this, a suspended sediment transport model is developed based on the quasi-2D hydrodynamic model of the whole Mekong Delta developed by Dung et al. (2011). The model is calibrated and validated using observed data derived from several sediment measurement campaigns in channel networks and floodplains. Measured sediment data and hydrodynamic model quantify the spatio-temporal variability of sediment depositions in different spatial units: individual dyke compartments, and the sub-regions Plain of Reeds, Long Xuyen Quadrangle and the area between Tien River and Hau River. It is shown that the distribution of sediment deposition over the delta is highly depended on the flood magnitude, that in turn drives the operation policy of flood control systems in floodplains of the Mekong Delta. Thus, the sedimentation distribution is influenced by the protection level of the dyke systems in place and the distance to the Tien River and Hau River, the main branches of the Mekong in the Delta. This corroborates the main findings derived from data analysis obtained from a small scale test site by Hung et al, (2011, 2012a). Moreover, the results obtained here underlines the importance of the main channels for the sediment transport into the floodplains, and the deposition rate in floodplains is strongly driven by the intake locations and the distance from these to the main channels as well.