

Multi-thermal structures above a polar region observed with XRT and EIS.

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Abstract. A solar eclipse is a good opportunity to observe faint objects in the solar corona with the XRT as pointed out by Kano et al. (2008, PASJ), because we can well calibrate the amount of scattered X-rays from the other bright areas. From the XRT observation of the eclipse on February 17 in 2007, Kano et al. (2008, PASJ) reported a positive vertical gradient of the coronal temperature above a polar coronal hole, and suggested that the coronal heating happened not near the surface but around a height of 100Mm. Because they used the XRT filter ratio method for deriving the coronal temperature by assuming a single temperature along each line of sight, effects of multi-thermal structure in the corona to the filter ratio method should be checked. Therefore, we carried out the coordinated eclipse observation between XRT and EIS on January 26 in 2009. We derived not only the filter-ratio temperature map above a polar region from the XRT data but also the differential emission measure (DEM) distributions at different altitudes above the limb from the EIS data. The DEM distributions show not a single temperature structure but a widely spreading multi-thermal structure, and suggest that the positive gradient of the XRT filter-ratio temperature above a polar region is not an intrinsic temperature structure in the corona but an apparent effect of hydrostatic weighting of multi-thermal vertical threads as suggested by Aschwanden and Nitta (2000, ApJ).