

Mesospheric ionization during a substorm: A case study of PANSY and Arase satellite observations

Kiyoka Murase¹, Ryuho Kataoka^{1,2}, Takanori Nishiyama^{1,2}, Koji Nishimura^{1,2,3}, Taishi Hashimoto^{1,2},
Yoshimasa Tanaka^{1,2,3}, Akira Kadokura^{1,2,3}, Yoshihiro Tomikawa^{1,2}, Masaki Tsutsumi^{1,2},
Kaoru Sato⁴ and Yoshizumi Miyoshi⁵, Yoshiya Kasahara⁶, Tatsuhiko Sato⁷

¹*The Graduate University for Advanced Studies, SOKENDAI*

²*National Institute of Polar Research*

³*ROIS-DS, Polar Environment Data Science Center*

⁴*Department of Earth and Planetary Science, University of Tokyo*

⁵*Institute for Space–Earth Environmental Research, Nagoya University*

⁶*Graduate School of Natural Science and Technology, Kanazawa University*

⁷*Japan Atomic Energy Agency*

A transient deep atmospheric ionization at 65 km altitude was identified by PANSY radar at Syowa station, associated with auroral breakup (Kataoka et al., 2019). The detailed mechanism which lead to the precipitation of energetic electrons remains open question. In this presentation, we report another good example of mesospheric ionization event during a moderate substorm event occurred on 25-26 May, 2017, in which footprints of the Arase satellite passed across the all-sky field of view of Syowa station. A transient ionization at 68 km was identified during the growth phase, while the Arase satellite did not observe electro-magnetic ion-cyclotron waves or chorus waves. During the recovery phase, however, the Arase satellite observed whistler mode waves associated with pulsating auroras over Syowa station, and PANSY observed associated modulation of mesospheric echo power at ~80 km. We quantitatively discuss the mechanisms of the mesospheric ionization PANSY radar observed during this substorm event, also combining air-shower simulation and riometer observation.

References

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