CIR/HSSS-related TID activity and their interhemispheric circulation

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The paper presents results of the analysis of the changes in the regular ionospheric variability and TID activity observed during CIR/HSSS-related storms. We analyzed main ionospheric parameters retrieved from manually scaled ionograms, plasma drift measurements and TEC data obtained from several European and African ionospheric stations and GNSS receivers. Most of the observed storm-related TIDs had periods of 60-180 min (LSTIDs). During the analyzed storms we also observed extraordinary spreads and plasma bubbles at the F region heights. The results of the analysis were compared with the TID activity during strong magnetic storms of CME origin along the European-African sector. In order to obtain quantitative information on the likeliness and morphology of interhemispheric circulation of LSTIDs at about 40 events were examined lasting between 8 and 24 hours each. We used exclusively GPS-based detection methods, specifically information on TEC, TEC deviations in space and time from a background reference (dTEC), and the Rate of TEC change in time (ROT), all inferred from GPS receiver networks in Europe and Africa. We conclude that hemispheric conjugacy of LSTID is highly probable while interhemispheric circulation rather unlikely but still occurring during some periods.