

Polarization analysis of VLF/ELF chorus waves observed at Athabasca at subauroral latitudes

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Chorus waves are naturally occurring and very intense electromagnetic whistler-mode wave emissions, generated near the geomagnetic equator and propagating through the geomagnetic field lines to the ionosphere. They are believed to be of a major contribution to the acceleration and loss of radiation belt particles (Omura et al., 2007, Inan et al., 1982). The spatial and temporal variations of the acceleration region of radiation belt electrons might be directly linked to the spatial and temporal variations of Very Low Frequency/Extremely Low Frequency (VLF/ELF) ionospheric exit point. Hence this research will focus on studying VLF/ELF chorus characteristics at frequencies of 0.003-30kHz with the objective of locating their ionospheric exit point.

During February 17 Ó 25, 2012, the VLF-CHAIN campaign observed VLF/ELF emissions at subauroral latitudes using two loop antennas at Athabasca (MLAT=61.31, L=4.3) and Fort Vermillion (MLAT=64.51, L=5.4), Canada. Since the end of this campaign, continuous measurements of VLF/ELF waves with a sampling rate of 100 kHz, have been made at subauroral latitudes at both of these ground stations. Several interesting features of chorus emissions have been observed such as quasi-periodic emissions, falling-tone and rising-tone chorus, as well as bursty-patch emissions, which we intend to study. We will report polarization and spectral analysis of these VLF/ELF waves that have been observed by the loop antennas at Athabasca and Fort Vermillion.

References:

Inan et al. (1982), Particle precipitation induced by short-duration VLF waves in the magnetosphere, *J. Geophys. Res.*, 87, A8, doi: 10.1029/JA087iA08p06243.

Omura et al. (2007), Relativistic turning acceleration of resonant electrons by coherent whistler mode waves in a dipole magnetic field, *J. Geophys. Res.*, 112, A06236, doi: 10.1029/2006JA012243.