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The main periodicities of the geomagnetic pc5 wave power and their relationship with solar wind dynamic pressure, magnetospheric field and electron fluxes

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We use ground geomagnetic micropulsations power in the range 2-7 mHz (Pc5) at TNB (Terranova Bay), magnetospheric field observations at geostationary orbit (GOES data), solar wind pressure and relativistic electrons flux (0.6 MeV $<$ E $<$ 2 MeV) in the period January 2008 - September 2008, in order to detect typical periodicities and physical mechanisms involved into solar wind (SW)-magnetosphere coupling during the declining phase of the solar cycle. Performing Empirical Mode Decomposition (EMD) analysis, by which we are able to decompose non linear and non stationary signals into a finite number of empirical modes, and according to significance test, in order to perform a denoising process, we find three significant nonlinear waveforms which could be related to three different physical mechanisms. Applying cross-correlation analysis between couples of waveforms, either in magnetosphere or at ground, we show that Pc5 waves can lead electron flux which could be related to acceleration mechanisms due to wave-particle interactions in the magnetosphere. Moreover, performing cross-correlation analysis between Pc5 wave power and SW dynamic pressure (ΔP_{SW}), we found that the latter (and not the SW velocity variations alone) is directly involved into the generation of geomagnetic micropulsations via Kelvin-Helmholtz instability. Interestingly, we found an instantaneous correlation between TNB ground data and SW dynamic pressure variations, while we found a correlation delay time of $\sim$ 25-30 hrs between Pc5 wave power and ΔP_{SW}.