グローバルシミュレーションによって得られたオーロラ強度の南北非対称性

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Winter-summer asymmetry of auroral intensities revealed from a global MHD simulation

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Winter-summer asymmetry in auroral intensities is investigated by using a global magnetohydrodynamic (MHD) simulation. Enhancement of the ionospheric conductivity as a proxy of auroral intensities is estimated from parameters at the inner boundary of the magnetosphere in the simulation. The parameters are field-aligned currents (FACs), pressure, temperature and vertical plasma flows. The FAC in the daytime at the inner boundary is larger in summer than in winter at the auroral brightening due to enhanced background conductivity. Pressure and temperature do not exhibit significant winter-summer asymmetry at the onset of auroral brightening. The vertical plasma flow flux from the magnetosphere in the nighttime is larger in winter than in summer. This asymmetry is attributed to magnetotail configuration where the plasmasheet in the magnetotail is located in the winter-hemisphere side from the magnetic equatorial plane. From these simulation results, it is estimated that the auroras in daytime are more intensified in summer than in winter, whereas those in the nighttime are more enhanced in winter than in summer. Winter-summer asymmetry of the auroral intensities estimated from the simulation is consistent with observations.