南極広域観測網による太陽－地球系現象の総合研究

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Synthetic Study on Solar-Terrestrial Phenomena with Circumpolar Observation Network in Antarctica

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A large observation network with the SuperDARN radars and other ground-based instruments at manned and unmanned stations is currently developed in the Antarctic area from sub-auroral latitudes to polar cap region and from nightside to dayside hours under international collaboration. Such a wide-spread circumpolar observation network is very unique and powerful for studies on the phenomena which occur due to the Sun-Earth interaction, e.g., direct entry of solar wind energy and momentum into the cusp and polar cap regions, explosive energy dissipation during substorm-time, highly energetic particle precipitation into the atmosphere during storm-time. In the coming phase IX of the Japanese Antarctic Research project, coordinated observations with several magnetospheric satellite projects, e.g., MMS (Magnetospheric Multiscale Mission), ERG (Energization and Radiation in Geospace), etc., can be expected

現在南極域には、SuperDARN レーダー網や地上の有人、無人観測点における様々な観測機器による観測点網など、極を取巻いて、緯度方向にはサブオーロラ帯から極冠域まで、経度方向には、夜側から昼間側の時間帯にまで及ぶ広域観測網が国際協力の下展開されている。こうした広域観測網は南極域独自のものであり、太陽－地球相互作用の結果生じる現象：昼間側カスプ域、極冠域への太陽風エネルギー、運動量の直接的な侵入、サブストーム時の爆発的なエネルギー消費、ストーム時の高エネルギー粒子の大気への侵入、などの研究に適している。第IX期日本南極地域観測計画期間には、ERG 衛星や MMS 衛星といった磁気圏観測衛星計画と連携した観測・研究が期待出来る。

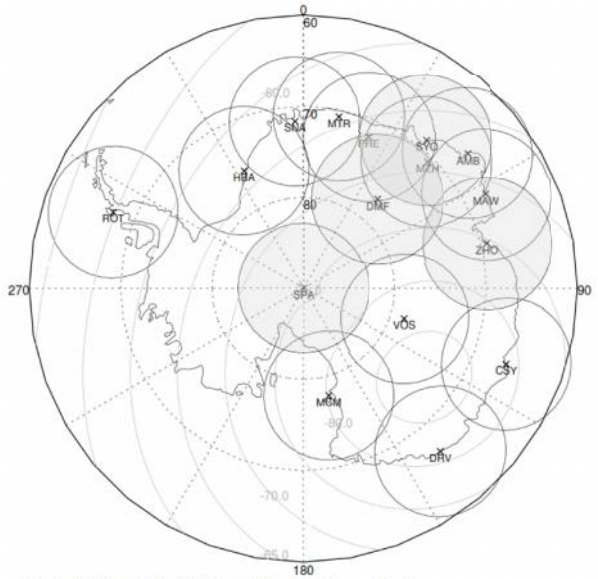

Figure 1. Field of views (FOVs) of Antarctic stations projected at 120 km altitude for elevation above 5 deg. The shaded FOV indicates the station where auroral optical observation is currently carried out. Geomagnetic latitudes are also shown in gray lines.

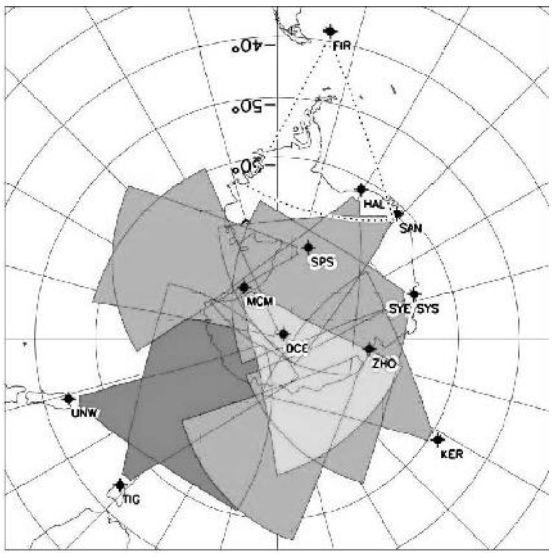

Figure 2. Field of views of the SuperDARN radars in the southern hemisphere in the magnetic coordinates, including two radars at Syowa Station (SYE and SYS).