

**DEVELOPMENT OF A METEOROLOGICAL DATABASE
ALGORITHM FOR RADIO CHANNEL EVALUATION**

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ABSTRACT

This study developed an instrumentally and computationally efficient linkage between a meteorological database' and the performance of a radio communication channel by determining the effect of meteorological conditions on the range of frequencies suitable for radio waves under varying meteorological conditions. It also developed an algorithm for evaluating radio channels from meteorological data with a view to predicting the emerging radio communication characteristics.

Radio meteorological data, including net radiation, were extracted from the meteorological database of an experiment conducted at the campus dam site of the Obafemi Awolowo University, Ile-Ife, by the micrometeorology group of the Physics Department in October/November, 1998. The values of motivation of net radiation were estimated and used in calculating the equivalent earth radius factor (K) using the market paradigm. The hourly minimum, maximum, median and average values of K were subsequently evaluated.

The results showed that the variation of the equivalent earth radius factor (K) with time had a direct application in describing the propagation properties of radio waves in terms of "diffraction", "reflection", "refraction", "extinction", "attenuation": and "ducting" modes. The median values of K evaluated were applicable in the description of climate types and weather conditions. The hourly-average values of K were found suitable in describing and predicting the real-time channel evaluation of the range of frequencies suitable for radio wave propagation. The statistical distributions of the values of K were found to be a random function of time.

The study concluded that the meteorological database algorithm (MEDAL) developed was suitable for carrying out the real time channel evaluation of radio communication frequencies and in the estimation of the equivalent earth radius factor (K).