



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

Ian Mann (1), Maria Usanova (1), Kyle Murphy (1), Matthew Robertson (1), David Milling (1), Andy Kale (1), Craig Kletzing (2), John Wygant (3), Scott Thaller (3), and Tero Raita (4)

(1) University of Alberta, Physics, Edmonton, Canada (imann@ualberta.ca), (2) University of Iowa, Iowa City, USA, (3) School of Physics and Astronomy, University of Minnesota, USA, (4) Sodankylä Geophysical Observatory, Sodankylä, Finland

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.

This work is supported in part by participation in the MAARBLE (Monitoring, Analyzing and Assessing Radiation Belt Loss and Energization) consortium. MAARBLE has received funding from the European Community's Seventh Framework Programme (FP7-SPACE-2010-1, SP1 Cooperation, Collaborative project) under grant agreement n° 284520. This paper reflects only the authors' views and the European Union is not liable for any use that may be made of the information contained herein.