[SO-17] Statistical Significance of Association between Whistler-mode chorus Enhancements and Enhanced Convection Periods during Fast Solar Wind Stream from Solar Coronal Holes

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During fast solar wind stream from solar corona holes, substorms occur repetitively and relativistic electron fluxes in geosynchronous orbit enhance significantly. It has recently been proposed that enhanced dawnside chorus waves lead to the energization of the relativistic electrons and that they are associated with the periods of enhanced convection that precede substorm expansions, rather than with the expansions themselves. In this paper, we have evaluated the statistical significance of this association using a total of 657 substorms during high-speed solar wind streams observed by the ACE spacecraft and whistler-mode chorus waves observed from the VLF/ELF Logger Experiment (VELOX) at Halley station, Antarctica. We find that ~66% of the substorm events identified at 04-14 MLT show the association with the chorus enhancement that starts to increase ~35 min, on average, prior to substorm onsets and remains elevated until declining back to near the pre-enhancement level in ~16 min, on average, after substorm onsets. Our statistical results suggest that a large number of the chorus wave enhancements at dawn to post-noon local times occur during the enhanced convection period of the substorm growth phase. This is distinguished from the chorus wave enhancement near midnight that is caused by substorm-injected electrons after onsets. We find that ~59% of the events identified at 22-02 MLT show chorus enhancements that start on average ~6 min after substorm onsets and remain elevated for ~32 min on average.

[SO-18] Statistical Analysis of the Relationship among Coronal Holes, Corotating Interaction Regions, and Geomagnetic Storms

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Recently the solar and interplanetary sources of major geomagnetic storms (Dst ≤-100 nT) were identified by Zhang et al.(2007). They found that 87% and 13% of the major storms were produced by CME(ICME) and CIR(Corotating Interacting Region)s, respectively. The interaction between slow and fast solar wind creates a CIR of compressed, heated plasma at the leading edge of the high speed stream. We first identified the CIRs from 1996 to 2003 using ACE and WIND data, and then linked them to coronal holes seen in NSO-KP daily He I 10830 maps by taking into account the Sun-Earth transit time of observed solar wind speed. We examined the area, location, and magnetic polarity of the coronal holes as well as the association with geomagnetic storms. As a result, we found that (1) their mean longitude is about 13 degree east, (2) about 75 % of the events are located from 30 degree south to 30 degree north, and (3) about 50 % of the CIRs were associated with geomagnetic storms. Using these data sets, we are looking for geoeffective parameters of the coronal holes and the CIRs that are responsible for geomagnetic storms.