DEVELOPMENT OF A KNOWLEDGE BASE FOR THE OPTIMUM UTILIZABILITY OF THE AVAILABLE SOLAR RADIATION OVER SRI LANKA

K. PERERA AND T.D.M.A. SAMUEL

Department of Engineering Mathematics, Faculty of Engineering, University of Peradeniya

Sufficient knowledge of the Solar Radiation over the country has to be built up to enable Solar Energy to have a tangible impact on the energy scene in the country. To achieve this three areas have to be examined. The sensors, method of data collection and the analysis of the collected data. The data with human errors collected from Class 3 sensors have been analyzed and estimates of Global Radiation are available. Iso-radiation maps have been produced with these data.

As the next stage of development, the following are possible:

(a) Liu & Jordan in their method take the function that describes the correlation that exists between Diffuse and Global Radiation data available at that time. Then they use the resulting cumulative distribution function to calculate the Diffuse Radiation in locations which do not have measured values. Unfortunately their method is location specific and their data is from a specific region of the USA.

(b) It is also possible to improve the frequency distribution function.

In order to improve the frequency distribution function, data of good quality is necessary. This is now available in the Solar Research Laboratory. They may be described in the following way:

(a) Data collected for the period 1986-1991 using Class 1 Pyranometers with automated data collection. Data is recorded on fanfold chart. A software developed to digitize this is being tested.

(b) Data is collected using Li-Cor sensor and CR10X data logger and stored in the computer.

With the improvement of the quality and quantity of data it must be possible to give improved description of the distribution function. A suitable distribution function, but not popularly known, is the Generalized Lambda Distribution. This includes a wide variety of curve shapes. This function has four parameters which takes into account the four moments, mean, variance, skewness and kurtosis. Its versatility is demonstrated for different quality data in very different climatic conditions.