あらせ衛星観測に基づくコーラス放射のポインティングベクトルに関する統計解析

Statistical investigation of Poynting vectors of chorus emissions observed by the Arase satellite

*宝本 航大[1]、栗田 怜[1]、小嶋 浩嗣[1]、笠原 禎也[2]、松田 昇也[3]、松岡 彩子[4]、三好 由純[5]、篠原 育[6]、中村 紗都子[5]
*Takaramoto Kouta[1], Satoshi Kurita[1], Hirotsugu Kojima[1], Yoshiya Kasahara[2], Shoya Matsuda[3], Ayako Matsuoka[4], Yoshizumi Miyoshi[5], Iku Shinohara[6], Satoko Nakamura[5]

1. 京都大学生存圏研究所、2. 金沢大学学術メディア創成センター、3. 金沢大学、4. 京都大学　理学研究科　地磁気世界資料解析センター、5. 名古屋大学宇宙地球環境研究所、6. 宇宙航空研究開発機構/宇宙科学研究所
1. Research Institute for Sustainable Humanosphere, Kyoto University, 2. Emerging Media Initiative, Kanazawa University, 3. Kanazawa University, 4. Data Analysis Center for Geomagnetism and Space Magnetism,Graduate School of Science, Kyoto University, 5. Institute for Space-Earth Environmental Research, Nagoya University, 6. Japan Aerospace Exploration Agency/Institute of Space and Astronautical Science

Chorus waves are a type of plasma wave propagating in the magnetosphere.

Chorus waves are frequently observed in the frequency range from 0.2 to 0.7 times

of electron gyrofrequency, fce, and often show a gap of wave power near 0.5fce. The

waves below and above 0.5fce are called lower-band chorus (LBC) and upper-band

chorus (UBC), respectively. Previous studies show that these waves are excited

near the magnetic equator and propagate toward higher latitudes. On the other

hand, the difference of radiation characteristics between UBC and LBC is not clear.

The purpose of this study is to clarify the radiation characteristics of chorus waves

by analyzing data obtained by the Arase satellite.

This study evaluates the Poynting vector of chorus waves using electric and magnetic

field waveforms observed by the Arase satellite. We computed the Poynting

vector parallel to the ambient magnetic field. The magnitude of the northward and

southward Poynting vector is averaged over the bandwidth of 0.05fce and 1 second

time interval, and is sorted by the distance from the magnetic equator. Frequency

spectral feature such as rising tones are also considered in the analysis. In the case of rising tone LBC, as the frequency of the chorus increases, the region where the large Poynting flux is measured moves the opposite direction compared to the wave propagation direction. In the case of rising tone UBC, the region where the large Poynitng flux is measured shrinks toward the equator as the frequency of the wave increases. On the other hand, waves without frequency chirping do not show the frequency dependence of the region where the large Poynting flux is measured.

From these results, we propose that the excitation region of the rising tone chorus moves as the frequency increases.

We also propose that the excitation region for waves without characteristic frequency chirping does not depend on the wave frequency.

キーワード：あらせ衛星、コーラス
Keywords: The Arase satellite, Chorus

