

The separation of temporal and spatial fluctuation of magnetic field data obtained by SWARM satellites.

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It is difficult to separate temporal and spatial fluctuation from data obtained by satellites.

Sugiura et al. (1984) suggested that the small-scale magnetic fluctuations over the high-latitude ionosphere are mainly caused by small-scale field aligned currents. We revealed the fact observationally by using the high-time resolution magnetic data from SWARM satellites.

We took correlation coefficients between satellite-A and satellite-B by shifting time (i.e., correlation function) and picked up the peak of them for each time interval used for the calculation. Then we found, sometimes, the value of correlation coefficient without time shifting is larger than that with time shifting. In short, temporal fluctuations are sometimes more dominant than special fluctuations.

To compare with the results obtained by Ishii et al, (1992), we analyzed this tendency in more detail by changing filtering window, latitudes and MLT.

In addition, we show the relationship with AE index to estimate the effort of external factors (e.g. substorms).

Keywords: SWARM satellites, high-latitude ionosphere, field-aligned current, magnetic fluctuations, separation of temporal and spacial fluctuations