

Prediction of the effect of huge structures on eco-hydrological changes in Changjiang Basin

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Abstract Increasing frequency of severe floods on the middle and lower Changjiang (Yangtze) River during the past few decades is attributed to abnormal monsoon rainfall, various landscape changes and levee construction. Here, the process-based National Integrated Catchment-based Eco-hydrology (NICE) model was developed further for controlled discharge release at reservoirs to predict the impact of the Three-Gorges Dam (TGD) and South-to-North Water Transfer Project (SNWTP) on eco-hydrological changes. The model predicted that TGD might promote flood risk during the early summer monsoon (contrary to original justifications), and that morphological change over the long-term would promote the flood risk. This indicates the importance of managing both flood discharge and sediment deposition for the entire basin. Furthermore, time-integrated NDVI (TINDVI) estimated from satellite images during the past two decades showed generally decreasing trends beside the lakes, which indicates that the increase in lake reclamation and the resultant decrease in rice production were closely related to the hydrologic changes.

Key words Changjiang River; eco-hydrology model; flood risk; South-to-North Water Transfer Project; Three-Gorges Dam