Disappearance of proton auroral emission within substorm expanding bulge

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We have analyzed relationship
between auroral emissions observed by the
Meridian Scanning Photometer at Syowa Station
and energetic particle fluxes observed by
the LANL geosynchronous satellite whose
footpoint is located about 1 hour local time
later from Syowa. Disappearance of the proton
auroral emissions were closely related with
the flux enhancement of energetic ions at
geosynchronous orbit during the expansion phase.
As the flux recovered to the quiet time value,
the proton emissions re-appeared from the higher
latitudes. It is also found that pulsating auroral
activity appeared within the proton auroral void
region. These results suggest that the disappearance
of the proton emissions should be caused by the
enhanced trapped distribution of ions.

It is well-known that proton auroral emissions
become very weak within expanding substorm
auroral bulge. We have analyzed relationship
between auroral emissions observed by the
Meridian Scanning Photometer at Syowa Station
and energetic particle fluxes observed by
the LANL geosynchronous satellite whose
footpoint is located about 1 hour local time
later from Syowa. Disappearance of the proton
auroral emissions were closely related with
the flux enhancement of energetic ions at
geosynchronous orbit during the expansion phase.
As the flux recovered to the quiet time value
during recovery phase,the proton emissions
re-appeared from the higher latitudes down to
the lower latitudes. It is also found that
pulsating auroral activity appeared preferably
within the proton auroral void region. These
results suggest that the disappearance of the
proton emissions might be mainly caused by the
change in the pitch angle distribution of
magnetospheric ions toward more trapped one
due to the extreme dipolarization during expansion
phase, and source mechanism of the pulsating
aurora might be closely associated with such an
extreme dipolelike configuration in the near
earth region.