

Remote sensing of the magnetospheric plasma by means of VLF chorus emissions observed at low latitude Indian ground stations Jammu and Gulmarg

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Abstract: Observation of VLF chorus emissions during magnetic storm periods made at our low latitude Indian ground stations Jammu ($L=1.17$) and Gulmarg ($L=1.28$) are used to deduce magnetospheric plasma parameters in the vicinity of magnetospheric equator. The special feature of VLF chorus emissions observed at Jammu and Gulmarg is the regularities of the chorus spectra development by the gradual increase of the upper boundary frequency of the chorus emissions during the first-initial phase of observation. UBF-method based on the measurement of the upper boundary frequency of the ground-observed VLF chorus is used for the estimation of L-value of the chorus source of the reported VLF chorus, which is found to be about 4 ($L\sim 4$). Calculations of magnetospheric plasma parameters in the vicinity of chorus source ($L\sim 4$) such as resonance length, frequency sweep rate, bandwidth of chorus, wave magnetic field and number density of energetic electrons taking part in the generation of VLF chorus are reported on the basis of Helliwell's theory. The large-scale electric field in the magnetosphere is estimated based on the spectral analysis of the regularities of the chorus spectra development observed at Jammu and Gulmarg during the first-initial phase of observation. The calculated parameters are in good agreement with the measured parameters.

Index terms: VLF chorus emissions, electric field, plasma parameters, low latitude, UBF-method.