The Equatorial Ionospheric Variations Caused by Geomagnetic Storms

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Variations of the virtual ionosphere height and critical frequency foF2 at the equator are compared with the interplanetary magnetic field and the geomagnetic data. It is shown that these variations are defined to a significant degree by the direction of the Bz-component of the interplanetary magnetic field. The ionospheric heights and foF2 variations at the equator during the northward IMF Bz and the southward IMF Bz (the main phase of the magnetic storm) are very distinguished. Distinction between quiet and disturbance periods in the heights can reach up to100 km and more. The critical frequency foF2 is markedly lower during the southward IMF Bz. These phenomena can mainly be explained by the solar wind – magnetosphere – ionosphere coupling. We show that the field-aligned currents can serve as a coupling agent between the auroral and the equatorial ionosphere.

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