Anomalous electron density enhancement and spacecraft charging in the pre-noon sector of geosynchronous orbit

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Anomalous electron density enhancements, inducing spacecraft surface charging, are not frequently but sometimes observed in the pre-noon sector of geosynchronous orbit. These electron density enhancements are local and temporal events. About two-thirds of the events have been observed in solar maximum. Another third of them have been observed in the declining phase of solar activity. However, no such events have been observed in solar minimum. More than two-thirds of the events in solar maximum occur in a day after the main phase of magnetic storm. These events would be related to the enhanced magnetospheric convection during magnetic storm. However, less than one-third of the events in the declining phase of solar activity occur in a day after the main phase of magnetic storm. This difference could be attributed to differences between CME-driven magnetic storms and CIR-driven magnetic storms. We will discuss generation processes of the events and the integration of them into the geosynchronous spacecraft charging forecast for the newly starting solar cycle 24.