

Effects of Fast Co-Rotating Beams/HILDCAAs on the Brazilian Ionosphere.

D.C.S.Arruda, J. H. A. Sobral, V. M. Castilho

Instituto Nacional de Pesquisas Espaciais – INPE, Brazil

daniela@dae.inpe.br (tel.: +55 12 39457184)

ABSTRACT

The effects of Fast Co-rotating Beams/HILDCAAs (High Intensity Long-Duration Continuous AE Activity) events on the Brazilian ionosphere (low and equatorial latitudes) are investigated here. The HILDCAAs events are associated with Fast Co-rotating Beams (following a selection criteria empirically defined by AE index) which are commonly embedded with alfvénic fluctuations originated in coronal holes of the Sun. The Fast Co-rotating Beams/HILDCAAs events are characterized by continuous activity of high intensity auroral currents for days (until weeks) in the absence of the geomagnetic storms and, moreover, some recent studies showed that the time-integrated effect of the particle precipitation can be greater than the magnitudes observed during intense geomagnetic storms. In this study, we analyze the Brazilian ionosphere dynamics during 11 Fast Co-rotating Beams/HILDCAAs events for 2003 (F10.7cm: 128.5MHz) utilizing the ionospheric parameters (hF, hmF2, foF2 and fmimF) obtained from ground-based Digisondes located at São Luis (equatorial region: 2.33°S; 44.2°W, dip 1.9°S epoch 2003) and Cachoeira Paulista (22.41°S; 45°W, dip 32.2°S epoch 2003) as well as magnetic index (D_{ST}) and interplanetary parameters from ACE satellite (solar wind velocity, plasma temperature, plasma density and intensity magnetic field). The responses of ionosphere on the Brazilian region are widely distinct due to vast local variability of the magnetic equator and the territorial dimensions that enclose low and equatorial latitudes. In this way, such study intend to improve the understanding of the coupling processes involved in the ionosphere/magnetosphere/interplanetary environment system that is fundamental to the space weather so important at present.