

Meaning of the ASY Indices and Their Characteristics

Toshihiko Iyemori[1], Satoru Yamashita[2], Shin'ya Nakano[3]

[1] WDC-C2 for Geomag., Kyoto Univ., [2] Dept. of Geophysics, Kyoto Univ., [3] Dept. of Geophysics, Kyoto Univ.

A set of indices which indicate middle latitude asymmetric geomagnetic disturbance fields, ASY-D and ASY-H, has been derived for the period after 1984 using 6 stations. They have rather high correlation with the AE indices both for storm and substorm periods. From a comparison with satellite observations, it is suggested that a net field-aligned current system which flows into the ionosphere on the day-side and out on the night-side mainly contribute to the storm-time ASY indices. The auroral electrojets connects these two field-aligned currents, and this connection explains the high correlation between the ASY and the AE indices.

A set of indices which indicate middle latitude asymmetric geomagnetic disturbance fields, ASY-D and ASY-H, has been derived for the period after 1984 using 6 stations. They have rather high correlation with the AE indices both for storm and substorm periods. For storm period, the ASY-H mainly monitors the dawn-dusk asymmetric disturbance field, and the ASY-D monitors noon-midnight asymmetric field. At substorm onsets, the ASY-H and -D monitor so called 'mid-latitude positive bay'. From a comparison with satellite observations, it is suggested that a net field-aligned current system which flows into the ionosphere on the day-side and out on the night-side mainly contribute to the storm-time ASY indices. The auroral electrojets connects these two field-aligned currents, and this connection explains the high correlation between the ASY and the AE indices.