

# Ionospheric Perturbations from VLF Transmitter Signals

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The use of very-low frequency (VLF) transmissions propagating inside the waveguide formed by the Earth and the lower ionosphere is a well developed technique for probing conditions within the waveguide. This presentation seeks to discuss the use of VLF propagation as a long-range probe into the electrical properties of the upper atmosphere. Changes in the characteristics of the waveguide, some of which are associated with thunderstorms, produce changes in the electrical properties. Therefore, one can examine the changes through variations in the received phase and/or amplitude of VLF transmissions. Particular emphasis will be placed upon events which appear to be produced directly by lightning discharge processes, and lightning properties deduced from the VLF radiation from the lightning itself.