

The effects of urbanization on catchment storage capacity of surface water –a conceptual model in plain catchment in Yangtz river delta

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Hydrological processes in Yangtze river delta area have been significantly changed due to rapid urbanization in the last 30 years. A conceptual model involving four modules - river network, lakes/reservoir, wetland/floodplain, and ecological land use –was proposed to evaluate the surface water storage capacity, as well as its temporal variation and its structural sensitivity from 1980s to 2010s in Qinhuai River Basin, Yangtz River Delta. The data sources include MSS/TM images, thematic maps, Digital Elevation Model, and gauged hydrological data from 1980s and 2010s. The main findings indicated that, 1) the main driver of the storage variation is the construction land expanded and forest decrease; 2) although the total water area increased, the complexity and stability of river network declined; 3) the surface water storage capacity of Qinhuai river catchment decreased by 13.45%, from $207 \times 10^6 \text{ m}^3$ to $179 \times 10^6 \text{ m}^3$ during the study period; 4) the lake/reservoir storage is the most sensitive module to the urbanization, while the river network module serves as main contributor to the total storage. More effects should be made in the protection and restoration of the low-level rivers, forest and wetlands to protect and restore the catchment storage capacity. The results of the study would provide support in policy formulation and intervention strategies.

Keywords: Storage capacity, urbanization, conceptual model, effect analysis, Yangtze River Delta

