



GPS global detector for monitoring of ionospheric disturbances

E. L. Afraimovich

Institute of Solar-Terrestrial Physics, Irkutsk, Russia (afra@iszf.irk.ru / Phone: +7 3952 564554)

Creating the global network of GPS receivers has opened a new era in the field of the global and continuous monitoring of ionospheric disturbances (ID). The ISTP SB RAS developed technology for a global GPS detector (GLOBDET) of ID and improved sensitivity, accuracy and temporal and spatial resolutions of derived parameters using developing GPS processing techniques that are based on the latest achievements in the field of spatiotemporal signal processing. The application of new technology first enabled new results to be acquired: **A** – the visualization of the wave front of traveling ID; observation of solitary type large-scale wave with the annular front. **B** – the evidence of generation of small-scale ID due to intensive large-scale AGW propagation. **C** – GPS global detection of the ionospheric response to solar flares in a wide range of X-ray flare classes (C, M, X). **D** – the determination the phase velocity, the shape of wave front and the location of ID source during rocket launchings and earthquakes at different distances from sources. **E** – GPS detection of ionospheric effects of the total Solar eclipses. **F** - developing the methods for estimating the global electron content (GEC) that is equal to the total number of electrons in the near-Earth space environment bounded by the GPS orbital altitude (about 20200 km). The first results have been obtained for investigation of the GEC dynamics during the 23rd solar cycle. **G** – the evidence on the total failure of GPS performance during strong solar radio bursts on 6 and 13 December 2006. **H** – developing the methods of adaptive long-wave radio astronomy using ionosphere GPS sounding. The full list of publications is placed on website: <http://rp.iszf.irk.ru/homepage/afra/>.