

**Incident directions of fractional-hop whistlers recorded at LEO –
meridional, oblique wave propagation in the ionosphere**

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Three component magnetic field (IMSC) waveform data, recorded in the ELF frequency range on board of the DEMETER satellite was used to calculate the incident directions of numerous whistlers at LEO orbit altitudes. Calculation of instantaneous amplitude, phase and arriving time of selected waveforms was performed using matched filtering (known model waveform) and subsequent statistical parameter estimation algorithm. Supposing that field vector \mathbf{B} and propagation factor \mathbf{k} are orthogonal (plane wave approximation), direction of the wave normal was estimated in case of selected short path fractional hop whistlers, acquired at different magnetic latitudes in the topside ionosphere, globally. The resulted incident azimuth and elevation angles exhibit remarkable dependence on local geomagnetic latitude and declination.

According to the determined incidents at the receiving sensors whistler propagation may occur in the local magnetic meridional plane in the anisotropic, layered lower plasmasphere. The impulses most likely reach upward the satellite altitude obliquely, their path fall between the vertical (shortest but large angle) and the field aligned (longer but longitudinal) directions, ensuring the minimum propagation time of the signals.

Presented results of this investigation aime to characterize the guided or oblique behavior of the e.m. impulses in the ionosphere, supporting the studies on field-aligned wave propagation in the plasmasphere, as well as on the L-discrepancy of one hop whistlers.