R006-07
A 会場 ：11/25　PM2 （15:30-18:15）
17:15〜17:30

あらせ衛星観測に基づくコーラス波動強度の経験モデルの構築

#栗田 怜[1)], 三好 由純[2)], 加藤 雄人[3)], 齊藤 慎司[4)], 松田 昇也[5)], 笠原 禎也[6)], 松岡 彩子[7)], 堀 智昭[8)], 寺本 万里子[9)], 山本 和弘[10)], 篠原 育[11)]
([1] 京都大学 生存研, [2] 名大 ISEE, [3] 東北大・理・地球物理, [4] 情報通信研究機構, [5] 金沢大学, [6] 金沢大, [7] 京都大学, [8] 名大 ISEE, [9] 九工大, [10] 名大 ISEE, [11] 宇宙機構／宇宙研

Construction of empirical wave power model of whistler-mode chorus waves based on the Arase observation

#Satoshi Kurita[1)], Yoshizumi Miyoshi[2)], Yuto Katoh[3)], Shinji Saito[4)], Shoya Matsuda[5)], Yoshiya Kasahara[6)], Ayako Matsuoka[7)], Tomoaki Hori[8)], Mariko Teramoto[9)], Kazuhiro Yamamoto[10)], Iku Shinohara[11)]
([1]Research Institute for Sustainable Humanosphere, Kyoto University, [2]Institute for Space-Earth Environement Research, Nagoya University, [3]Department of Geophysics, Graduate School of Science, Tohoku University, [4]National Institute of Information and Communications Technology, [5]Kanazawa University, [6]Emerging Media Initiative, Kanazawa University, [7]Graduate School of Science, Kyoto University, [8]Institute for Space-Earth Environmental Research, Nagoya University, [9]Kyushu Institute of Technology, [10]Institute for Space-Earth Environmental Research (ISEE), Nagoya University, [11]Japan Aerospace Exploration Agency/Institute of Space and Astronautical Science

Whistler-mode chorus waves play crucial roles in the Earth's inner magnetosphere dynamics through wave-particle interactions. In particular, stochastic acceleration by chorus waves is considered to be responsible for the creation of relativistic electrons in the Earth's outer radiation belt during geomagnetic disturbances. The quasi-linear diffusion regime can describe the stochastic acceleration, and modeling works based on the regime successfully reproduce observed flux increase in radiation belt electrons during geomagnetic disturbances. The quasi-linear diffusion model of chorus waves requires information on wave power and the normal angle of chorus waves, which significantly changes the timescale for the acceleration of relativistic electrons. The model describes the wave power distribution as a function of frequency using a Gaussian function. Since the magnetic latitude dependence of this distribution has not been clarified very well, it needs to be incorporated into the model to correctly evaluate the stochastic acceleration of electrons during the propagation of chorus waves from the magnetic equator to higher latitudes.

We aimed to develop the empirical chorus wave model based on the Arase satellite observation, which describes the wave power distribution as a function of frequency as well as MLAT and MLT dependence of the distribution. We have statistically studied the frequency spectra of wave magnetic fields obtained by the Onboard Frequency Analyzer (OFA), a part of the Plasma Wave Experiment onboard the Arase satellite. The wave power of chorus waves is derived from the OFA-SPEC dataset, and the wave power is modeled so that the parameter can be used as inputs of the quasi-linear diffusion model. We report on the integrated wave power distribution of lower-band and upper-band chorus waves as a function of L^*, MLAT, and MLT. The input parameters of the quasi-linear diffusion model are derived from the obtained distributions, and diffusion rates will be calculated using the parameters derived from the Arase observation.