

Evapotranspiration Estimation over Yangtze River Basin from GRACE satellite measurement and in situ data

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Abstract: As the critical component of hydrologic cycle, evapotranspiration (ET) plays an important role in global water exchanges and energy flow across the hydrosphere, atmosphere and biosphere. Influenced by the Asian monsoon, the Yangtze River Basin (YRB) suffer from the several severe floods and droughts over the last decades due to the significant difference between temporal and spatial distribution terrestrial water storages. As an indispensable part, it is practically important to assessment ET in the YRB accompany with increased population and rapid economic and agriculture development. Average ET over the YRB is computed as the residual of terrestrial water budget using the Gravity Recovery and Climate Experiment (GRACE) satellite-based measurements and the ground-based observations. The GRACE-based ET were well coincidence with the ET from MODIS, with the correlation coefficient of 0.853, and the correlation coefficient is 0.696 while comparing with the ET ground-based observation. The mean monthly average of ET from these various estimates is 56.9 mm/month over the whole YRB, and peak between June and August. Monthly variations of ET reach a maximum in Wujiang with 69.11 mm/month and a minimum in Jinshajiang with 39.01 mm/month. Based on the correlation between ET and independent estimates of near-surface temperature and soil moisture, it is showed that as the temperature increased, the ET of the seven sub-catchment were rising except for the Poyang Lake and Dongting Lake. And we also can infer that the midstream of YRB is significant correlated with ESON especially in the Hanjiang basin. The Surface Humidity Index over the YRB was gradually decreased and its variations in each sub-catchment showed a significant decreasing trend in Jinshajiang and Mingjiang. This research has important potential for use in large-scale water budget assessments and intercomparison studies.

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