



Signature of solar wind turbulence in the ground magnetic field and its relation to ion acceleration

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The effect of solar wind turbulence on the magnetospheric environment is still unclear. We show that the strength of the magnetic field variation measured by ground-based observations (INTERMAGNET) is associated with variations of the interplanetary magnetic field direction and the solar wind speed. The variation is strongest during the declining phase of the solar cycle and is associated with high speed streams and Alfvén waves in the solar wind. Using Cluster observations, we show that during the declining phase, the ions are effectively accelerated to energies above 100 keV in the plasma sheet. This implies that on long time scales, enhanced solar wind magnetic field fluctuations and wind speeds lead to favorable conditions for effective ion acceleration in the plasma sheet. The acceleration is associated with magnetic turbulence (ultra-low-frequency) in the plasma sheet.