



Study of global distribution and solar activity variation of ionospheric ion temperature

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Since the mid-sixties, a substantial data base of in-situ thermal plasma parameters has been obtained. However, measurements of ion temperature (T_i) were much less abundant than measurements of other parameters (e.g., electron density, electron temperature, ion composition etc.). This is one of the reasons why progress in developing a reliable empirical model of ion temperature has been much slower than for the other parameters. The IRI (International Reference Ionosphere) model derives ion temperature from the energy balance equation among ions, electrons and neutrals.

We have re-assessed ion temperature data from older satellite and combined them with newly available data from DMSP, C/NOFS and others (available primarily from SPDF: <https://spdf.gsfc.nasa.gov/pub/data/>) into a joined data-base. This data-base has been used in our study to establish global patterns of the ion temperature and to determine T_i variation with solar activity. To better understand the solar activity variations of ion temperature at different latitudes and local times we have used simulations with the Field Line Interhemispheric Plasma flow (FLIP) model. The goal is to significantly improve the representation of T_i in the IRI model.