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Statistical study of the ionospheric perturbation observed by low-altitude satellite

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Using electric field power observed on board DEMETER satellite, we have performed the statistical analysis of the local ELF electric field enhancement located at the side of the equatorial anomaly crest for the time period of one year (Jan.1 to Dec. 31, 2005). Among 7576 half orbits during a year, 363 half orbits contain the local electric field bursts corresponding to the ionospheric perturbation and their peak electric field intensity are obtained. As a result distribution of the peak intensity is symmetrical about the magnetic equator and increases with increasing the magnetic latitude. This latitudinal dependence of the peak intensity is much clearer in daytime than nighttime. Then we study the connection between ionospheric perturbation and powerful seismic events ($M > 6$) occurred over the orbits (within 15 deg in longitude) and before 10 days from the perturbed orbits. Although the statistical error is relatively large, the median value of the peak intensity of the ionospheric burst events above land earthquakes is much larger than those for ocean earthquakes, which implies the lithosphere-atmosphere-ionosphere coupling due to the powerful earthquakes.

Keywords: ionospheric perturbation, DEMETER, equatorial anomaly, earthquake