RECONNBECTION RATE AND ENERGY CONVERSION AT THE MAGNETOPAUSE: MULTIPOINT MEASUREMENTS AND SIMULATION

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We use the multi-spacecraft mission Cluster to make observational estimates of the local energy conversion across the dayside high-latitude magnetopause. The energy conversion is estimated during eleven complete magnetopause crossings under steady south-dawnward interplanetary magnetic field (IMF). We describe a new method to determine the reconnection rate from the magnitude of the local energy conversion. The reconnection rate as well as the energy conversion varies during the course of the eleven crossings and is typically much higher for the outbound crossings. This supports the previous interpretation that reconnection is continuous but its rate is modulated. These results have been compared to results of the BATSRUS global MHD simulation based on the observed IMF conditions. We found that BATSRUS correctly reproduce the energy conversion observed by Cluster and the magnitude of the estimated energy conversion from Cluster and the model are in good agreement. Our results may be used to validate and scale BATSRUS to improve predictions of the total energy input to the magnetosphere, which is of importance for Space Weather.

Reconnection, Energy conversion, Magnetopause

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