R006-P05
ポスター 1：11/25　AM1/AM2（9:15-12:35）

#高原 璃乃 [1,2], 篠原 育 [2], 笠原 慧 [3], 浅村 和史 [2], 横田 勝一郎 [4], 桂華 邦裕 [3], 風間 洋一 [5], Wang Shiang-Yu[5], Tam Sunny Wing-Yee[6], Chang Tzu-Fang[6], Wang Bo-Jhou[5], Jun ChaeWoo[7], 堀 智昭 [8], 松岡 彩子 [9], 寺本 万里子 [10], 山本 和弘 [11], 笠原 禎也 [12], 松田 昇也 [12], 熊本 篤志 [13], 新堀 淳樹 [14], 土屋 史紀 [13], 三好 由純 [14]
([1] 東京大学, [2] 宇宙航空研究開発機構, [3] 東京大学, [4] 大阪大学大学院, [5]Academia Sinica Institute of Astronomy and Astrophysics, [6]National Cheng Kung University, [7] 名古屋大学, [8] 名古屋大学・宇宙地球環境研究所, [9] 京都大学, [10] 九州工業大学, [11] 名古屋大学宇宙地球環境研究所, [12] 金沢大学, [13] 東北大学, [14] 名古屋大学

Categorization of the Factors of Loss Cone Electron Input in Higher-Latitude Regions of the Inner Magnetosphere

#Rino TAKAHARA[1,2], Iku SHINOHARA[2], Satoshi KASAHARA[3], Kazushi ASAMURA[2], Shoichiro YOKOTA[4], Kunihiro KEIKA[3], Yoichi KAZAMA[5], Shiang-Yu Wang[5], Sunny Wing-Yee Tam[6], Tzu-Fang Chang[6], Bo-Jhou Wang[5], Chaewoo JUN[7], Tomoaki HORI[8], Ayako MATSUOKA[9], Mariko TERAMOTO[10], Kazuhiro YAMAMOTO[11], Yoshiya KASAHARA[12], Shoya MATSUDA[12], Atsushi KUMAMOTO[13], Atsuki SHINBORI[14], Fuminori TSUCHIYA[13], Yoshizumi MIYOSHI[14]
([1]University of Tokyo, [2]ISAS/JAXA, [3]University of Tokyo, [4]Osaka University, [5]ASIAA, [6]National Cheng Kung University, [7]Nagoya University, [8]ISEE / Nagoya University, [9]Kyoto University, [10]Kyushu Institute of Technology, [11]ISEE / Nagoya University, [12]Kanazawa University, [13]Tohoku University, [14]Nagoya University

Whistler mode chorus waves are detected primarily outside the plasmapause from the nightside to the dayside in the inner and outer magnetosphere. They scatter electrons in pitch angles and cause electron precipitation into the Earth's upper atmosphere. While nightside chorus waves are frequently observed at geomagnetically disturbed times around the magnetic equator, dayside chorus waves are much more detected ranging from the equator to higher latitudes (e.g., Meredith et al., 2012). The resonance energy tends to become higher in the off-equatorial regions due to larger magnetic field intensity. Electron measurements with the sounding rockets and numerical simulations have suggested that ˜sub-relativistic electron precipitation is caused by interactions with chorus waves propagating to higher latitudes (Miyoshi et al., 2010; Namekawa et al., 2023). Furthermore, the previous statistical survey of loss cone electrons by Takahara et al. (2025) also indicates the contribution of higher-latitude chorus waves to tens of keV electron precipitation in the regions of MLT >3 h at L=5 – 6.

In situ loss cone electron observations have just recently been enabled by electron analyzers onboard the Arase satellite that is capable of electron measurement with high angular resolution enough to resolve small loss cone angles in the magnetosphere. Moreover, the Arase satellite performs electron measurements up to |MLAT|= 40° , providing superior spatial coverage compared to other satellites. In this study, we investigated and categorized the loss cone input events for electrons with energies of 7 – 88 keV in the higher latitude regions (10° <|MLAT|<40°) observed by the Arase satellite from March 2017 to March 2022. This study aims to reveal and quantify the contribution of each factor by examining direct measurements of loss cone electrons.

We found that chorus waves are the primary cause of loss cone input as for higher-energy (29 – 88 keV) electrons (Type 1), and the occurrence probability decreases as with increasing magnetic latitudes. This spatial distribution may result from the spatial distribution of the resonance energy defined by the ambient magnetic field intensity and electron density and/or the less occurrence of intense chorus waves at higher latitudes. Besides, we also found another category of event (Type 2) which are characterized by the simultaneous detection of chorus waves although the resonance energies of them are too high compared to the energy range of observed loss cone electrons. Type 2 events are found to frequently occur around the dawnside (MLT = 3 – 9 h) at 20° <|MLAT|<40° . They occur with reduced electron densities or fpe /fce (fpe and fce are the local electron plasma frequency and electron gyro frequency, respectively) values and are sometimes accompanied by Langmuir waves. We also found that Type 2 events occur more frequently for lower-energy (7 – 24 keV) loss cone electron input from the nightside to the dawnside (MLT=21 – 9 h). Additionally, contributions of whistler hiss waves were identified, and events with broadband electrostatic noise (BEN) were also detected. In this presentation, we present the results of a categorization of loss cone input factors for 7 – 88 keV electrons and discuss the possible factors contributing to Type 2 events.