The splitting of eastward electrojet and the local system of field-aligned currents at the late stage of substorm growth phase

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By treatment results of data from the magnetometer meridional chain in the auroral zone and low-latitude magnetic stations separated by longitude before the onset of substorm expansion phase the studies of equivalent ionospheric currents in the region of "Harang discontinuity" and peculiarities of the longitudinal distribution of local system intensity of field-aligned currents which closed by a current directed to the east at the ionospheric heights have been carried out. The analysis of 20 distributions of equivalent ionospheric currents obtained by the methods of Popov et al. [EPS, 2001] has led to the determination of the rise of the intensity of discrete in latitude eastward streams which were observed during the transition from the magnetoquiet conditions to the disturbed ones 15÷30 min before the breakup onset. The local current system with a current directed to the east located poleward of auroral electrojets is formed at the meridian of the expected substorm center. The splitting of eastward electrojet and formation of the field-aligned current local system are the experimental evidence for the formation of current system of substorm growth phase suggested earlier by Velichko et al. [Geomagnetism and Aeronomy, 1995].
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