

## Modelling water re-uses of a tank cascade irrigation system based on satellite and field observations

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**Abstract** Many canal irrigation systems in southern China are supplemented by numerous surface storages, which are often connected to one another, leading to improved flexibility in managing water. This study aims to examine the role of storage cascades in capturing and re-using return flows through water balance modelling based on satellite and field observations. The weather data, irrigation application, and pond water level have been monitored in two selected cascades, and a water balance model is developed to account for the dynamic water balance with inputs from remote sensing and GIS analysis. The results showed that, on average, each storage structure is connected to 4.8 others, facilitating intense water re-use in the region. The return flows captured by cascades account for up to 20% of irrigation diversions. However, there are significant losses during the redistribution processes. Remote sensing and GIS-based analysis have proved powerful techniques in parameterizing complex hydrological processes.

**Key words** irrigation system; tank cascade; water balance; remote sensing