Dependence of different kind aurora intensity on geomagnetic activity

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Luminosity in the visible spectrum area for three types of auroras (proton, electron, and type A red auroras) have been analyzed as function of Kp index. The intensity was estimated from patrol spectrograph data. The following emissions were used: Hα 656.3 nm, [OI] 630.0 nm, 557.7 nm, $IPGN_2$ and $INGN_2^+$ bands. We have chosen the period of very high solar activity (1957-1960) for examining the proton auroras, the period of sufficiently high activity (1977-1982) for the electron auroras, and the whole observation period (1957-1992) for the type A red auroras. The integral intensity produced by electron precipitation under Kp = 9 appeared to be 4.5 times greater than the integral intensity due to proton precipitation. However in some cases the proton aurora luminosity energy can exceed that in the electron auroras. The spatial distribution of the proton and electron auroras has a shape of two mutually crossing rings. In the dusk LT sector the proton auroras are statistically observed more equatorward than the electron auroras. In the dawn LT sector the situation is reverse. This result agrees with the DMSP satellite observation of proton and electron fluxes. The domains of the proton and electron precipitation are statistically close, in turn, to the regions of downward and upward field-aligned currents observed by the TRIAD satellite. The precipitating particles seem to carry a fraction of the field-aligned current. Unequal drift of oppositely charged particles in the electric and inhomogeneous magnetic field can also contribute to the spatial separation of the proton and electron precipitation regions.