

**Observations of Surface Atmospheric Electric Potential Gradient and  
Boundary Layer Parameter during the Total Solar Eclipse of October 24,  
1995**

**G K Manohar, S S Kandalgaonkar, K G Vernekar and H K Trimbake**  
Indian Institute of Tropical Meteorology Pune 411 008, India

**Abstract**

A study of the impact of a total solar eclipse (TSE) on surface atmospheric electricity was made using observations of surface electrical potential gradient and boundary layer parameters during the TSE of 24 October 1995 and on three control days (22, 23 and 25 Oct 1995) at Robertsganj (24° 52' N 83° 04' E 220 m above m s l), U P India. The potential gradient was measured by the conventional method of freely exposing a radioactive probe at 1 m above ground level and the use of operational amplifier circuit. The boundary layer parameters were monitored by using appropriate sensors and the sophisticated electronics.

The most noteworthy feature of the potential gradient, during the eclipse period was the remarkable drop in their perturbations. On the control days also the positive potential gradient showed a similar drop near about the time of the start of the eclipse. However, there after the drop in the potential gradient appeared to be suppressed but the perturbations are seen strong and regular althroughout the observation period. This feature was unlike on the eclipse day. The net drop in the potential gradient on the eclipse day with respect to its initial value ( $1350 \text{ Vm}^{-1}$ ) was  $\sim 95\%$  while on the control days it was  $\sim 50\%$  respectively. The extra drop in the potential gradient on the eclipse day may be attributed to the development of the stable stratification of the surface atmosphere due to inhibition of the insolation as may be seen from the drop in temperature and wind and soil surface heat flux.