

**ANALYSIS OF THE SOLAR RADIATION DATA AND THE
DETERMINATION OF REGRESSION COEFFICIENTS FOR
VHEMBE REGION, LIMPOPO PROVINCE**

A Dissertation Submitted to the Department of Physics

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By

MULAUDZI TSHIMANGADZO SOPHIE

STUDENT NUMBER: 11553991

In the School of Mathematical and Natural Sciences,

University of Venda,

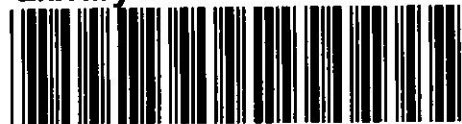
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Supervisor : Prof. V. Sankaran, UNIVEN

Co-supervisor : Dr. M. D. Lysko, CSIR

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ABSTRACT

An attempt has been made to determine the regression coefficients from sunshine hours for the Vhembe Region, Limpopo Province. Parameters such as horizontal average daily extraterrestrial solar radiation (H_o) and daily possible sunshine hours (N) were computed. Horizontal average daily global radiation data and daily actual sunshine hour data for the five stations in this study were obtained from Agricultural Research Council (ARC) and South African Weather Services (SAWS).

The plots of monthly average daily relative sunshine hours ($\frac{N_o}{N}$) versus clearness index ($\frac{H}{H_o}$) were drawn to determine the values of a and b of Angstrom – Prescott linear equation (where N_o and H represent the actual sunshine hours (in hours) and global solar radiation on the horizontal surface (in MJ) respectively). The variables a and b are the regression coefficients. The results obtained are discussed. From the computations, the values of a and b for Vhembe Region are calculated and the results obtained are compared with the regression coefficients for different countries.

The regression coefficients from a station with the best correlation of the coefficients were used to compute the estimated average monthly horizontal global solar radiation for the other four stations and the results compare favourably with our data.