

Assessment of water quality under changing climate conditions in the Haihe River Basin, China

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Abstract For the purpose of underpinning the technical requirements of saving energy and reducing emissions, this study attempts to construct a model, which aims to demonstrate the process of “pollutant production–discharge into rivers–transformation–discharge into seas” by choosing regular pollution indices as a research objective on a macroscale for a long period. This study focuses on the construction, calibration and verification of an integrated simulation model on water quantity and water quality for the Haihe River Basin, China, which has serious water shortages and pollution. The basin is divided into smaller units, including 3067 sub-basins and 11 752 contours, and in each unit pollutant loads are evaluated. The model has sufficiently high precision that it can be used to support water resources protection and water environment management. The study reported herein produced initial outcomes of the water pollution equilibrium status and made a preliminary exploration into integrated management of water resources and pollutant balance. The results indicated that the water quality has been degrading since the 1980s and is projected to continue to degrade in the context of climate change. The underlying reason behind the current situation is the continued pollutant discharge into the river, particularly during dry seasons when the low flow is insufficient to dilute the pollution. Concurrent with the river water quality degradation, groundwater and soil pollution further deteriorated. Therefore, it is advisable for the relevant departments (soil or land management and groundwater) to focus on controlling pollutant sources and remediation of contaminated areas.

Key words water quantity; water quality; assessment; China