SUPRA ARCADE DOWNFLOWS WITH XRT INFORMED BY DIPOLARIZATION FRONTS WITH THEMIS

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ABSTRACT:
Magnetic reconnection can rapidly reconfigure the magnetic field of the corona, accelerating plasma through the site of reconnection. Ambiguities due to the nature of remote sensing have complicated the interpretation of observations of the inflowing and outflowing plasma in reconfiguring regions. In particular, the interpretation of sunward moving density depletions above flare arcades (known as Supra Arcade Downflows — SADs) is still debated. Hinode/XRT has provided a wealth of observations for SADs and helped inform our current understanding of these structures. SADs have been interpreted as wakes behind newly reconnected and outflowing loops (Supra Arcade Downflowing Loops — SADLs). Models have shown the plausibility of this interpretation, though this interpretation has not yet been fully accepted. We present here observations of newly reconnected outflowing loops observed via situ instruments in the magnetosphere. These observations, provided by five THEMIS spacecraft, show that around retraction loops (dipolarization fronts in this context) similar dynamic temperature and density structures are found as seen in SADs. We compare data from multiple SADs and dipolarization fronts to show that the observational signatures implied in the corona can be directly observed in similar plasma regimes in the magnetosphere, strongly favoring the interpretation of SADs as wakes behind retracting loops.

REFERENCES:

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