

# Response of Total Electron Content of Terrestrial Ionosphere to GRB041227

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On 27 December 2004, at 21:30UT, an extremely intense gamma ray flare from the soft gamma repeater SGR1806-20 hit earth, which resulted in the additional ionization of earth's upper atmosphere exposed to this great flare. During this burst, an obvious sudden ionospheric disturbances (SID) event was recorded by multi-stations of very low frequency (VLF) observations. The X ray data from GOES satellite and the solar wind and interplanetary magnetic field (IMF) data from ACE satellite and theoretical analysis proved that the observed SID events were induced by SGR 1806-20. Using global positioning system (GPS) observational data provided by International GPS Service (IGS), and adopting coherent summation data processing method, the response of ionospheric total electron content (TEC) to this GRB is investigated in this paper. It is found that GRB041227 evidently affected ionosphere, and the peak increase of average TEC is about 0.04TECU ( $1\text{TECU}=10^{16}\text{el}/\text{m}^2$ ), which is equivalent with that caused by C or below C class solar flare. The calculated results of this paper as well as the former study results from other authors show that the remote celestial bodies can also affect near earth space environment more or less.

**Key words** astrometryGPS total electron content(TEC)