VERSIM in KYOTO 23 - 27 Mar. 2020
VLF/ELF Remote Sensing of Ionospheres & Magnetospheres

Recurrent Inner Magnetosphere Chorus Waves Observation Following Corotating Interaction Region

Livia R. Alves[1*], Graziela B. da Silva[1], L. A. da Silva[1], Antonio L. Padilha[1], David G. Sibeck[2], Shrikanth G. Kanekal[2], J. Bernard. Blake[3] , Craig Kletzing[4], Daniel Baker[5]

[1] National Institute for Space Research (INPE), Brazil [Calibri, 10.5pt, normal, aligned left]
[2] NASA Goddard Space Flight Center, USA
[3] The Aerospace Corporation, USA
[4] Department of Physics and Astronomy, University of Iowa, USA
[5] Laboratory of Atmospheric and Space Physics, University of Colorado, USA

*Corresponding Author: livia.alves@inpe.br

The key question on the Earth's radiation belts trapped particles lies in the understanding of how solar wind drives the magnetospheric physical mechanisms changing the trapped particle populations. Corotating Interaction Regions (CIR) from Coronal Holes (CH) are predominant structures through the descending phase of the solar cycle. Some of the solar wind conditions related to CIRs are also recurrent in each rotation, so these structures may also cause a recurrent magnetospheric response to the solar wind coupling, including the inner magnetospheric parameters, in particular at the outer radiation belt dynamics. Throughout the descending phase of the solar cycle 24, we identified 46 CIRs in the period from 2016-2019. All the CIRs are isolated solar wind structures, i.e. complex solar wind structures are out of the scope of this paper. By following seven recurrences of CH 838, we identified recurrent magnetospheric auroral disturbances, besides inner magnetosphere seed population particle injection, and as a consequence, whistler-mode chorus waves are observed in a wide frequency range and in several L-shells and Magnetic Local Time. The unprecedented Van Allen Probes observation of very low frequency (VLF) waves show that for two subsequent orbits, whistler-mode chorus waves frequency bands alternate from one satellite passage to the other, being observed in several frequencies ranges during the same solar wind event. As a result, the relativistic outer radiation belt electron fluxes can be lost and enhance each time, as a function of the chorus waves power spectral density, thus the survey of outer radiation belt particle flux from several CIR events results that dropout, enhancement or no change may occur with the same likelihood (~ 25%) each.