# AKR activity and storm-time substorms

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It is well known that the AKR activity has a close correlation with substorm activities, especially with aurora activity and AE index. It is also known that during a magnetic storm, AE index increases in the main phase and decreases in the recovery phase. Thus it would be expected that AKR activity also shows enhancement and depression corresponding to the development of the storm. However, during a magnetic storm, the case which AKR activity decreases suddenly in the initial and main phases compared to the pre-storm level is often observed by AKEBONO and GEOTAIL satellites. This AKR disappearing phenomenon tends to occur during intense storms, and when Dst minimum is below -150nT, there are no events showing AKR intensification. In this paper, we investigate storm-time substorm characteristics and their relationship. A case study of the Feb. 21,1994 magnetic storm showed that during AKR disappearance in the main phase, there were particle injections into the geosynchronous orbit and strong field-aligned currents into the ionosphere are confirmed from AKEBONO observation. Also, ground-based magnetometers observed Pi2 onsets. At that time, there were strong particle precipitation in the night-side auroral region, but the energy spectra of precipitating electrons did not show the feature of field-aligned acceleration. This suggests that the field-aligned electric field is not formed during storm-time substorms.