



# Microwave Propagation and Remote Sensing: Atmospheric Influences with Models and Applications

*Pranab Kumar Karmakar*

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## **Microwave Propagation and Remote Sensing: Atmospheric Influences with Models and Applications**

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Because prevailing atmospheric/tropospheric conditions greatly influence radio wave propagation above 10 GHz, the unguided propagation of microwaves in the neutral atmosphere can directly impact many vital applications in science and engineering. These include transmission of intelligence, and radar and radiometric applications used to probe the atmosphere, among others.

Where most books address either one or the other, **Microwave Propagation and Remote Sensing: Atmospheric Influences with Models and Applications** melds coverage of these two subjects to help readers develop solutions to the problems they present. This reference offers a brief, elementary account of microwave propagation through the atmosphere and discusses radiometric applications in the microwave band used to characterize and model atmospheric constituents, which is also known as remote sensing.

Summarizing the latest research results in the field, as well as radiometric models and measurement methods, this book covers topics including:

- Free space propagation
- Reflection, interference, polarization, and other key aspects of electromagnetic wave propagation
- Radio refraction and its effects on propagation delay
- Methodology of estimating water vapor attenuation using radiosonde data
- Knowledge of rain structures and use of climatological patterns to estimate/measure attenuation of rain, snow, fog, and other prevalent atmospheric particles and human-made substances

- Dual/multifrequency methodology to deal with the influence of clouds on radiometric attenuation
- Deployment of microwaves to ascertain various tropospheric conditions
- Composition and characteristics of the troposphere, to help readers fully understand microwave propagation
- Derived parameters of water, free space propagation, and conditions and variable constituents such as water vapor and vapor pressure, density, and ray bending

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