A method for calculating differential emission measures using the X-Ray Telescope on Hinode

Kathy K. Reeves

Harvard-Smithsonian Center for Astrophysics

Mark A. Weber

Harvard-Smithsonian Center for Astrophysics

Abstract. In this work, we validate a method for calculating differential emission measures (DEMs) with data from the X-Ray Telescope (XRT) on Hinode. The method we use is distributed in the XRT SolarSoft distribution as xrt_dem_iterative2.pro. We validate this routine by calculating a variety of model DEMs, generating synthetic XRT intensities from these DEMs, and then using the xrt_dem_iterative2 routine to reconstruct the model DEMs. We find that the χ^2 between the model and calculated observations (as output by xrt_dem_iterative2.pro) correlates well with the χ^2 value between the model and calculated DEMs, when we apply a bootstrap method that can compensate for the poorly constrained parts of the calculated DEMs. This indicates that the χ^2 of the obervations is a good proxy for how well the calculated DEM matches the "real" DEM. We also examine the effects of using different filters in the DEM calculation. Finally, we use the validated method to determine the properties of some post flare loops.