



## **Solar cycle Variations of Electron Density and Temperature in the Topside Ionosphere**

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Over the past three decades a large volume of electron temperature ( $T_e$ ) and density ( $N_e$ ) measurements has been accumulated by satellite in situ instruments as well as ground-based incoherent scatter radars. We have established a database with the most important of the satellite measurements reaching from the early Explorers to the more recent Akebono and DMSP satellites and including close to 7 million data points. Using this database we have studied the variation of  $T_e$  with solar activity at different altitudes, latitudes, and seasons. We have found that whereas  $N_e$  and the night  $T_e$  generally increases with increasing solar activity, the daytime  $T_e$  can decrease, increase or stay constant depending on specific altitude, latitude and season. Up to the altitude of 2000 km during equinoxes and winter at mid-latitudes there is a negative correlation between the solar activity and at summer the correlation is positive. Above 2000 km the solar activity and electron temperature are positively correlated. The trends established by our statistical analysis will be compared with the predictions by the FLIP model. An important goal of this work is the inclusion of an accurate representation of  $T_e$  solar cycle variations in the International Reference Ionosphere (IRI) model.