

Solar Soft X-ray Irradiance Obtained with Hinode/ XRT Full-Sun Images

Stefanie Davis(Weatherford College, USA) and Aki
Takeda(Montana State University, USA)

In this project, full-sun images from the X-Ray Telescope(XRT) on board the Hinode satellite were used to find the temperature and emission measure of the solar corona and solar soft x-ray irradiance. The Al-mesh and Thin-Be filter images were selected from January 2008 to June 2021. Using the filter ratio method, the emission measure and temperature were obtained. The temperature and emission measure were used to calculate isothermal coronal spectra with Chianti atomic database(version 9.0). The irradiance can be derived by integrating over the wavelength range of 5-60 Å, which includes the peak response of the XRT filters.

These results were then compared to a previous study that used Al-mesh/Ti-poly and Al-mesh/Al-poly filter pairs. In this comparison, the Al-mesh/Thin-Be temperature was higher by 11.5% than the previous study. However, when comparing the emission measures of the two studies, it was found that the composite of Al-mesh/Ti-poly and Al-mesh/Al-poly was higher by 34.2% than the Al-mesh/Thin-Be filter study. Interestingly, the irradiance was much like the emission measure, where the Al-mesh/Thin-Be pair was lower by 34% than the previous study. In addition, the irradiance calculated for

Al-mesh/Thin_Be was compared to monthly averaged sunspot numbers across the same time range. This showed a striking similarity between the two, and thus suggests a strong correlation.