

第 VIII 期重点研究観測による昭和基地上空の中層超高層大気の観測

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Observations of the middle and upper atmosphere over Syowa station, Antarctica by JARE VIII-th term prioritized research project

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Japanese Antarctic Research Expedition (JARE) has started the VIII-th six-year mid-term project in 2010, and the 52th JARE departed in November 2010 commenced observations of the six-year project. The middle and upper atmosphere study in the VIII-th term, named as 'Global environmental change revealed by observing the Antarctic middle and upper atmosphere', is one of the sub-projects of the prioritized research project entitled "Global warming revealed from the Antarctic". PANSY (Program of the Antarctic Syowa MST/IS) radar, and a Rayleigh/Raman lidar system have been newly installed besides the existing radio and optical instruments such as an MF radar, HF radar (Super DARN radar), ionosondes, an OH spectrometer and an all-sky airglow imager in Syowa station, in order to clarify variabilities on the atmosphere from the ground to the upper atmosphere. Also installed was a millimeter wave spectrometer.

PANSY radar is a 47 MHz VHF radar with 500 kW output power and **20,000 m² antenna array**. The radar observes wind velocities from the troposphere to the mesosphere, as well as plasma parameters in the ionosphere. Three groups of antenna (1/18 of full system) was installed during summer operation of the 53th JARE and the polar mesospheric summer echo (PMSE) was successfully detected in January 2012. Scientific observation started since April 2012 and the tropospheric winds has been measured continuously. The Rayleigh/Raman lidar observes temperature and clouds in the mesosphere, the stratosphere and part of the troposphere. In order to extend the height coverage to include mesosphere and lower thermosphere region, and also to extend the parameters observed, we are planning to install a multi-wavelength resonance scatter lidar and developing a new laser. The millimeter spectrometer measures density profiles of O₃ and other species. Since January 2012, NO density has been measured in order to observe day-to-day variation. As a result, an enhancement of NO due to precipitation of energetic electron from the radiation belt was detected successfully in April 2012. The current status and the future plan of the project will be presented in the talk.