

VLF chorus emissions observed by MAGION 5 satellite in plasmopause region near magnetic equator

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New VLF broadband measurements onboard the Magion 5 satellite near the magnetic equator are used for analysis of VLF chorus emissions detected in plasmopause region. Magion 5 was launched as a part of the INTERBALL mission into a highly elliptic orbit. VLF broadband measurements ($f < 22.5$ kHz) included both electric and magnetic field components.

An analysis of more than 8000 chorus elements recorded at latitudes of 30–40 degrees from the geomagnetic equator on $L = 2.5$ –6 in the morning sector yielded new statistical relationships between chorus parameters such as the mean frequency of an element, bandwidth, frequency sweep rate, amplitude, etc.

One of the most important parameters of chorus emissions is the frequency sweep rate. It reaches rather high values (higher than 10 kHz/s) for about 25% of all elements analyzed. The mean sweep rate increases with the chorus central frequency and decreases with L shell as L^{-2} . Also important is that the frequency sweep rates directly correlate with amplitudes of the chorus elements, implying that nonlinear mechanisms contribute to the frequency sweep rate of chorus emissions. We discuss relationships between the observed scalings of chorus parameters and existing models of chorus formation.