Contribution of Magnetic Reconnection Events to Energy Dissipation in Magnetosheath Turbulence

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Through analyzing the measurements of Magnetospheric Multiscale spacecraft (MMS) in the magnetosheath, we obtain the statistical results for the contribution of magnetic reconnection (MR) events at electron scales to the energy dissipation of coherent structures. To identify the MR events, we consider the following criteria such as the current sheet with magnetic field reversal, significant energy dissipation, and evident electron outflow velocity. The Partial Variance of Increments (PVI) method is employed to find coherent structures in the magnetic field data, out of which the current sheet structures with reversal of magnetic field component are further selected. Statistically, for most MR events, their energy dissipations are stronger than that of others. However, due to the relatively small proportion of MR events, their contribution to the energy dissipation of coherent structures is relatively trivial. If taken into account the dissipation of non-coherent structures, the MR's contribution to energy dissipation would be less. Hence, we suggest that MR events, though have strong dissipation locally, are not the major contribution to the energy dissipation in the magnetosheath. After analyzing the non-MR current sheets, we proposed that non-MR current sheets may be caused by Kinetic Alfvén Wave.