

Responses of different atmospheric electricity parameters, VLF sferics and subionospheric transmitted signal towards solar eclipse of July 22, 2009

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Abstract

The global thunderstorm and lightning activities maintain the atmospheric vertical electric field near the earth's surface. Thunderstorm and lightning discharges generate electromagnetic signals, named as sferics, which propagates throughout the globe along the Earth-ionosphere waveguide.

Various geophysical events, viz., solar flare, earthquake, cyclones, meteor showers, geomagnetic activities etc., have significant influences on the sferics amplitude, amplitude and phase of subionospherically propagated signals, vertical electric potential gradient and other related parameters. At the time of occurrence of solar eclipse, the solar flux is reduced progressively relative to the uneclipsed value thereby reducing the ionization of the ionospheric constituents resulting in an increase in the height of the D-region. This puts its signature on the records of the global electricity parameters. The observational results of several such parameters over Kolkata (lat: 22.56° N, long: 88.5° E) during the period of partial eclipse on July 22, 2009 will be reported here. The observed variations in each of the cases over their ambient value have been interpreted.

To monitor the said parameters, several experiments are being conducted at Kolkata on a continuous basis. Significant changes have been noticed in their values during the period of occurrence of the eclipse than their ambient values for the same period in the adjacent five days.