

Comparison of pulsating aurora with and without internal modulation: simultaneous observations with ARASE

*細川 敬祐¹、三好 由純²、尾崎 光紀³、大山 伸一郎^{2,4,8}、小川 泰信⁴、栗田 怜²、笠原 禎也³、笠羽 康正⁵、八木谷 聡³、松田 昇也²、土屋 史紀⁵、熊本 篤志⁵、片岡 龍峰⁴、塩川 和夫²、宮岡 宏⁴、田中 良昌⁴、野澤 悟徳²、寺本 万里子²、高島 健⁶、篠原 育⁶、藤井 良一⁷

*Keisuke Hosokawa¹, Yoshizumi Miyoshi², Mitsunori Ozaki³, Shin-ichiro Oyama^{2,4,8}, Yasunobu Ogawa⁴, Satoshi Kurita², Yoshiya Kasahara³, Yasumasa Kasaba⁵, Satoshi Yagitani³, Shoya Matsuda², Fuminori Tsuchiya⁵, Atsushi Kumamoto⁵, Ryuho Kataoka⁴, Kazuo Shiokawa², Hiroshi Miyaoka⁴, Yoshimasa Tanaka⁴, Satonori Nozawa², Mariko Teramoto², Takeshi Takashima⁶, Iku Shinohara⁶, Ryoichi Fujii⁷

1. 電気通信大学、2. 名古屋大学宇宙地球環境研究所、3. 金沢大学、4. 国立極地研究所、5. 東北大学、6. 宇宙航空研究開発機構／宇宙科学研究所、7. 情報・システム研究機構、8. オウル大学

1. University of Electro-Communications, 2. Institute for Space-Earth Environmental Research, Nagoya University, 3. Kanazawa University, 4. National Institute of Polar Research, 5. Tohoku University, 6. Japan Aerospace Exploration Agency/Institute of Space and Astronautical Science, 7. Research Organization of Information and Systems, 8. University of Oulu

Pulsating aurora (PsA) is one of the major types of aurora often seen in the lower latitude part of the auroral region in the morning side. PsA is known to have two distinct periodicities. One is the main pulsation whose period ranges from a few to a few tens of seconds. The other is so-called internal modulation which is ~3 Hz luminosity modulation during the ON phase of main pulsation. Previous studies indicated that ~50% of PsA are accompanied by the internal modulation (i.e., internal modulation is often seen, but not always observed during PsA). Recent coordinated ground/satellite observations of PsA suggested that these two periodicities are closely associated with the intensity modulation of whistler mode chorus waves in the morning side magnetosphere. In particular, the association between the main pulsation and bursts of chorus was confirmed by many examples. However, it is still under debate which characteristics of chorus waves control the existence/absence of internal modulation.

During the first coordinated campaign observations of PsA with the ARASE/ERG satellite in March 2017, we obtained two good case examples of simultaneous observations of PsA and chorus by the all-sky imagers (ASIs) and ARASE. During one of the cases in Scandinavia on March 29 (Case A), the correspondence between the periodicities of chorus burst and main pulsation was extremely good. However, it was difficult to identify signatures of discrete chorus elements and internal modulation. During the other case in Alaska on March 30 (Case B), on the other hand, good correlation was seen between chorus elements and internal modulations. These results imply a relationship between the existence of discrete chorus elements and appearance of internal modulation. In the presentation, we discuss what kind of background conditions control the appearance of chorus elements and internal modulation by comparing the two case examples.

Acknowledgement: The operation of the EMCCD camera at Sodankylä has been supported by Sodankylä Geophysical Observatory (SGO).

キーワード：脈動オーロラ、コーラス波動

Keywords: Pulsating aurora, Chorus waves

