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# Average Polar Pattern Variation of Electron Density and Temperature with Geomagnetic Activity at Swarm Altitude

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Average polar pattern variations of electron density, temperature and magnetic field of external origin during geomagnetically disturbed and quiet periods have been reconstructed using data recorded by different instruments on board of Swarm A satellite. Measurements cover the time interval of two years from 1 April 2014 to 31 March 2016 and both hemispheres are considered.
Using the Auroral Electrojet (AE) index to discriminate among the different levels of geomagnetic activity in the polar regions, intriguing features have been revealed from the large-scale variations of the analyzed quantities. Indeed, the spatial distribution of the variations of both electron density and temperature due to the increase of geomagnetic disturbance level can be explained in terms of magnetosphere-ionosphere coupling processes. In detail, the electron density tends to increase in regions which closely follow the ionospheric global convection patterns while the electron temperature increases in regions corresponding to the location of the auroral oval.
Through our maps obtained using Swarm data, it is also possible to follow the evolution of ionospheric electron density and temperature distribution at high latitudes with varying geomagnetic activity level, and in particular its changes as a consequence of the occurrence of geomagnetic substorms.