次期太陽活動期におけるジオスペース探査： ERGプロジェクト

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The ERG project

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It has been known that the energetic particles in the ring current and radiation belts are drastically changed during magnetic storms. Comprehensive observations of particle, fields, and waves are necessary to understand key processes of particle acceleration in the inner magnetosphere. The geospace exploration project: ERG (Energization and Radiation in Geospace) has been proposed, in order to investigate the acceleration process of particles in the inner magnetosphere up to the relativistic energies and the global dynamics of Geospace during the next solar maximum. The project consists of three groups; satellite (ERG-satellite), ground-network observations (ERG-ground networks), and modeling/data-center (ERG-theory/modeling).

he ERG satellite will be launched into a geosynchronous transfer orbit with a small inclination during the next solar maximum (~2012). The ERG satellite will observe particles of a wide range of energies from a few eV to 10 MeV with measurements of ion species. The satellite will also observe fields and waves for both electric and magnetic components. The pre-Phase A studies for the ERG satellite, including concept study and basic design of the instruments, are now going in ISAS/JAXA.

Several domestic ground network groups join the ERG project (ERG-ground networks) such as radars, magnetometers, and optical measurements. The remote-sensing of geospace from these ground-based networks are essential to obtain global images of geospace mapped on the ionosphere. Combinations with the in-situ observations by the ERG-satellite will provide the excellent data set to resolve the particle acceleration processes occurring in geospace. Several universities and institutes in Japan have plans to develop various networks at subauroral latitudes for the next solar maximum.

The ERG project also will include a comprehensive data center and modeling/simulation efforts including data assimilation (ERG-theory/modeling). In fact, the new modeling project; GEMSIS have started at STEL, Nagoya University, since 2007.

Finally, during the next solar maximum, several geospace projects are planned; THEMIS and RBSP (US) and ORBITALS (Canada). International collaboration with these projects under the ILWS and CAWSES programs are important and will make fruitful contribution to the study of geospace.