

## **Assessing the effect of vegetation change on actual evapotranspiration through a hydrological model**

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**Abstract** Vegetation has a direct effect on the regional evapotranspiration (ET) regime and relevant hydrological processes. Land cover data, classified from original Landsat images of different periods, were used to estimate vegetation change within the Laohahe basin, China. Then, the Variable Infiltration Capacity (VIC) macroscale hydrological model was applied to calculate the corresponding changes in actual evapotranspiration (AET). The VIC model performed well in simulating monthly runoff over the Laohahe basin, with a correlation coefficient, Nash-Sutcliffe efficiency coefficient, and bias of 0.9, 0.88, and 2%, respectively, during the calibration period of 1965–1971, and 0.8, 0.8, and 6%, through the verification period of 1972–1976. The correlation coefficient between annual AET computed by the VIC model and by an empirical equation was up to 0.745. Based on the VIC-simulated annual AET, it is known that vegetation change has exerted an influence on AET both temporally and spatially within the study area.

**Key words** Variable Infiltration Capacity (VIC) model; actual evapotranspiration; vegetation change; Laohahe basin