

## **Preliminary results of Ca<sup>+</sup> observation at Syowa Station and Japan by a frequency-tunable resonance scattering lidar**

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The National Institute of Polar Research (NIPR) is leading a prioritized project of the Antarctic research observations. One of sub-project is entitled the whole atmosphere system revealed by precise profiling over the Antarctic. Profiling dynamical parameters such as temperature and wind, as well as minor constituents is the key component of observations in this project, together with a long term observations using existent various instruments at Syowa, Antarctica (69S). As a part of the sub-project, a new resonance scattering lidar system with frequency-tunable alexandrite laser was developed and installed at Syowa Station by the 58th Japan Antarctic Research Expedition (JARE 58). Density profiles of minor constituents such as iron (Fe), potassium (K), and calcium ion (Ca<sup>+</sup>) in the mesosphere and lower-thermosphere region were successfully observed at NIPR (36°N, 139°E) during a period of observation test (2013-2016) and at Syowa Station (69°S, 40°E) in 2017 and 2018. In this study, Ca<sup>+</sup> density variations are focused on. Ca<sup>+</sup> layers were often observed over Japan as a thin layer corresponding to the sporadic *E* (*E<sub>s</sub>*) layer detected by Ionosonde. On the other hand, only a weak Ca<sup>+</sup> layer was observed at Syowa Station. We will report characteristics of Ca<sup>+</sup> layer over Antarctica comparing with those over Japan.