

## **Dynamical Response of the Middle Atmosphere at Trivandrum during the Solar Eclipse 2009/2010**

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The Sun's radiation being the basic energy input for the atmospheric phenomena, a sudden obscuration of the radiation during a solar eclipse triggers severe changes in the atmospheric structure and its dynamical state. A study of these effects occurring during the solar eclipse will lead to a better understanding of some of the basic processes involved in the atmospheric phenomena. Earlier eclipse related observations could reveal cooling followed by changes in horizontal winds, changes in the tropopause height, temperature perturbations and associated wind variations in the stratospheric and mesospheric regions etc.

To study the temperature and wind perturbations in the middle atmospheric region and also to look into the structure and properties of waves generated in association with eclipse, GPS sonde flights were conducted on 22 July 2009- the eclipse day and on control day -23 July 2009 from Trivandrum/TERLS (8° N) around 0530 hrs (close to maximum obscuration), 0615 hrs and 0730 hrs. During the annular eclipse on 15 January 2010 and on control day 14 January, GPS sonde and RH 200 flights and radar observations were also conducted before (0800 hrs, 1000hrs), during (around 1300 hrs) and after (1500 hrs) the eclipse event. The analysis of temperature and wind profiles showed significant variations in temperature and winds around tropopause and in the 25-30 km height region. The delayed effect of eclipse could be seen more pronounced in the horizontal winds rather than in temperature. Removing the contribution of equatorial waves from the observed wind profiles, the shorter period variations in wind could be derived. Wavelet analysis of these variations and the hodograph analysis could bring out the changes in the characteristics of these fluctuations on the eclipse day compared to the control day.