



Magnetic reconnection and flux rope in the Martian magnetotail current sheet
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As a ubiquitous plasma configuration in various cosmic plasma environments, the current sheet is critical in facilitating the release of magnetic energy through explosive processes^[1,2], such as fast magnetic reconnection. On Earth, magnetic reconnection in the tail current sheet can be responsible for triggering substorms and generating auroras. Recent observations have indicated that reconnection in the Martian tail enhances ion escape from the planet's atmosphere^[3,4]. Utilizing observations obtained from the Mars Atmosphere and Volatile Evolution (MAVEN) spacecraft, we present the characteristics of the Martian tail current sheet and unveil the occurrence rate of magnetic reconnection in the current sheet. By comparing the results with those in the Earth's magnetotail, we will discuss the reasons for the observed differences. Furthermore, we report two types of flux ropes successively observed in the magnetic reconnection exhaust in the Martian tail. We also found that the Alfvénic dayside-produced plasma clouds are accelerated by tail magnetic reconnection, providing a plausible explanation for the tail bursty mass escape.

References

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