

Evapotranspiration and Priestley-Taylor α in tallgrass prairie and winter wheat ecosystems.

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Eddy covariance measurements of evapotranspiration (ET) were made in two ecosystems (tallgrass prairie and winter wheat) in north-central Oklahoma. We will present the seasonal dynamics of the actual and equilibrium evapotranspiration from these ecosystems using three years of observations, and will examine the long-term variability in actual and equilibrium rates in terms of their sensitivity to total and green foliage area index, soil moisture, and management practices. We will also examine the variation of the ratio of actual to equilibrium evapotranspiration (Priestley-Taylor coefficient, α) over the growing season. We will present a simple empirical adjustment to compute actual ET from equilibrium ET using the Priestley-Taylor α , corrected for variations in soil moisture and leaf area. We will construct such adjustment using 1999 data from tallgrass prairie and then apply this adjustment to other years of data from the tallgrass prairie and to all the data from the winter wheat. We will show that using an adjusted α (instead of $\alpha=1.26$) considerably improves the calculation of the actual ET for the prairie and wheat ecosystems.