

Data Processing and Archive System for the Antarctic PANSY Radar

Koji Nishimura^{1,2*}, Masaki Tsutsumi², Yoshihiro Tomikawa², Toru Sato³, Taishi Hashimoto³, Masashi Kohma⁴, Kaoru Sato⁴

¹ Polar Environment Data Science Center, Tachikawa 190-8518, Japan

² National Institute of Polar Research, Tachikawa 190-8518, Japan

³ Dept. Communications and Computer Engineering, Kyoto Univ., Kyoto 606-8501, Japan

⁴ Dept. Earth and Planetary Science, The Univ. of Tokyo, Tokyo 113-0033, Japan

Email: knish@nipr.ac.jp

Summary. Program of Antarctic Syowa MST/IS (PANSY) Radar is the first and the only mesosphere-stratosphere-troposphere (MST) and incoherent-scatter (IS) radar in the Antarctic region. It continuously observes the atmosphere from about 1,500 m through 500 km above the Syowa Station (69S, 40E) as of 2012. Since the station is remote both in physical access and data communications, special treatments are needed for archiving and transporting the large amount of data that the radar yields. *The PANSY data archiving system (PANDA)* is the integrated data management system devoted to PANSY radar, equipped with realtime data processing, archive, transfer, quick-look display, and search functions.

Keywords. PANSY radar, MST/IS radar, Syowa Station.

1. PANSY Radar

PANSY Radar, which has been installed and set up in the Japanese Syowa Station through 2012 to 2016, is the first and currently the only MST/IS radar in the Antarctic [1]. This radar has a capability of measuring the neutral wind as from the altitude of 1.5 up to about 100 km, and the ionized atmosphere above that. Syowa Station is isolated not only in physical access that is almost solely maintained by the Japanese icebreaker ship, but also in communications that is mainly supported by Intelsat. PANSY radar is continuously producing a large amount of data but, reflecting the limited bandwidth, the data is limited we can transfer realtime to Japan.

In this presentation, we present the scheme and the system for data transfer, archive and distribution for PANSY radar.

2. PANDA, Data Management System

PANSY radar is in operation 24 hours and yielding data of roughly 3 MB/min (~4 GB/day) as time series. In order to reduce the occupancy in the communication bandwidth, however, we

temporally integrate the power spectra into ones with a data rate of about 400 kB/min and transfer them realtime via Intelsat to the hub in National Institute of Polar Research, Japan, and then to other spokes.

The original time series data are hand-carried once a year by the ship. Until the transport, for a risk of accidental losses, the data are multiply stored in physically separate buildings in the station. As the storage system is so distributed with a satellite channel inbetween, coherent data handling is needed.

Thus we have developed the integrated data management system PANDA, with some peripheral functions such as a quick-look display and a health monitoring of the system. In this talk, we present our data management and operation based on the PANDA system.

References

1. Sato, K., Tsutsumi, M., Sato, T., Nakamura, T., Saito, A., Tomikawa, Y., Nishimura, K., Kohma, M., Yamagishi, H., Yamanouchi, T., Program of the Antarctic Syowa MST/IS radar (PANSY). *J. Atmospheric Sol.-Terr. Phys.*, 118, 2-15, 2014