

Monitoring and Forecast of Space Environment by Using Global Magnetometer Network Observations

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We can nowcast and forecast the space environment by using the magnetometer network observations. Characteristics of daytime DP 2, Pi 3 and Pc 3 are associated with the solar wind parameter. From phase delays of Pi 2s, we can deduce the source region in the magnetosphere. The phase gradient and the dual-station H ratio techniques of the field-line resonances are useful to identify the plasmopause, and to diagnose the small scale plasma structure in the magnetosphere. From the network observation of sfe and the monitoring of solar wind at the L1 point, we can forecast the process of geomagnetic storms. In order to clarify the middle atmosphere-ionosphere interaction, we have to study seasonal variations of Sq and wind variations in the middle atmosphere.

In this paper we will review how we can nowcast and forecast the space environment by using the global magnetometer network observations. Activities and characteristics of daytime DP 2, Pi 3 and Pc 3 are deeply associated with the solar wind parameter (V_{sw} , BIMF, cone angle, dynamic pressure). From phase delays of nighttime Pi 2s, we can deduce the source region of Pi 2s in the magnetosphere. The phase gradient and the dual-station H ratio techniques of the field-line resonances are useful to identify the plasmopause, and to diagnose the small scale plasma structure in the magnetosphere.

On the other hand, from the ground-based network observation of sfe and the monitoring of solar wind changes at the L1 point, we can forecast the process of geomagnetic storms. In order to clarify the middle atmosphere-ionosphere interaction, we have to study seasonal variations of the Sq current and wind variations in the middle atmosphere by using the global network observations.

Further fundamental studies by coordinated ground-based network and satellite observations are needed to understand space environment changes, which control impacts of GIC's, high energetic particle precipitation, and radioactive rays in the South Atlantic anomaly region on the atmospheric environment, human technologies and ecosystems.