

IONOSPHERIC EFFECTS OF THE SOLAR ECLIPSE OF MARCH 9, 1997,
AS DEDUCED FROM DATA FROM THE GPS-RADIO INTERFEROMETER
AT IRKUTSK

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This paper presents data from first measurements of total electron content (TEC) and its gradients during the solar eclipse of March 9, 1997, obtained with the GPSINT GPS-radio interferometer at Irkutsk. The interferometer consists of three receivers (one TurboRogue SNR-8000, and two Ashtech Z-12) located at the vertices of a triangle and spaced by about 3--5 km. The measured TEC variations are indicative of profound changes in the ion production process in the ionosphere attendant on the solar eclipse, simultaneously in a large volume of space with a radius of 300 km at 300 km altitude. The delay of a minimum value of TEC with respect to the maximum phase of eclipse at 300 km altitude ranges from 10 to 34 min, and the depression depth of TEC growth varies from 10 to 50%. By analysing the data on TEC gradient variations, one is led to conclude that the depression of TEC growth during the eclipse is essentially independent of the latitude (within the observation range $52 \pm 4^\circ\text{N}$), and longitude ($104 \pm 6^\circ\text{E}$).

Keywords: acoustic gravity waves; GPS; ionosphere; SADM; solar eclipse; transionospheric sounding; travelling ionospheric disturbances