



Ionospheric behaviour over Europe during the solar eclipse of 3 October 2005

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An annular eclipse occurred on 3 October 2005 which provided a good opportunity to study the ionospheric/thermospheric response to solar radiation changes. Since the electron density peak behaviour of the F2 layer follows the local balance of plasma production, loss and transport, the ionospheric plasma redistribution processes significantly affect the shape of the electron density profile. These processes are discussed here based on a comparison of vertical incidence sounding and total electron content data above selected ionosonde stations in Europe. The equivalent slab thickness, derived with a time resolution of 10 minutes, provides valuable information on the variation of the electron density profile shape during the eclipse. As the TEC measurements indicated, the photo production was reduced during the event in comparison with the neighbouring days. The supersonic motion of the Moon's shadow through the atmosphere is capable of generating atmospheric gravity waves at ionospheric heights. Since the eclipse occurred on a geomagnetically quiet day, there were particularly good conditions for detecting and studying wavelike phenomena. Doppler shift spectrograms were recorded by an HF Doppler sounder during the eclipse showing that a distinct disturbance is observed in the band of maximum eclipse during its main phase. However, the disturbance is almost not distinguishable from locations about 200 km outside this band, which differs from previous measurements carried out during the solar eclipse of 11 August 1999.