R005-02
A 会場 ：11/24　PM1 （13:15-15:15）
13:30〜13:45

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Investigation on K variations during wintertime observed at Syowa Station, Antarctic

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Metallic layers, such as Na, Fe, K, etc., originating from meteors are valuable tracers for observations of the Earth's upper atmosphere. Through investigations on variations in such metallic layers, it would be important to advance our understanding of the dynamical and chemical processes in the upper atmosphere. Many observations for Na and Fe have been done for decades, and their variations have been widely investigated. On the other hand, observational data on K are relatively limited. As for previous K observations, there are several reports from several resonance scattering lidars located in, for example, Arecibo, Puerto Rico (18.35° N, 66.75° W), Beijing, China (40.41° N, 116.01° E), and Kühlungsborn, Germany (54.1 ° N, 11.7° E), which are the observational sites in the Northern Hemisphere. In addition, a shipboard-lidar campaign between 71° S and 45° N was carried out, and it provided limited information on the K layer variations in the Southern Hemisphere. Furthermore, there are investigations based on near-global K data, which were obtained from observations of K resonance scattering of the sunlight by a polar-orbit satellite, Odin/OSIRIS. The satellite observations were limited during the daytime, which means that the obtained data are mainly during summer at high latitudes. Thus, there are fewer K observations in winter high latitudes in the Southern Hemisphere, where there is less sunlight.

In the present work, we have investigated seasonal variations in the K layer over Syowa Station (69.0° S, 39.6° E), Antarctic, based on observational data which were obtained by a resonance scattering lidar. The resonance scattering lidar was operated from 2017 to 2018. During the period, K density data of 385 hours for 38 nights were obtained mainly during the Antarctic winter. These data were analyzed to investigate seasonal variations in the K layer over Syowa Station. As a result, the K peak density reached a maximum in June-July during wintertime. Then, a minimum of the K peak density was observed in September during springtime, The relative variation of K column density observed at Syowa Station agrees with the previous observations in the Northern Hemisphere, but those absolute values in the K column density show differences. The variation of K centroid altitude observed at Syowa Station seems to be close to the results from Odin/OSIRIS, while it was different from those from the lidar observations in the Northern Hemisphere. The variation of RMS width in K layer over Syowa Station presents the opposite of that from Arecibo, but it agrees with those from Kühlungsborn and Beijing. To discuss important factors that contribute to the observed K variations, we have investigated relationships with the background temperature and oxygen atom density and found signatures that both two factors would provide important contributions to the variation of the K density during Antarctic winter.