



Contribution ID: 94

Type: **Contributed talk**

Magnetospheric Dynamics and Atmospheric Mass Loss driven by Solar-Stellar Winds and Storms

Thursday, January 23, 2025 4:25 PM (15 minutes)

Coronal Mass Ejections (CMEs) are massive eruptions of supersonic magnetized plasma from stellar atmospheres. They create adverse space weather conditions around (exo)planets and can significantly perturb their environment. We investigate how varying ICME characteristics —such as speed, orientation, and magnetic field strength —affect the global dynamics, atmospheric mass loss rates and magnetotail current density during reconnection events in (exo)planetary magnetospheres. We find a highly correlated polarity reversal of the induced magnetosphere with stellar wind magnetic field orientations for unmagnetised planets, and as the planetary magnetospheric field strength increases, the polarity reversal in the vicinity of the planet becomes less pronounced. Detailed analysis of the magnetotail current density during polarity reversals for unmagnetized planets aligns closely with observations of the Venusian-induced magnetosphere. We discuss the implications of our findings for solar forcing of planetary atmospheres that are relevant for upcoming space missions.

Contribution Type

Theme

Solar - Stellar Connections

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Session Classification: Stellar Activity as a Limiting Factor for Characterising Exoplanets