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A case study on the GEO flux dropout during a weak geomagnetic storm of November 7, 2008: RBE results

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We investigate a geosynchronous flux dropout event during a weak storm of which Sym-H minimum value is -37 nT on November 7, 2008. During this event period, two dropouts are observed by GOES observation. Interestingly we found that there is local time dependence by THEMIS SST observation such that the GEO flux dropout starts first from noon-dusk MLT and recovers from midnight-dawn MLT in a few hundreds of keV electrons. This tendency is confirmed with RBE simulation results for both lower and higher energies' electrons; a few hundreds of keV and ∼Me V. There is no observed atmospheric precipitation during the first dropout period and there are just negligible atmospheric precipitations during the second dropout by all available NOAA POES satellites' observations. We also check wave activities can provide the indirect proof of the atmospheric precipitation through wave-particle interactions, Chorus wave power from THEMIS exists just only during the second dropout period. EMIC waves do not appear from THEMIS observations while ground observations by CARISMA network show that there are clear EMIC waves during both dropouts. Finally we conclude that the first dropout event is caused by purely magnetopause shadowing effect and the second one might be the result of the combination of magnetopause shadowing and atmospheric precipitation into the earth's atmosphere by wave-particle interaction.