

IONOSPHERIC SIGNATURES OF SOLAR FLARES

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VLF waves propagate in the Earth-ionosphere waveguide (EIW). The EIW is bounded below by the surface of the Earth and above by the ionospheric D-region (50–90 km altitude). The D-region is maintained by shortwave solar radiation that ionises the neutral atmosphere. The Wait parameters, H' (reflection height) and B (sharpness), describe the lower boundary of the D-region. Any enhancement in solar X-rays modify these parameters, leading to a change in the propagation conditions for VLF signals in the EIW. A case study is presented for such an event which occurred as a result of a solar flare. H' and B are calculated from the VLF signals by the Long Wave Propagation Code (LWPC). It was found that H' lowered and B increased at the time of flare. Once H' and B are obtained, the electron density profile can be constructed that is of crucial importance for VLF waves propagating in the EIW. It's showed that all the modal interference minima are moved towards the transmitter at the time of the flare. For flares of great magnitude, extrapolation is required to classify flare in a magnitude class. It's showed that the change in the phase of the VLF signal is proportional to the logarithm of the change in the flux.

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