昭和基地 SENSU SuperDARN イメージングレーダーと第 IX 期南極研究観測計画

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Syowa SENSU SuperDARN imaging radar and JARE project phase IX

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SENSU Syowa HF radars are important components of SuperDARN, the international HF radars network since 1995 and have significantly contributed to understanding not only magnetosphere-ionosphere system and their couplings 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 have 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 our preparation of the SENSU imaging radar system, and will discuss particularly on the scientific targets including coming JARE (Japanese Antarctic Research Expedition) project phase IX (2016-2022) and the future perspectives which can be revealed by this new technique using SuperDARN.

1995 年以来国際短波帯レーダーネットワーク観測プロジェクトである SuperDARN の重要な一翼を担ってきた SENSU 昭和基地 HF レーダーの空間分解能を飛躍的に向上させる為のイメージング化の準備がほぼ整った状況であり、詳細な現況を中心に報告する。また、イメージング化の実現によって研究の発展が期待される、オーロラや電離圏不規則構造近傍の詳細な電離圏電場構造の観測による電磁圏・磁気圏結合物理素過程の研究、様々なメソスケールの過渡的現象や波動現象、電離圏不規則構造自体の生成消滅物理素過程の研究、更には、高精度中性風や PMSE 等の観測による中間圏下部熱圏研究への貢献の可能性、また、人工衛星等の飛翔体観測、他の地上ネットワーク乃至拠点観測との連携の具体的な観測計画、そして間もなく始まる第 IX 期南極研究観測計画への貢献について議論し、将来展望も行う。