Automating the Characterization of Solar Flares

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The future Geostationary Operational Environmental Satellite (GOES) EUV and X-Ray Irradiance Sensors (EXIS) will continue the more than 30-year record of solar X-Ray measurements. Unlike previous GOES X-Ray Sensors (XRS) instruments the EXIS-XRS will use silicon detectors and by using a quadrant photodiode will be able to locate solar flares on the disk of the Sun. A similar photodiode on Solar Dynamics Observatory's (SDO) Extreme ultraviolet Experiment (EVE) EUV SpectroPhotometer (ESP) instrument was launched in February of 2010, monitoring the Sun in the soft X-Ray 0.1 – 7 nm (0-order) band. I have created a database of recent flares, as recorded by the current GOES satellites and found the corresponding flare in ESP's zeroth order channel. ESP's significantly higher time cadence data provide a more detailed view of the evolution of a solar flare. This allowed me to examine the relationship between the magnitude and rise time of a flare. Using this correlation I developed a flare finding algorithm that automates the flare detection process, providing information on both flare location and magnitude.