

Reconstruction of 3D coronal magnetic structures from THEMIS/MTR and Hinode/SOT vector maps

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Abstract. Coordinated campaigns with THEMIS, Hinode and other instruments have allowed us to study faculae, filaments and active regions. The objective of such a work is to study the magnetic configuration of these magnetic structures and understand the initiation of solar eruptive events, flares and CMEs. The polarimetry analysis of THEMIS/MTR and Hinode/SOT data gives consistent results using UNNOFIT or MELANIE inversion codes. SOT allows to detect fine flux tubes in faculae, MTR allows us to have magnetic information at different levels in the atmosphere. Using other magnetic vectors observed by THEMIS/MTR in an active region as the boundary conditions, we constructed a 3 D magnetic field structure in an active region with the nonlinear force-free field extrapolation. We removed the 180 degree ambiguity of the transverse fields and minimized the force and torque in the observed vector fields to construct a consistent bottom boundary condition for the nonlinear force-free field model. Then, we found a twisted magnetic flux rope along the polarity inversion line. The magnetic flux rope is well aligned with part of an H α filament. The flux rope is located at the place where a flare is initiated about two hours later.