

Ellen Pettigrew

Abstract:

The Solar X-ray Imager (SXI) on the GOES-12 satellite is an x-ray telescope that was used to image the sun at a one to two minute cadence throughout its lifetime. While it was operational (April 2003 - April 2007), it accumulated over two million images, which are stored and made available to the public by the National Geophysical Data Center (NGDC). In a large subset of this database the sun-center coordinates that are recorded in image headers have errors of up to 30 arcseconds, significantly reducing the database's utility to researchers by preventing the use of standardized image-analysis procedures. These errors are strongly correlated to thermal distortions in instrument components and therefore they can be reduced in post-processing by the implementation of an empirical correction factor based on temperature values. In this project, statistical analyses were performed to determine an appropriate correction factor and this correction was implemented in existing image-processing code. The correction factor was shown to successfully reduce the pointing errors to fewer than 5 arcseconds for a significant majority of all images tested.