Verification of the BWO model of VLF chorus generation using data from Magion 5

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We present a detailed study of chorus emissions in the magnetosphere detected onboard the Magion 5, when the satellite was at low magnetic latitudes. We determine the frequency sweep rate and the periods of electromagnetic VLF chorus emissions. These results are compared with the backward wave oscillator (BWO) regime of chorus generation. Comparison of the frequency sweep rate of chorus elements shows: (i) There is a correlation between the frequency sweep rates and the chorus amplitudes. The frequency sweep rate increases with chorus amplitude in accord with expectations from the BWO model. (ii) The chorus growth rate, estimated from the frequency sweep rate, is in accord with that inferred from the BWO generation mechanism. (iii) The BWO regime of chorus generation ensures the observed decrease in the frequency sweep rate of the chorus elements with increasing L shell. We also discuss the relationship between the observed periods of chorus elements with the predictions following from the BWO model of chorus generation.

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