R006-P35
ポスター 1 ：11/24　PM1/PM2 （13:15-18:15）

#宮下 隼輔 [1)], 加藤 雄人 [1)], 熊本 篤志 [1)], 土屋 史紀 [2)], 笠羽 康正 [2)], 笠原 禎也 [3)], 松田 昇也 [3)], 松岡 彩子 [4)], 三好 由純 [5)], 堀 智昭 [5)], 新堀 淳樹 [5)], Santolik Ondrej[6,7)]
([1] 東北大・理・地球物理, [2] 東北大・理・惑星プラズマ大気, [3] 金沢大, [4] 京都大学, [5] 名大 ISEE, [6] チェコ共和国 ASCR 大気物理学研究所, [7] カレル大学数物学部

Study of propagation characteristics of EMIC wave using multipoint observation by Arase and Cluster

#Shunsuke Miyashita[1)], Yuto Katoh[1)], Atsushi Kumamoto[1)], Fuminori Tsuchiya[2)], Yasumasa Kasaba[2)], Yoshiya Kasahara[3)], Shoya Matsuda[3)], Ayako Matsuoka[4)], Yoshizumi Miyoshi[5)], Tomoaki Hori[5)], Atsuki Shinbori[5)], Santolik Ondrej[6,7)]
([1]Department of Geophysics, Graduate School of Science, Tohoku University, [2]Planetary Plasma and Atmospheric Research Center, Graduate School of Science, Tohoku University, [3]Emerging Media Initiative, Kanazawa University, [4]Graduate School of Science, Kyoto University, [5]Institute for Space-Earth Environement Research, Nagoya University, [6]Institute of Atmospheric Physics ASCR, Prague, Czech Republic, [7]Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic

Electromagnetic ion cyclotron (EMIC) waves are important for the loss of radiation belt electron and ring current ions. After being excited by an instability driven by the temperature anisotropy followed by nonlinear wave-particle interactions occurring near the magnetic equator of the inner magnetosphere, EMIC waves propagate parallel along the magnetic field lines with left-handed polarization. As the waves propagate to higher latitudes, their wave normal angles with respect to the magnetic field increase. At latitudes where the wave frequency is the same as the crossover frequency, the polarization changes from left-handed to right-handed, called polarization reversal. Polarization reversal is one of the mechanisms that allow EMIC waves to propagate to the ground without being reflected in the magnetosphere (Chen et al.2014). The crossover frequency at which polarization reversal occurs depends highly on the surrounding plasma environment. To investigate the polarization reversal in the magnetosphere, conjugate observation, in which the same event is observed at different latitudes, is useful for discussing the propagation process of plasma waves and changes in the surrounding plasma environment. However, few previous studies have observed and analyzed an identical wave in different latitudes, and there is a spatial spread (Engebretson et al. 2018).

In this study, we analyzed EMIC waves simultaneously observed by the Arase and Cluster satellites. We used the electric and magnetic field waveform data observed by the PWE-EFD and MGF onboard the Arase satellite and the magnetic field waveform data observed by STAFF onboard the C1 satellite. By analyzing the properties of the same wave at different latitudes, we study the surrounding plasma environment and wave characteristics in detail. The event of interest was observed from 21:20 to 21:40 UT on July 25,2020, with the same L-value-(L=6) and MLT-(12.9 MLT). In the spectra observed by Arase located in the equatorial region (MLAT=5°), we identified the enhancement of electromagnetic waves in the frequency range from 0.65Hz to 1.1Hz, corresponding to the proton-band EMIC waves. The same EMIC wave was observed by C1 in the region away from the equator-(MLAT=-24°). While the frequency range of the EMIC wave observed at Arase was higher than the local helium cyclotron frequency, the EMIC wave observed at C1 appeared in the spectra close to the local helium cyclotron frequency. Considering the cold plasma dispersion relation, it was suggested that polarization reversal may have occurred during the wave propagation process from the equatorial region at Arase to the higher latitude at C1. Also, to investigate polarization properties, we have performed the Singular Value Decomposition (SVD) method (Santolik et al. 2003) for each satellite data. This method allows us to derive polarization properties, Poynting vectors, etc., and to investigate how the waves change in the propagation process. In this presentation, we present the analysis result of these polarization characteristics and the surrounding environment in which the waves are propagating.