Generation mechanisms of Pc 1 waves associated with transient processes in the cusp and LLBL region

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Using ULF wave data from at six Automatic Geophysical Observatories in Antarctica and solar wind data obtained from spacecraft observations, the characteristics of transient Pc 1 waves associated with magnetic impulse events (MIEs) and SSCs have been investigated in detail. It is found that MIE-related Pc 1 waves have a duration of about 5 min and often a falling-tone spectral structure. The outward motion of the magnetopause due to the formation of hot flow anomalies (HFAs) or the expansion of the foreshock region might cause a decrease in the frequency of ion cyclotron waves in the LLBL that are considered to be the source of Pc 1 waves. On the other hand, SSC-related Pc 1 waves would be excited by the compression of the cusp/LLBL region by shock waves.