2.3.6 Stephens-Stewart Method

Stephens and Stewart (1963) introduced a radiation method adjusted for mean monthly temperature and calibrated it against 30 months of *ET* data from St. Augustinegrass growing in non-weighing lysimeters at Fort Lauderdale, Florida.

$$ET_p = 0.01476\ (T_m + 4.905)\ MR_s/\lambda \tag{17}$$

where ET_p = monthly potential *ET* in mm
T_m = monthly mean temperature in °C
MR_s = monthly solar radiation in cal/cm^2, and
λ = latent heat of vaporization of water, $59.59 - 0.055\ T_m$, cal/cm$^2 \cdot$ mm.

This method was called the "Fractional Evaporation-Equivalent of Solar Energy" method by Stephens and Stewart, but it is essentially the same form as the original Jensen and Haise (1963) method that has been used frequently under western conditions. Stephens (1965) determined coefficients for data from Waynesboro, North Carolina, and Davis, California, and for western and midwestern crops reported by Jensen and Haise (1963). The slope of the line increased with increasing aridity of the location of the *ET* data sets, which implies greater *ET* per unit of solar radiation energy as aridity (or saturation vapor pressure deficit) of the climate increases.

2.4 POTENTIAL EVAPOTRANSPIRATION FOR VARIOUS REGIONS IN FLORIDA

Seven climatological districts are defined for Florida by the National Climatic Center for reporting climatological data: northwest, north, north central, south central, Everglades and southwest coast, lower east coast, and Keys. These seven districts are located within the range from 24°30′ to 31° north latitude. Three weather stations located within this range of latitudes were selected as examples to demonstrate the techniques of the Penman method used to compute the potential *ET* for various regions of Florida. These three stations selected were Hialeah (25°50′ N. lat., 80°17′ W. long.), Lakeland (28°01′ N. lat., 81°55′ W. long.), and Milton (30°47′ N. lat., 87°08′ W. long.). (See Figure 2.)

Estimates of surface albedo are required for applying the Penman equation (Equation 10) to calculate ET_p. As discussed earlier, surface albedo is not constant but varies with ground cover, soil type, and crop stage of growth. Because of the difficulty in estimating seasonal changes in surface albedo, one approach for applying the Penman method is to use an albedo for a free water surface ($\alpha = 0.05$) to estimate potential evaporation rate for a free water surface (E_o), and then to multiply that