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Hemispheric asymmetry of the electron temperature distribution in the topside ionosphere

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Six-years dataset of in-situ registrations made by the ISL Probe on board the DEMETER satellite revealed strong hemispheric asymmetry in the electron temperature distribution. Obtained results indicate the Southern Hemisphere being "warmer" than the Northern Hemisphere. The feature is strongly manifested in the daytime ionosphere and persists during the whole mission. Dayside registrations for the electron temperature reveal remarkable hemispheric asymmetry at middle (20 - 45°) and high latitudes (>45°) manifested by significantly greater temperatures in the Southern Hemisphere. Observed feature does not posses the solar zenith angle dependence, and estimated excess reaches 1000 K. In the Northern Hemisphere the electron temperature maximum is reached in July and does not exceed the value of 4500 K, while in the Southern Hemisphere the maximum surpasses 5000 K.

The questions addressed in presented work are as follows:

- Is the similar feature observed in registrations of the ion temperature, measured by the IAP instrument on board the same satellite?
- Is there a correlation between temperature asymmetry and ionospheric plasma density distribution?
- Is there any correlation between the magnitude of observed asymmetry and changes in geomagnetic conditions and solar activity?

In order to asses stated goals, data registered on board the DEMETER satellite by two instruments: IAP and ISL, are examined.