

The equatorial expansion of the westward electrojet during disturbed periods

B.-H. Ahn¹, G. Chen², W. Sun³

¹Kyungpook National University, Daegu

²Institute of Geology and Geophysics, Chinese Academy of Science, Beijing, China

³ Geophysical Institute, University of Alaska, Fairbanks, AK, U. S. A.

Auroral electrojet (AE) indices have been widely used in various solar-terrestrial physics since their introduction to the community. Recently it has been reported that the AE indices do not properly monitor the auroral electrojets because they expand equatorward beyond the standard AE network as magnetic activity increases, thus resulting in a serious underestimation of the auroral electrojet intensity. It is particularly acute in the study of substorm-storm relationship. To determine quantitatively the equatorial expansion of the auroral electrojets, we analyze extensive database obtained from the Alaska meridian chain, Greenland chain and IMAGE chain of magnetometers. These chains of magnetometers enable us to determine the latitude where the auroral electrojets with maximum current density flow. It is noted that the center of the westward electrojet tends to migrate equatorward with increase of magnetic activity. However, we also note that there seems to be a lower boundary of the equatorial expansion of the westward electrojet, approximately 60° in magnetic latitude. We discuss the implication in terms of the magnetosphere and ionosphere coupling.