



Spatial Localization and Ducting of EMIC Waves: Van Allen Probes and Ground-based Observations

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On 11th October 2012, during the recovery phase of a moderate geomagnetic storm, an extended interval (> 18 hours) of continuous EMIC waves was observed by CARISMA and STEP induction coil magnetometers in North America. At around 14:15 UT, both Van Allen Probes B and A (65 degrees magnetic longitude apart) in conjunction with the ground array observed very narrow ($\Delta L \sim 0.1-0.4$) left-hand polarized EMIC emission confined to regions of mass density gradients at the outer edge of the plasmasphere at $L \sim 4$. EMIC waves were seen with complex polarization patterns on the ground, in good agreement with model results from Woodroffe and Lysak [2012] and consistent with Earth's rotation sweeping magnetometer stations across multiple polarization reversals in the fields in the Earth-ionosphere duct. The narrow L-widths explain the relative rarity of space-based EMIC occurrence, ground-based measurements providing better estimates of global EMIC wave occurrence for input into radiation belt dynamical models. EMIC wave impacts on the radiation belts during this interval are also presented.

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