

Resonance scattering lidar system at Syowa Station in Antarctica: Test observations of potassium layer in Japan

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We are developing a new resonance scattering lidar system to be installed at Syowa Station (69S, 39E) in Antarctica. For the new lidar system, we have employed a tunable alexandrite laser covering the resonance scattering wavelengths of two neutral species, which are atomic potassium (K, 770.11 nm) and atomic iron (Fe, 386.10 nm), and two ion species, which are calcium ion (Ca^+ , 393.48 nm) and aurorally excited nitrogen ion (N_2^+ , 390.30 nm, 391.08 nm). Thus the new lidar system will provide information on the mesosphere and lower thermosphere as well as the ionosphere. Using the new resonance scattering lidar and other instruments, we will conduct a comprehensive ground-based observation of the low, middle, and upper atmosphere above Syowa Station. This unique observation is expected to make important contribution to studies on the atmospheric vertical coupling process and the neutral and charged particle interaction. In this presentation, we introduce the new resonance scattering lidar system and report current status of its development. In particular, our presentation focus on test observations of potassium layer at National Institute of Polar Research in Tachikawa, Japan.

Keywords: Resonance scattering lidar, Potassium layer, Syowa Station, Antarctica