

On peculiarities of the magnitospheric disturbances accompanied by signals of mid-latitude coherent echo based on Irkutsk Incoherent Scatter radar data.

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The aim of the paper is the investigation of auroral echo peculiarities, observed at mid-latitudes with corrected geomagnetic latitudes 52-58 grad. based on the Irkutsk Incoherent Scatter radar (IISR) data. In the paper the dependence of observation frequency, duration and power of the scattered signal on time and on circular current intensity are investigated, as well as magnitospheric causes leading to the coherent echo observed at mid-latitudes. An algorithm for detecting existence of the coherent echo from power profile of scattered signal is presented. The analysis of mid-latitude coherent echo observed by IISR during January 1998 - January 2005 period is carried out. Echo signals which were revealed during the analysis were divided into 2 groups by intensity: strong (s) and weak (w) ones. A numerical characteristic that defines fragmentariness level of the coherent echo over the time is suggested. It allows us to divide the observed echo into prolonged and fragmentary ones. The analysis of data which is obtained at the Irkutsk Incoherent Scatter radar over the 7 years and is presented in the given paper, shows the following: 1.The signals, defined in this paper as a weak auroral echo are observed at mid-latitudes at any geomagnetic activity level at any local time. It is not improbable, however, that a part of the events is associated with the given group erroneously, so their nature requires further detailed investigation. 2.The probability of the strong auroral echo occurrence at middle latitudes is maximal from midnight till morning and is minimal at noon MLT hours. 3.Strong prolonged echo is observed at mid-latitudes basically at different phases of strong magnetic storms during the periods of the increased solar wind dynamical pressure. 4.The existance of daily variations in the observational frequency of strong auroral echo at mid-latitudes is caused by two effects: the dependence of the latitude of auroral percipitations (auroral electrojets) region on MLT and the aspect sensitivity that limits the region, available for IISR investigations, over latitude.

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