



Modulation of electromagnetic ion cyclotron waves by Pc5 ULF waves and energetic ring current ions

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We present the ground observation of the modulation of strong electromagnetic ion cyclotron (EMIC) waves by short and long periodicities at Indian Antarctic station, Maitri. The signatures of these waves were evident in the magnetic field variations recorded by an induction coil magnetometer during the interval 4.7--7.2 UT on 17 September 2011, a moderately disturbed day. These waves preceded by a gradual increase in the solar wind dynamic pressure, which started at 3.88 UT. The discrete rising tone EMIC waves were observed in the Pc1 frequency band ~0.5--0.9 Hz. The investigation of the periodicities of the observed wave spectrogram shows the presence of short (2.9--3.2 minute) and long (42--83 minute) periodicities. A possible mechanisms for these short and long duration periodicities are discussed. A new method, based on the cross-correlation technique is adopted to determine sweep rates of the discrete rising tones. The sweep rates estimated in the range of 0.4--2 mHz/s are relatively low as compared to the past reports of sweep rates derived from the satellite observations of EMIC waves. We found that the higher sweep rates are associated with the stronger EMIC waves on the ground, which is in agreement with the theoretical studies.