



Sunward propagating Pc5 wave observed in the post-midnight magnetosphere flank

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The overall focus on the driver of toroidal Pc 5 waves has been on processes located at or acting on the dayside and flanks of the magnetosphere. These processes can generate waves that propagate tailward in the magnetosphere. However more and more studies, both theoretical and experimental, have looked at waves propagating sunward and that are caused by processes in the magnetotail. Here we present a ULF wave observed in the post-midnight/morning sector of the magnetosphere at $L=16$ R_E (calculated from the IGRF-model). The wave has a toroidal mode polarization. We estimate the azimuthal wave number to $m=3$, consistent with a toroidal mode type pulsation. The positive sign indicates that the wave is propagating sunward and this is confirmed by looking at the Poynting flux of the wave. The frequency of the wave is not constant with time but shows a small increase in the beginning of the event up to 2.5 mHz. Then the frequency decreases down to 1.0 mHz. This decrease coincides with a drop in the total magnetic field strength and we speculate if this is related to an observed reversal of the sign of the interplanetary magnetic field (IMF) By-component. This event occurs during relatively quiet magnetospheric conditions with a solar wind speed of approximately 400 km/s. Thus this event is highly likely to be driven by a source in the magnetotail and the change in frequency is an excellent example that the frequency of an ULF wave can be modulated by changes of the plasma parameters at the resonant field lines.