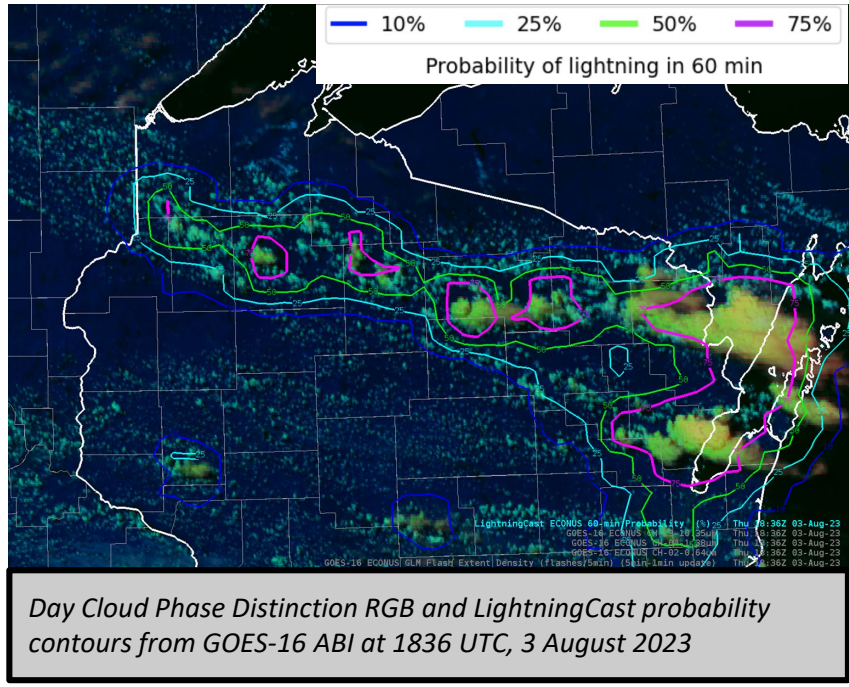


LightningCast

Quick Guide

What is LightningCast?

LightningCast is an AI model that uses *images* from [GOES-R ABI](#) to predict lightning in the next hour at any given location. It was trained using [GLM](#) flash-extent density as the target or “truth” data. LightningCast learned salient *multispectral and spatial* features from ABI data. The primary goal of LightningCast is to predict *lightning initiation* in developing convection in an automatic, quantitative, and objective fashion.



Inputs

Band, wavelength	Physically relates to
C02, 0.64 μm	Cloud optical thickness
C05, 1.6 μm	Cloud phase
C13, 10.3 μm	Surface or cloud-top temperature
C15, 12.3 μm	Cloud-top temperature/height

Primary Applications

Lightning initiation: Used to assess when cumuliform clouds will soon become electrified. Probabilities in the 20-50% range often provide 20 minutes or more of lead time to initiation.

Convective maintenance: Used to monitor strengthening or weakening convection. Changes in probabilities often coincide with changes in storm-top appearance and properties.

Limitations

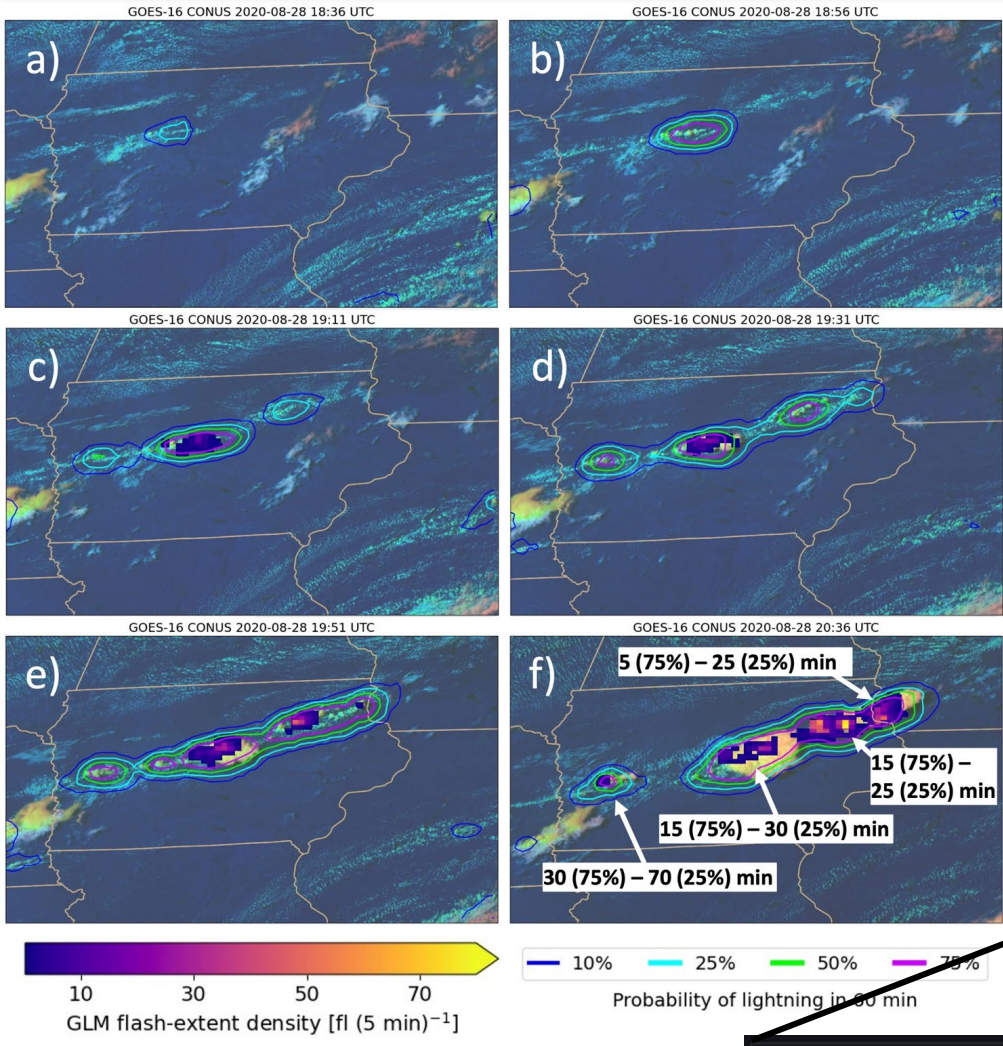
Convection under thick ice: Limited ability to monitor convection developing under a thick anvil.

Tropical Cyclones: Very tall, cold clouds that don't produce much lightning can cause false alarms.

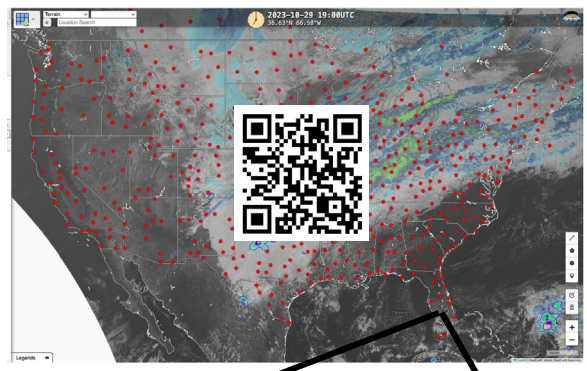
Diurnal/Seasonal: LightningCast is more accurate during the day and during the warm season (Apr-Oct). It tends to over-predict convection in the cool season (Nov-Feb).

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Left: A sequence of images depicting the evolution of LightningCast probabilities along a cold front in Iowa, superimposed on the day cloud phase distinction RGB and GLM flash-extent density from GOES-16. Lead times to the initial GLM flashes for several areas of interest are annotated in (f), showing lead times in minutes from both the 75% and 25% probability thresholds.



From webpage, lightning dashboards at airports, stadiums, wildfires. Data is parallax-corrected.

Coverage

- GOES-West PACUS
- GOES-West Mesoscales 1 and 2
- GOES-West American Samoa
- GOES-West Alaska / west Canada
- GOES-East CONUS
- GOES-East Mesoscales 1 and 2
- GOES-East OPC/TAFB offshore zones
- Himawari Guam

