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EFD experiment onboard CSES satellite: Characterization of hiss and chorus whistler emissions during geomagnetic activity

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We study the geomagnetic activity effects on whistler emissions recorded by the Electric Field Detector (EFD) experiment onboard the China Seismo-Electromagnetic Satellite (CSES). This mission is devoted to investigate the ionospheric disturbances linked to the seismic activity. The satellite has a circular sun-synchronous orbit with a descending node at 14 LT and an altitude of 507 km [1]. Four probes are used to measure the electric field recorded by EDF instrument covering a frequency range from DC up to 3.5 MHz [2]. We consider in this analysis geomagnetic events which occurred in the year 2018 after the launch of the CSES satellite, i.e. on 02nd February 2018. The Kp-index leads us to estimate the variation of the geomagnetic activity which is found to have sudden enhancements on the following days: 21st April, 05th May, 26th Aug. and 10th Sept. We show in this analysis that the whistler emissions, i.e. hiss and chorus occurring in the frequency bandwidth 1 kHz to 20 kHz, are influenced by the Earth's magnetic activity. Hence whistler spectral shapes are globally found to develop towards higher frequencies. Two aspects are discussed: (a) the way to characterize an ionospheric disturbance index taking into consideration the CSES geographical configuration orbit and (b) the comparison of the electric field power levels as derived from EFD/CSES instrument and from ICE/DEMETER experiment [3].

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