Study of Pc5 pulsations effects during intense geomagnetic storms observed by the SAMBA network

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Problem formulation

The geomagnetic ultra low-frequency Pc5 pulsations are a characteristic component of a disturbed magnetosphere with typical periods of about a few minutes [1]. Typically Pc5 waves are predominantly observed at auroral latitudes in the morning LT hours and during intense geomagnetic storms where the solar-wind drivers of Pc5 waves are activated [2]. To investigate the drivers of these micropulsations, the magnetic ground stations measurements are useful for studying the correlations between Pc5 waves and other magnetospheric parameters.

In this line, we studied several intense geomagnetic storms ($Dst<-100$ nT, $7\leq Kp\leq 9$) during the maximum phase of solar cycle 24 by using ground-level magnetic data taken from the SAMBA network. Thus, we covered from –5° to –50° geomagnetic latitude and around the 0° geomagnetic longitude by using the X (North) Y (East) Z (Down) coordinate at 1 sec time resolution over Chile and Antarctica sectors. As a first step, a baseline method was employed using the 10 international quietest days. Later, the next step was the frequency separation using a Butterworth filtering process to decompose the geomagnetic data into different frequency bands while maintaining the localized time domain of the original time series [3].

Our preliminary results show the apparition of global Pc5 pulsations during the intense geomagnetic storms studied. This fact suggests that the excitation of their magnetospheric waveguide mode is triggered by the effect of the solar wind flow.

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