

## **Current status and future plan of the Program of the Antarctic Syowa MST/IS radar (PANSY)**

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Atmospheric circulation is one of the key processes in the climate system. Gravity waves, Rossby waves, tides have ability to redistribute momentum and energy in the atmosphere and play important roles to determine the circulation through nonlinear processes such as wave-wave and wave-mean flow interactions and instability. Thus, quantitative understanding of the atmospheric circulation mechanisms based on precise and high-resolution observations is crucial for accurate prediction and projection of the global earth climate on various time scales from days to one solar cycle and beyond. However, the data shortage especially in the high latitude region had prevented the progress of the research.

The PANSY radar, the first mesosphere-stratosphere-troposphere (MST)/incoherent scatter (IS) radar in the Antarctic, could provide invaluable observation data with fine vertical and time resolution to solve this problem. The PANSY radar was constructed in 2011 and its full-system continuous operation over about 13 years to capture the whole solar cycle started on the 1st of October 2015. During the IXth JARE, intensive observations with multi-instruments at Syowa Station and international collaborations via the MST radar network, which was completed by the PANSY radar construction, have been performed in the framework of AJ0901. Particularly, the mechanism of the interhemispheric coupling initiated with a sudden stratospheric warming event in the Arctic has been scrutinized by combination of high-resolution general circulation models (GCMs) covering the whole neutral atmosphere. To make initial values for the GCM simulation, a new data assimilation system has also been developed.

We will report the current status of the PANSY project including results from four successful international observation campaigns (Interhemispheric Coupling Study by Observations and Modelling, ICSOM; PI:K. Sato) and show our future plan for Phase X of Japanese Antarctic Research Project.