110. Evapotranspiration Evalu ated over Paddy Rice Field by Bowen Ratio - Heat Balance Method

Korea Meteorological Service

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열수지 - 보웬비법에 의한 수도포장의 증발산에 관한 연구

중앙기상대

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I. Objectives

Actual evapotranspiration was measured over rice paddy field by Bowen ratio heat balance method and based on this, investigated was the reliabi lity of evapotranspiration estimation from class-a pan and small pan evaporation and reference evapotranspiration calculated by modified Panman - Monteith model.

II. Methods

This experiment was carried out in the paddy rice field of Suwon Weather Forecating Office sown with Samkwang rice variety in 1987. Actual evapotranspiration was measured by Bowen ratio heat balance metrhod with BEARN system(Bilan D'Energie Automatique Regional Numerique, I,N,R,A), composed of four pairs of psychrometer, a net radiometer, a soil heat flux meter,a electronic box for microprocessing and a print. Class-A pan and small pan evaporation were measured at the weather observation field covered with short grass. And Reference evapotranspiration based on modified Penman-Monteith model was calculated from the routine weather observation data of Suwon Weather Forecasting Office.

III. Results

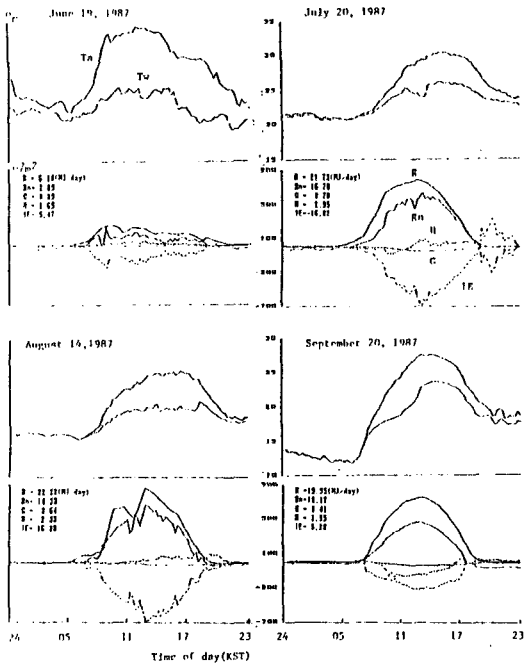
1. Net radiation partitioned to evapotranspiration varied from 10 to 90 percent, being smallest at the end of growing season.

2. Daily actual evapotranspiration varied in the range of 0.1mm to 8mm according to weather condition through growing season.

3. Daily mean of albedo varied from 0.15 to 0.25, increasing linearly with leaf area expansion upto 4 of LAI and thereafter showing gentle increase.

4. Crop coefficient based on Class - A pan and small pan evaporation and reference evapotranspiration by modified Penman - Monteith model were averaged to be 1.57, 1.10 and 1.49 over the whole rice growing season, respectively. their respective coefficients of variation were 28.7, 22.7 and 12.8 percent.

5. Crop Coefficient based on modified Penman - Monteith model varied in good agreement with the trend of leaf area development, being greatest around heading stage.



Diurnal march of the energe balance components evaluated over Samgwang rice. net radiation; Gground heat flux; Hsensible heat flux; lElatent heat flux); air temperature; Twwet air temperature).

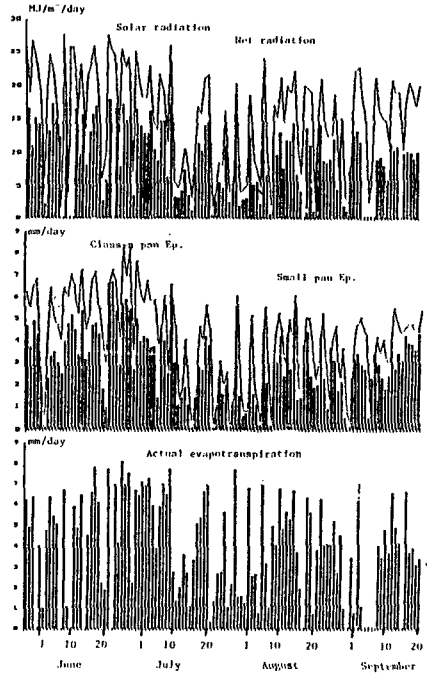
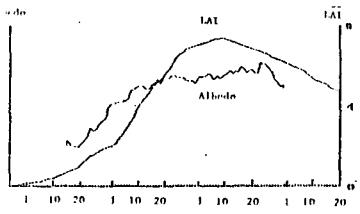


Fig.2 Seasonal variations in actual evapotranspiration measured by Bowen ratio-heat balance method, pan evaporations, solar and net radiation during the period from 28 May to 20 September, 1987.



Seasonal changes in albedo and leaf area index(LAI) ated over Samgwang rice.

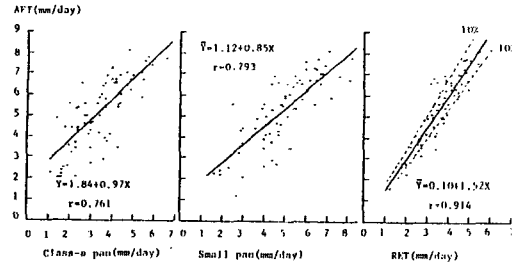
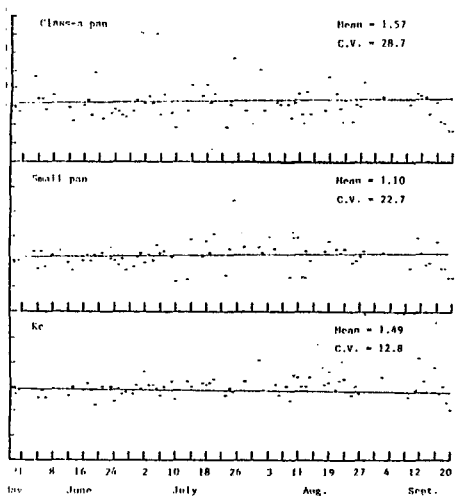


Fig. 4 Comparison of actual evapotranspiration(AET) from rice field measured by Bowen ratio-heat balance method with pan evaporation and reference evapotranspira (PET) calculated by the Penman-Monteith model.



Seasonal variation in evapotranspiration ratios based on class-a small pan, and crop coefficient(Kc) calculated by the Penman-Monteith

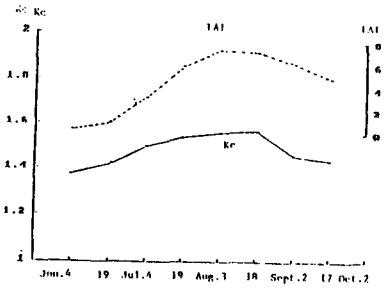


Fig. 6. Seasonal change in leaf area index(LAI) and crop coefficient(Kc) based on Penman-Monteith model. Crop coefficients coefficients are the values averaged over 15days centering on the data in the figure.