Relationship between sawtooth scillations and solar wind dynamic pressure variations

이대영[1], L. R. Lyons[2]
[1]충북대학교, [2]UCLA

During a magnetic storm, several cycles of changes in the energetic particle flux and magnetic field are often observed in the inner magnetosphere, which can be most easily seen by the geosynchronous spacecraft. The question of where this so-called sawtooth oscillations comes from is currently a hot issue in the magnetospheric physics, and certainly important for the storm-substorm relationship problem. In the present work, we have examined the relationship between the sawtooth events and the solar wind dynamic pressure. It is found that each cycle of the sawtooth oscillations has a one-to-one association with series of jumps in the solar wind dynamic pressure during the southward IMF period. It is the percentage change rather than the absolute value of the dynamaic pressure that triggers the sawtooth oscillations. Also, multi-spacecraft observation of the solar wind is crucial as the spatial structure of the solar wind is often serious enough that one spacecraft measurement can easily miss the presence of the dynamic pressure jump.