

LETTERS TO THE EDITORS

Letter to the Editors—Correction

Dear Sirs,

In Vol. 24, pp. 113–115 you kindly printed a letter from me concerning collector equations. I am grateful to George Lóf who has correctly drawn my attention to the fact that the statements made in that letter apply to *liquid* collectors (i.e. collectors in which the temperature difference between plate and fluid is small), a fact inadvertently not stated: thus the simplifications

used and assumptions made would, in general, not be applicable to air collectors.

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The probability distribution of terrestrial irradiation

Dear Sirs,

There is a disagreement regarding the probability distribution of terrestrial irradiation that is not widely discussed. It is our intent that this letter, by highlighting representative contributions, will assist in clarifying some of the important issues. Since any stochastic solar model must make certain assumptions regarding the characteristics of terrestrial irradiation, it is important to clearly understand its true distribution.

The following publications have addressed this issue and to provide some perspective are listed in chronological order:

1. Bennett (1967) studied *daily* irradiation data from 57 U.S. and 27 Canadian stations. He found the distribution of daily data to be skewed.
2. Baker and Klink (1975) demonstrated that the distribution of *weekly* data in the North Central U.S. was skewed.
3. Brinkworth (1977) autoregressed *daily* means and found symmetric residual error distributions which "resemble those of normal distribution." He did not conduct an in-depth analysis nor statistically prove that daily mean irradiation is normally distributed.
4. Getz and Nicholas (1979) compiled probabilities and extremes by *climate week* from several U.S. stations. However, the question of the underlying distribution was not addressed. They employed rehabilitated (Solmet) data.
5. Mustacchi *et al.* (1979) divided *hourly* insolation measurements collected in Italy by a deterministic component to obtain a "transmittance" variable. The distribution of this variable was bimodal and skewed.
6. Sfeir (1980) built a stochastic model of solar system performance based upon the assumption that: "The average *daily* insolation consists of daily fluctuations superimposed on the seasonal change due to the variation of solar declination. Daily fluctuations have a normal distribution about the mean for interval durations not exceeding a month. These facts have been shown to be approximately true in a recent study by Brinkworth. The departure of the distribution of H_O from the normal distribution will be neglected..." Interestingly, Sfeir indicates that his model "gives results that agree well with those predicted by the F-chart".

The authors have recently begun some research on the stochastic nature of terrestrial irradiation and some preliminary results are given in Refs. [7] and [8] that extends the work cited in Refs. [1–5].

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