

Connection of geomagnetic indexes SYM, ASYM with polar indexes AE (AU, AL) on different phases of a geomagnetic storm

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The research of connection of indexes SYM, ASYM characterizing the ring current magnetic field with the indexes of auroral electrojets activity AE (AU, AL) is carried out during the main phases and phases of recovery of some magnetic storms in 2000-2001. For the main phases of these magnetic storms, the maximal correlation coefficients are between the arrays SYM and AU, ASYM and AU, ASYM and AL; for phases of recovery between the arrays ASYM and AE, ASYM and AL, SYM and AE. Thus, the asymmetry of the ring current magnetic field is connected to the particular current systems, parts of which are eastern and western electrojets during the whole magnetic storm. The symmetrical part of the magnetic disturbance during development of the main phase of magnetic storm is connected to the current system, part of which is eastern electrojet; and during the storm recovery phase to the integral current activity in the whole oval of polar auroras.

The executed correlation analysis offers the scheme of equivalent current systems which is consistent with marked patterns in magnetic disturbance behavior. Simultaneously with the correlation analysis, when correlation was calculated with no temporary shift between studied values, the analysis taking into consideration temporary delays in half an hour up to two hours between AE (AU, AL) and indexes SYM, ASYM was executed. It showed that the development of the symmetrical part of the magnetic disturbance created by ring current lags behind development of western electrojet, while its asymmetric part develops simultaneously with the western and eastern electrojets.

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