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Poster
Solar flares are some of the most energetic phenomena in the Solar System, producing bursts of radiation across the electromagnetic spectrum which can lead to space weather impacts, including radio blackouts and increased satellite drag. Operational products for flares have typically included long-term probabilistic forecasts (e.g., probability that a flare of a given size will occur over a given time period) and flare alerts (e.g., notification when the flare flux has already reached a high level), leaving a gap in the forecast horizon. For a variety of research and operational purposes, there is a need for predictions that are more actionable than long-term probabilistic forecasts and provide earlier notice than current flare alerts. In addition to potential space weather applications, having earlier notice of impactful flares can support triggered observations of scientifically interesting events. To address this gap, we are working to develop a real-time early solar flare alert, with the goal of leveraging flare onset signatures to predict the magnitude and duration of an ensuing eruptive event. Here we describe this concept and the implementation of a preliminary early flare alert system to support a successful and unprecedented solar-flare-triggered sounding rocket launch in April 2024 to observe a large flare with novel solar instrumentation. We additionally discuss the observational needs for improving this flare alert system in the future.

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