Study on the magnetospheric dynamics of AKR disappearance during magnetic storms

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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 magnetic storms are always accompanied by substorms, but there is only one previous study on storm-time AKR activity. We have discovered that AKEBONO and GEOTAIL satellites often observes the case in which AKR activity decreases suddenly in the initial and main phase compared to the pre-storm level.

The objective of this study is to know the cause of this AKR disappearance during magnetic storms and use it to understand storm-time magnetspheric dynamics.

A case study of an AKR disappearing event shows that the presence of field-aligned electric fields controls the AKR activity. Based on this result and Knight[1973]'s current-voltage relation, we proposed a scenario for AKR disappearance during magnetic storms. Data from LANL and WIND satellite observations supports the scenario and a picture of solar wind-magnetosphere interaction of AKR disappearing events is shown.