

Antarctic Syowa station SENSU SuperDARN radars in the 9th phase of JARE Antarctic project (2016-2023)

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Syowa SENSU SuperDARN HF radars are important components of SuperDARN, the international HF radars network since 1995 and have significantly contributed to understanding not only magnetosphere-ionosphere coupling system but also MLT region dynamics. As SuperDARN radars were originally designed to reveal global polar ionospheric plasma convection patterns in both hemispheres in real time, its spatial resolution has been relatively low. As the number of new scientific targets like comparison with mid and small scale aurora phenomena, meso scale transient phenomena, elementary generation and decay process of field aligned irregularities, PMSEs and fine height profile of neutral wind has been increasing, higher spatial and temporal resolution observations have been essentially desired and of great importance. Imaging radar technique has been tried to be applied and developed to overcome these issues. We show the current status of the SENSU imaging radar system, and will discuss particularly on the scientific targets including coming JARE (Japanese Antarctic Research Expedition) project phase IX (2016-2023) and the future perspectives which can be revealed by this new technique using SuperDARN. In the phase IX JARE project. Our research group has proposed a research program to JARE project focused especially on possible grand minimum influences on geospace environment and inner magnetospheric dynamics and the detail plans including collaboration with other satellite and ground-based observation and its contribution to the project "Study of coupling processes in solar-terrestrial system" as well as the international VarSITI program will be discussed.

Keywords: SuperDARN, Antarctic Syowa Station, Japanese Antarctic Research Expedition project phase 9, Grand minimum, inner magnetosphere, VarSITI