

Optimization of an etalon system for Rayleigh lidar daylight observations with an 82-cm telescope

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A Rayleigh lidar to monitor atmospheric temperature from the troposphere to the mesosphere and upper clouds (PSC, PMC) in high altitudes was installed at Syowa Station in February January 2011 by the 52nd Japanese Antarctic Research Expedition (JARE 52). In the first season of the Syowa Rayleigh lidar observation, Polar Mesospheric Summer Echoes (PMSEs) observation by the lidar and the HF radar was successfully conducted [Suzuki et al. in prep]. A new receiver system of 35 cm telescope with a combination of a polarizer and an etalon was placed in Syowa by JARE 53 and started taking data. With this system, we confirmed an improvement of the signal to noise ratio by a factor of three. To detect weaker signal with an 82cm-telescope, an optimized etalon was simulated (air gap: 100 micrometer, reflection: 89%). In this presentation, we discuss this etalon and the expected signal to noise ratio.

Keywords: Syowa station, Rayleigh lidar, etalon, daytime observation