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Mars lacks a global intrinsic magnetic field, resulting in a complex induced magnetosphere shaped by its interaction with solar wind. This interaction induces a dawn-dusk asymmetry in the magnetotail current sheet, and the cause of this behavior is unknown. Spacecraft observations and numerical simulations have been used to study this system, but inconsistencies persist between observations and model predictions, even under nominally identical solar wind conditions. We use the Block Adaptive Tree Solar wind Roe-type Upwind Scheme (BATS-R-US) multispecies magnetohydrodynamic (MHD) code to investigate the physical processes driving the magnetotail current sheet asymmetry and to improve consistency with spacecraft observations. This investigation compares the baseline grid configuration from the parameter study to two Mars atmosphere and Volatile EvolutioN (MAVEN) passes on 28 May 2017. Results show encouraging agreement between BATS-R-US simulations and MAVEN observations, demonstrating the ability of the BATS-R-US model to reproduce key features observed in spacecraft data.
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