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Developing a Continuous Record of the Data from the GOES Extreme Ultraviolet Sensor

Abstract

For many years, thermosphere and ionosphere modelers, including those supporting NOAA and the Department of Defense (DOD), have been requesting solar extreme ultraviolet (EUV) irradiance data for ionospheric and thermospheric modeling because it is a key variable to these systems. Variations in EUV irradiance produce large variations in neutral and electron densities on time scales ranging from minutes to years. Currently modelers have been using F10.7 radio flux data, which is a proxy for EUV and is only available at a daily cadence. In response to these requests, the Geostationary Operational Environment Satellites (GOES) 13, 14, and 15 suites of space weather sensors included the capability to measure EUV irradiance with an instrument called the EUV Sensor (EUVS). The EUVS measures irradiance in five separate broadband channels at a cadence of 10 seconds. However, until now the data had remained unused because it had not been analyzed and made ready for public access. The focus of this project has been to create a continuous record of EUV irradiance in the A, B, and E broadband channels at a cadence of one minute dating back to July 2009 using the EUVS data from GOES 13, 14 and 15. In order to do this, we compared the data between the three different satellites during their operational time periods, specifically when those periods overlapped. We then scaled the data to one another to create a smooth, continuous record that could actually be used rather than the disjointed one that existed prior to the adjustments. In this presentation, I will discuss in detail the data analysis tools and methods we used to accomplish this task.