E1-09: Estimation of solar radiation at Lunuwila

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Angström formula developed using world geographical relationship in 1924, is still being extensively used to estimate solar radiation (**SR**) as **SR** values are not readily available.

In Sri Lanka, only 4 locations have regular records on **SR**. Samuel (1991) established separate equations to determine the 2 regression coefficients of the Angström formula to suit any location in Sri Lanka and thus for a given duration 3 sets of coefficients (either on monthly basis or yearly basis or monthly basis between years) can be computed. In this study it was found that when separate coefficients were used on a monthly basis between years for the period 1976 to 1992, monthly **SR** gave the highest significant correlation ($P = 0.001$) with the monthly sunshine (**SS**) records for each of the 17 years as well as for the entire duration (1976-92). Irrespective of time, the relationship can be modelled by an unique equation:

$$\mathbf{SR} = 2.6388 + 0.7216*\mathbf{SS} \quad (R^2 = 92^{***})$$

and there was no serial correlation in the residuals. It was found that the **SR** values obtained using this model for the entire period and the corresponding values obtained from the Angström formula were similar and all the student residuals were extremely low. Thus, monthly solar radiation at Lunuwila (7°20' N; 71°53'E; 30.5m) can be easily computed using sunshine duration records only. In addition to the importance of this information in agriculture, to predict reference crop evaporation (ET_o) the model will be useful in other areas as well.