

THEMIS 衛星を用いた地球近傍磁気圏における磁気圧・プラズマ圧変動の位相関係の統計的研究

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Statistical study of phase relationships between magnetic and plasma thermal pressures in the near-earth magnetosphere

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The auroral finger-like structures appear in the equatorward part of the auroral oval in the diffuse auroral region, and contribute to the auroral fragmentation into patches during substorm recovery phase. In our previous presentations, we reported the first conjugate observation of auroral finger-like structures using the THEMIS GBO cameras and the THEMIS satellites, which was located at a radial distance of ~ 9 Re in the dawnside plasma sheet. In this conjugate event, we found anti-phase fluctuation of plasma pressure and magnetic pressure with a time scale of 5-20 min in the plasma sheet. This observational fact is consistent with the idea that the finger-like structures are caused by a pressure-driven instability in the balance of plasma and magnetic pressures in the magnetosphere. Then we also searched simultaneous observation events of auroral finger-like structures with the RBSP satellites which have an apogee of 5.8 Re in the inner magnetosphere. Contrary to the first result, the observed variation of plasma and magnetic pressures do not show systematic phase relationship. In order to investigate these phase relationships between plasma and magnetic pressures in the magnetosphere, we statistically analyzed these pressure data using the THEMIS-E satellite for one year in 2011. In the preliminary analysis of pressure variation spectra, we found that out of phase relationship between magnetic and plasma pressures occupied 40 % of the entire period of study. In the presentation, we will discuss these results in the context of relationships between the pressure fluctuations and the magnetospheric instabilities that can cause auroral finger-like structures