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Poster
We present the X-ray Time of Flare Forecast (X-TOFF) tool, a real-time forecasting system designed to predict the remaining duration of solar flares as they unfold. Building upon the methods described in Reep et al. (2021), the original X-TOFF ingested continuous GOES X-ray data to determine key flare parameters—such as start time, time of maximum derivative, and peak time—which are dynamically marked on an interactive display. This display features two plots that update at a one-minute cadence, one showing the GOES X-ray flux and the other its time derivative, providing updated predictions of flare end times as new data arrive.

The operational utility of X-TOFF was clearly demonstrated during the Hi-C and FOXSI-4 rocket launch campaign. The tool's accurate flare duration forecasts, particularly of the decay phase, provided the necessary confidence for the Hi-C team to capture critical phases of a large solar flare, thereby underscoring its value in real-time observational decision-making.

In our latest development, we have successfully integrated data from the Extreme Ultraviolet Variability Experiment (EVE) on the Solar Dynamics Observatory (SDO) into the X-TOFF system. Covering the 0.1–7.0 nm range, the EVE data offer improved latency over GOES XRS data and have significantly enhanced the timeliness and precision of our flare duration forecasts. We will present a comprehensive evaluation of the upgraded X-TOFF tool, comparing its performance with the previous GOES-only configuration and discussing the implications for future space weather forecasting.

Our results demonstrate the benefits of low-latency multi-instrument integration for real-time solar flare prediction and offer promising advancements for operational forecasting in future solar observational campaigns.

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