

Future direction of the ground-based network observations of the magnetosphere and the upper atmosphere

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Multi-point ground-based instruments are powerful tools to investigate global dynamics of the magnetosphere, ionosphere, and the upper atmosphere. Airglow imagers and multi-point GPS receivers provide two- and three-dimensional view of these regions. The ring-current and radiation-belt particles in the inner magnetosphere round the earth with a time scale from a few tens of minutes to a few hours. Interactions of these particles with Pc5 (times scale of ~minutes), Pc1 (~Hz) and VLF/ELF chorus (~kHz) causes acceleration and loss of these particles. Thus, longitudinal chain of ground-based stations to observe these various waves and auroras is essentially needed to understand the acceleration and loss of the plasma in the inner magnetosphere. The auroral energy input from the solar wind and magnetosphere to the high-latitude ionosphere is a major energy source of the dynamic variation of the upper atmosphere. Intense convective activity in the equatorial troposphere gives another energy source of the dynamic variation of the upper atmosphere. Thus, meridional chain stations are essentially needed to understand these dynamic variations and their global coupling. In this presentation we discuss possible future directions of these ground-based network observations to understand the global dynamics of the magnetosphere, ionosphere, and the upper atmosphere.

Keywords: ground-based network observation, ionosphere, magnetosphere, upper atmosphere, future direction