



Contribution ID: 8

Type: **Invited talk**

# In situ observation of mass ejections caused by magnetic reconnections in the ionosphere of Mars

*Thursday, January 23, 2025 9:40 AM (20 minutes)*

Explosive mass ejections triggered by magnetic activities are common on our Sun and other stars in the Universe. However, there is a lack of evidence for such explosive phenomena in magnetized or partially magnetized planets with atmospheres. Here we present direct evidence for explosive mass ejections from the Martian ionosphere, resulting from magnetic reconnections between strong crustal field regions with open magnetic fields. A plasma density cavity with signatures of magnetic reconnection that is directly evident for an eruptive mass ejection caught in the act indicates that a considerable amount of ionospheric mass has been rapidly ejected into space. Although Martian mass loss associated with magnetic reconnection has been reported previously, our results demonstrate that explosive mass ejections can occur even on partially magnetized planets without global magnetic fields. In this scenario, we suggest that strong localized magnetic fields extending above the exobase are needed. In situ observations reveal explosive mass ejections due to magnetic reconnection in the ionosphere of Mars, with a density cavity as direct evidence. Reconnection between strong open crustal fields can rapidly eject a large amount of mass from Mars.

## Contribution Type

### Theme

Solar - Stellar Connections

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