

Fine structures in the E-region plasma density of the ionosphere observed by a Ca⁺ resonance scattering lidar observation

*Mitsumu K. Ejiri¹, Takanori Nishiyama¹, Takuo T. Tsuda², Makoto Abo³, Katsuhiko Tsuno⁴, Satoshi Wada⁴, Takayo Ogawa⁴, Takuya Kawahara⁵, Takuji Nakamura¹

1.National Institute of Polar Research, 2.The University of Electro-Communications, 3.Graduate School of System Design, Tokyo Metropolitan University, 4.RIKEN, 5.Faculty of Engineering, Shinshu University

The National Institute of Polar Research (NIPR) is developing a new resonance scattering lidar with multiple wavelengths to install and operate it at Syowa, Antarctica. The lidar will observe temperature profiles and variations of minor constituents such as Fe, K, Ca⁺, and aurorally excited N₂⁺ in the mesosphere and lower thermosphere. In August 2014, it received the first light from Ca⁺ in a sporadic E layer. After that, we increase the resolution of the Ca⁺ observation and have succeeded in getting the Ca⁺ profile with time/height resolution of 5 sec/15 m. As a result of the high resolution observations, fine structures in a sporadic E layer with a vertical width of only 1 -2 km have become detectable clearly. In this presentation, we will show the observed fine structures and discuss atmospheric instabilities in the E-region plasma.

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