

- Geoinformation, 2004,5(2):129-140.
- [30] 胡继超,张佳宝,赵炳梓,等. 冬小麦冠层阻力日变化的估算[J]. 灌溉排水学报, 2005,24(2):1-4. (HU Jichao, ZHANG Jiabao, ZHAO Bingzi, et al. Estimating diurnal variation of winter wheat canopy resistance at different growth stages [J]. Journal of Irrigation and Drainage, 2005,24(2):1-4. (in Chinese))
- [31] Liu G, Liu Y, Xu D. Comparison of evapotranspiration temporal scaling methods based on lysimeter measurements [J]. Journal of Remote Sensing, 2011.
- [32] Malek E, Bingham G E, McCurdy G D. Continuous measurement of aerodynamic and alfalfa canopy resistances using the Bowen ratio-energy balance and Penman-Monteith methods[J]. Boundary-Layer Meteorology, 1992,59(1-2):187-194.
- [33] Choudhury B J, Reginato R J, Idso S B. An analysis of infrared temperature observations over wheat and calculation of latent heat flux[J]. Agricultural & Forest Meteorology, 1986,37(1):75-88.

### Comparative Analysis of Temporal Scale Expansion Methods for Evapotranspiration over Semi-arid Areas

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**Abstract:** Evapotranspiration (ET) temporal scale expansion methods play an important role in ET remote sensing. This study aimed to compare and assess the accuracy of seven temporal scale expansion methods. Based on the measured data of the observed flux site located in the Walnut experimental basin in the southwestern United States, it analyzed the estimation effect of seven methods: evaluation of the constant evaporative fraction method, the simplified evaporation fraction method, crop coefficient method, simplified crop coefficient method, sinusoidal relation method, canopy resistance method and modified canopy resistance method. The results show that the 7 methods are consistent in the overall trend, and the simulation precision of the revised crop coefficient method, simplified crop coefficient method and the simplified evaporation fraction method (relative root mean square error is about 20 %) are much higher, which are suitable to estimate the daily evapotranspiration in semi-arid areas. For the areas with similar climate, meteorological conditions, underlying surface conditions, spatial scale data and with enough meteorological observation data, the temporal scale expansion method based on the improved crop coefficient is recommended to extend the time scale from the hour to the day. For the similar areas without meteorological observation data, the sinusoidal method and simplified evaporation fraction method are recommended for temporal scale expansion.

**Key words:** evapotranspiration (ET); temporal scale expansion; evaporative fraction; crop coefficient, sine relation; canopy resistance; uncertainty analysis

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