

南極昭和基地大型大気レーダー計画 (PANSY)

佐藤 薫¹、堤雅基²、佐藤亨³、中村卓司²、齊藤昭則⁴、富川喜弘²、西村耕司⁵、山岸久雄²、山内恭²

¹ 東京大学大学院理学系研究科

² 国立極地研究所

³ 京都大学大学院情報学研究科

⁴ 京都大学大学院理学研究科

⁵ 情報・システム研究機構新領域融合研究センター

Program of the Antarctic Syowa MST/IS Radar (PANSY)

Kaoru Sato¹, Masaki Tsutsumi², Toru Sato³, Takuji Nakamura², Akinori Saito⁴, Yoshihiro Tomikawa², Koji Nishimura⁵,
Hisao Yamagishi², Takashi Yamanouchi²

¹ *Department of Earth and Planetary Science, University of Tokyo, Tokyo, Japan.*

² *National Institute of Polar Research, Tokyo, Japan.*

³ *Department of Communications and Computer Engineering, Kyoto University, Kyoto, Japan.*

⁴ *Department of Geophysics, Kyoto University, Kyoto, Japan*

⁵ *Transdisciplinary Research Integration Center, Research Organization of Information and Systems*

Syowa Station is one of the distinguished stations, where various atmospheric observations for research purposes by universities and institutes as well as operational observations by Japan Meteorological Agency and National Institute of Information and Communications Technology are performed continuously. National Institute of Polar Research plays a central part in the operations. The observation of the Antarctic atmosphere is important in two senses. First, it is easy to monitor weak signal of the earth climate change because contamination due to human activity is quite low. Second, there are various unique atmospheric phenomena in the Antarctic having strong signals such as katabatic flows, the ozone hole, noctilucent clouds, and auroras. The middle atmosphere is regarded as an important region to connect the troposphere and ionosphere. However, its observation is sparse and retarded in the Antarctic compared with the lower latitude regions; nevertheless the vertical coupling through the mechanisms such as momentum transport by gravity waves is especially important in the polar region.

Since 2000, we have developed an MST/IS radar to be operational in the Antarctic and have made feasibility studies including environmental tests at Syowa Station. Various significant problems have been already solved, such as treatment against low temperature and strong winds, energy saving, weight reduction, and efficient construction method. A current configuration of the planned system is a VHF (47MHz) Doppler pulse radar with an active phased array consisting of 1045 yagis.

The value of the PANSY project has been approved internationally and domestically by resolutions and recommendations from international scientific organizations such as IUGG, URSI, SPARC, SCOSTEP, and SCAR. The scientific research objectives and technical developments have been frequently discussed at international and domestic conferences and at a scientific meeting at NIPR organized by the PANSY group every year. Special and union sessions of PANSY were organized at related scientific societies such as MSJ (Meteorological Society of Japan), SGEPS (Society of Geomagnetism and Earth, Planetary and Space Sciences) and JpGU (Japan Geophysical Union) to deepen the discussion. The PANSY project was authorized as one of main observation plans for the period of JARE52-57 in 2008, and funded by Japanese government in 2009. We will start the radar construction in early 2011. After one year for initial test observations, MST/IS observations will be made over 12 years which covers one solar cycle.

<http://pansy.eps.s.u-tokyo.ac.jp/>