

## Statistical Analyses of Ionospheric Storms Over 50 Years In Japan

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Statistical analyses of the ionospheric storms over Japan are carried out based on the long-term observations over 50 years in Japan. While there are many types of ionospheric variations such as ionospheric storms, plasma bubbles, TIDs and so on, ionospheric storms are most large fluctuations of electron density in the ionosphere. In general, the increase of the electron density is termed positive storm and the decrease of it is termed negative storm [1]. The positive storms cause satellite-positioning errors due to the delay of radio propagation and negative storms cause HF radio communication outages due to lowering the maximum usable frequency. Because these two types of ionospheric storms shows different characteristics on the duration, scale, and the seasonal dependences, we analyzed ionospheric storm occurrences using critical frequency of the F2 layer; foF2 obtained from ionograms over 4 observation sites (Wakkanai, Kokubunji, Yamagawa, and Okinawa) operated by National Institute of Information and Communications Technology, Japan (NICT) [2]. We extracted ionospheric storms based on the differences between the daily observation values and the one-month median in Japan for more than 50 years. Extracted storms of each station will be analyzed by the occurrences, duration, seasonal dependence and geomagnetic variations.

### References

- [1] G. W. Prolss, Ionospheric F-region storms, Vol. 2 of Hand book of Atmospheric Electro- dynamics, CRC Press, 1995.
- [2] World Data Center for Ionosphere, <http://wdc.nict.go.jp/>.

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