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Data assimilation of historical and recent land use information for a sustainable flood management

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The flood events of the last decade showed remarkable uncertainties regarding the estimated stage values of the hydrological statistics for the Elbe river. Especially the differences in the classification of the return period of the same flood at different gauging stations along the river clarified the complexity of an adapted flood management in practice. But to understand such differences, uncertainties or even mistakes concerning the used statistic values or their interpretation, it's necessary to know essential information about the affected areas. Therefore the focus of this work deals with methods and results of data assimilation of historical and recent land use information. It's the purpose to document their state during the period of data recording and the hence derived and nowadays used hydrological statistic. Then flood management needs feasible values of discharge and water levels as well as of roughness for best possible hydraulic simulations. Beside the already mentioned view, the investigations focused on three main objectives. First, the methods of data collection of all available documents, which describe the structure and state of the land use and with it the roughness in the floodplain areas since 1850 along a 300km section of the middle Elbe in Saxony-Anhalt, Germany. The second objective deals with the evaluation of these historical and recent states of land uses and their influence of water levels during floods. In this context, changes of the spatial distribution of vegetation types or agricultural used areas in floodplains and their importance to the flood management is regarded. The objective of the third point contains the hydraulic simulation with the surveyed states of historical and recent land use distributions to get adapted water levels and inundation areas. With these concluding results an approach is given to improve the evaluation of long-term measures for the flood management like the construction of embankments or the kind of land use management in floodplain areas.