

Probability Scoreboard

<https://sep.ccmc.gsfc.nasa.gov/probability/>

Intensity Scoreboard

<https://sep.ccmc.gsfc.nasa.gov/intensity/>

All-Clear Scoreboard

<https://sep.ccmc.gsfc.nasa.gov/allclear/>



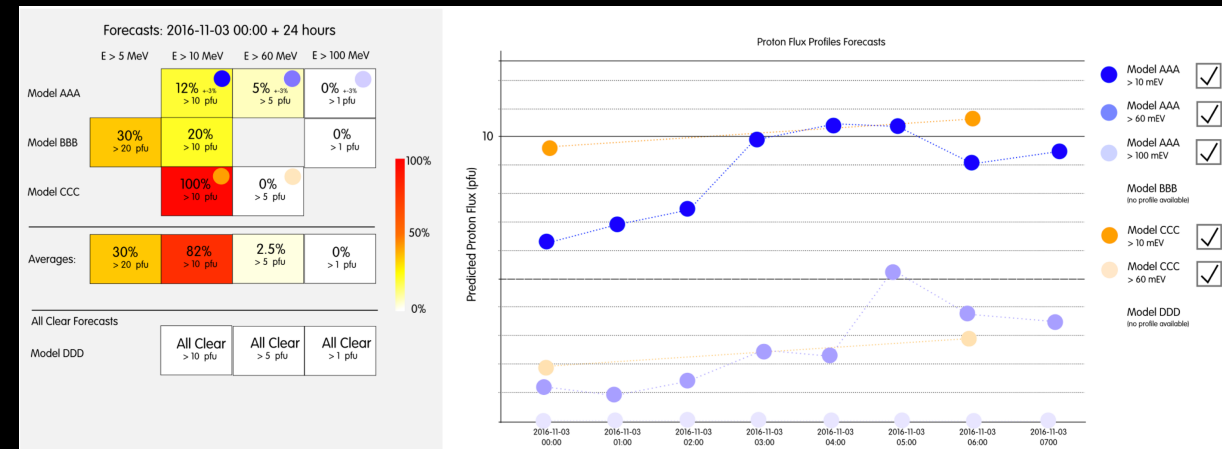
Go here!

The SEP Scoreboards

A Discussion on Improving the Scoreboards with Input from the Community

SEP Scoreboard Development

- Planning started in 2016 led by BIRA-IASB, GSFC, and the UK Met Office
- Similar idea to the Flare Scoreboard and CME Scoreboard where real-time model results are displayed together
- Almost a completely automated system where models run at the CCMC, store output in the iSWA data tree, and display results on the scoreboards
- SRAG's involvement starting in 2018 helped transition SEP models from research to operations and guided development of the scoreboard displays
 - Development focused toward use in operations by SRAG



Early display mock-up

Models on the SEP Scoreboards

Model	Predicts	Energies (MeV)	Scoreboards
UMASEP	Threshold crossing, Max intensity	>10, >30, >50, >100, >500	All-Clear, Intensity
REleASE	Proton intensity	15.8-39.8, 28.2-50.1	Intensity
MAG4	SEP event occurrence	>10	All-Clear, Probability
SEPSTER	Peak intensity	14-24, >10, >30, >50, >100	All-Clear, Intensity
SEPSTER2D	Peak intensity	>10, >100	All-Clear, Intensity
SEPMOD	Time profile	>10, >100	All-Clear, Intensity
SAWS-ASPECS	SEP event occurrence, Time profile	>10, >30, >100, >300	Probability, Intensity
SPRINTS	SEP event occurrence	>10, >30, >50, >100	Probability

Detailed descriptions here: <https://ccmc.gsfc.nasa.gov/scoreboards/sep/> 

Model Catalog

Search by name

Found 9 models [Reset Filters](#)

HESPERIA_RELEASE
High Energy Solar Particle Events foRecasting and Analysis Relativistic Electron Alert System for Exploration
Version: v20190101
Status: Production
[Continuous/RT Run \(ISWA data tree\)](#)
[Continuous/RT Run \(ISWA layout\)](#)
[Continuous/RT Run \(SEP Scoreboard Intensity\)](#)

MAG4
Magnetogram Forecast
Version: v20190904
Status: Production
[Continuous/RT Run \(Flare Scoreboard\)](#)
[Continuous/RT Run \(SEP Scoreboard Probability\)](#)
[Continuous/RT Run \(ISWA data tree\)](#)

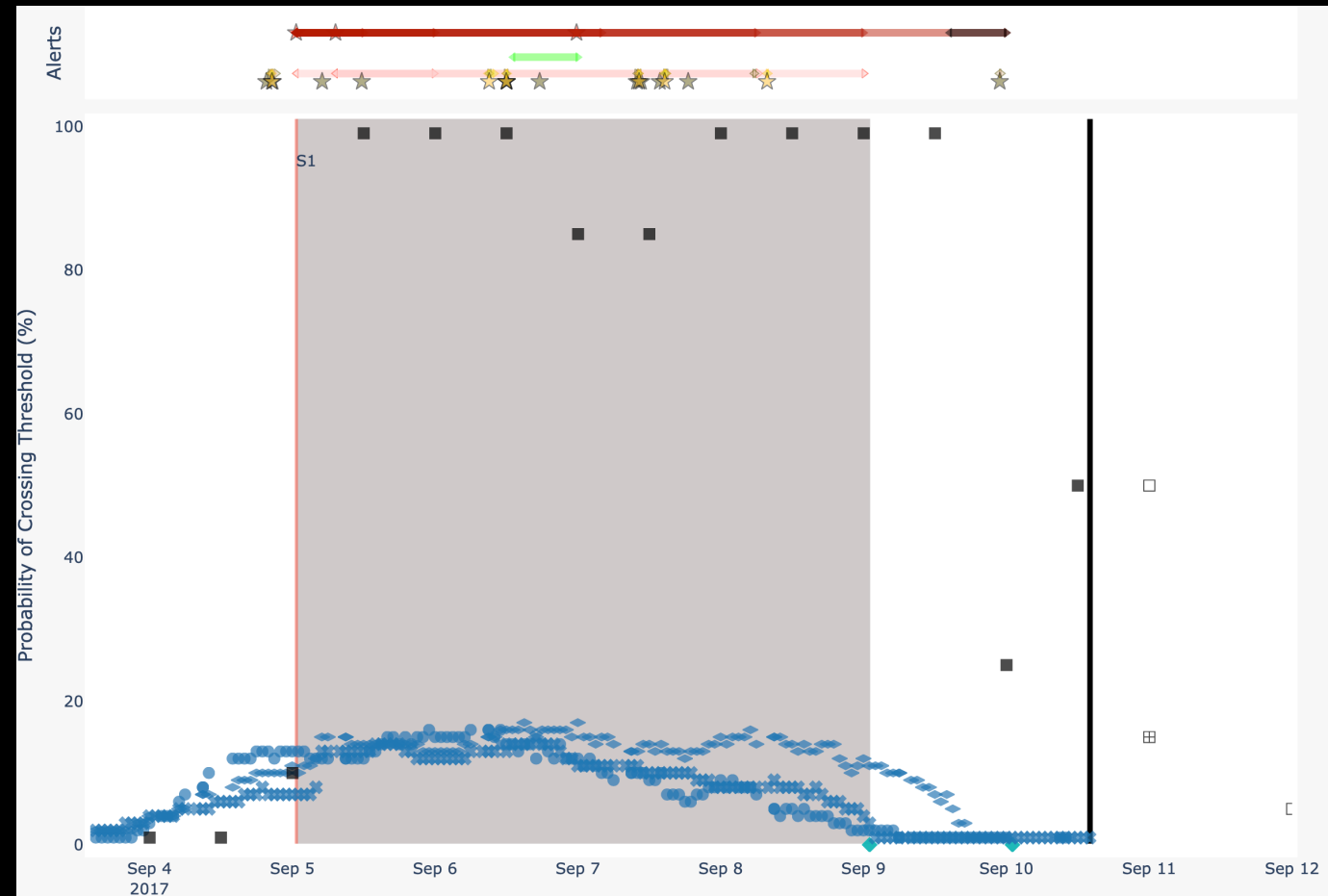
MLSO_K-Cor_CMEs
MLSO K-Cor Automated CME Catalog
Version: 1.0
Status: Result Only
[Continuous/RT Run \(ISWA data tree\)](#)
[Continuous/RT Run \(SEP Scoreboard Intensity\)](#)
[Continuous/RT Run \(SEP Scoreboard Probability\)](#)

SAWS-ASPECS
Solar Particle Radiation Advanced Warning System - Advanced Solar Particle Events Casting System
Version: 1.2
Status: Result Only
[Continuous/RT Run \(ISWA data tree\)](#)
[Continuous/RT Run \(SEP Scoreboard Intensity\)](#)
[Continuous/RT Run \(SEP Scoreboard Probability\)](#)

SEPMOD

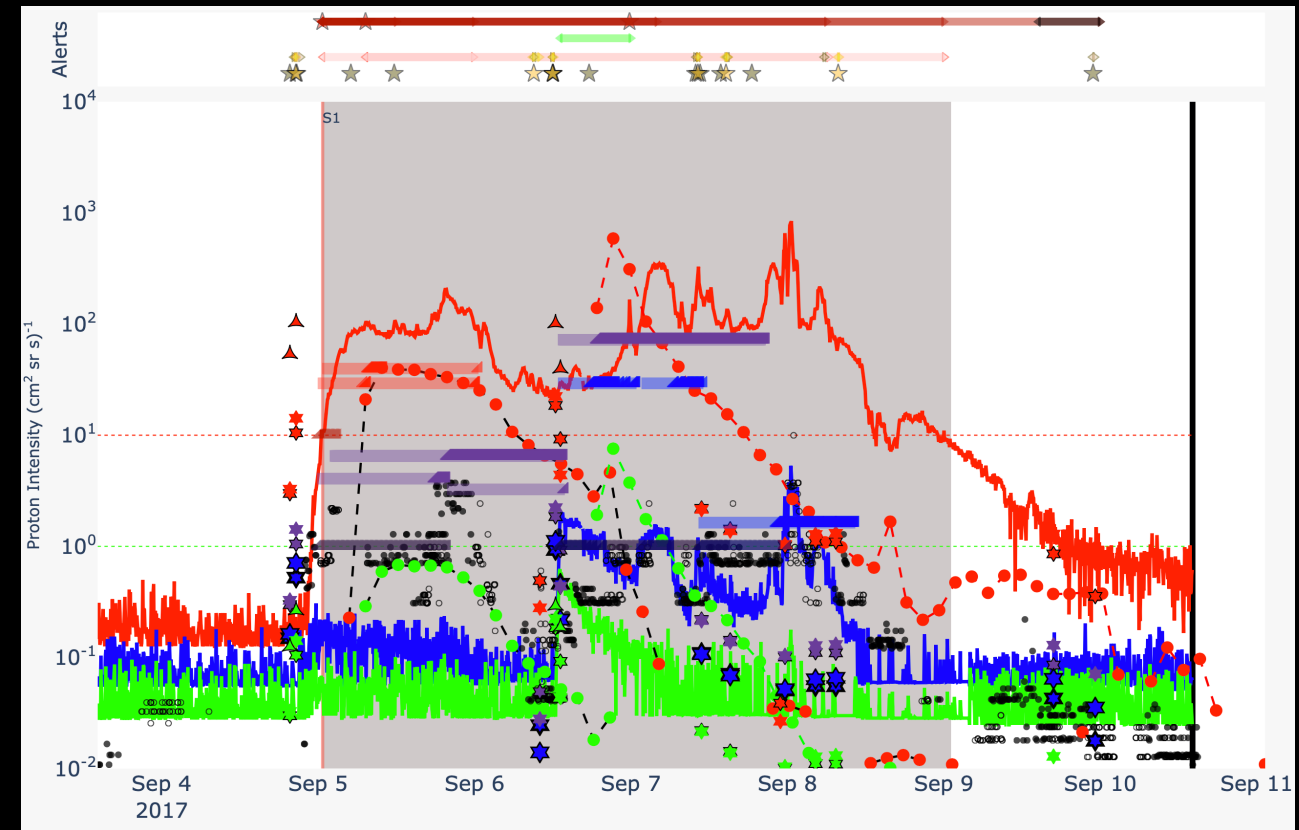
SEP Probability Scoreboard

- Displays model results for the probability of an SEP event occurring within the model's prediction window
 - SPE = GOES >10 MeV protons >10 pfu
 - ESPE = GOES >100 MeV protons >1 pfu
 - and others
- Model forecasts:
 - MAG4
 - SAWS-ASPECS
 - SPRINTS
- Human forecasts:
 - SWPC



SEP Intensity Scoreboard

- Displays model results of proton intensity including threshold crossing time, peak intensity, and intensity time profile
- GOES proton intensity and ACE electron intensity displayed in real-time for quick comparisons
- Model forecast:
 - UMASEP
 - REleASE
 - SEPSTER and SEPSTER2D
 - SEPMOD
 - SAWS-ASPECS
- Observations (in MeV):
 - GOES proton intensity >10, >30, >50, >100
 - ACE electron intensity 175-315



SEP All-Clear Scoreboard

- Displays model results for the categorical prediction of an SEP event occurring
- GOES >10, >100, and >500 MeV proton intensities displayed to indicate the current environment
- Model forecasts:
 - MAG4
 - SEPMOD
 - SEPSTER and SEPSTER2D
 - UMASEP
 - SAWS-ASPECS (in work)
 - SPRINTS (in work)
- Human forecasts:
 - SWPC
- Observations:
 - GOES proton intensity



Live Demo!

- What do other operational groups want to see on the scoreboards?
 - Other energy ranges?
 - Other thresholds?
 - More models?
- How can the scoreboards be used for science?
 - Cross comparison of models?
 - Real-time validation?
 - Ability to download model results and observations currently in the display window?
 - Ability to extract quantities such as event start or end time from time profiles?
- What features can be added?
 - More filters?
 - Better displays?
- What can be improved?
 - Readability?

(or human forecast
or observations!)

<https://ccmc.gsfc.nasa.gov/scoreboards/sep/>

- Fill out CCMC's forms and email the forms to Leila Mays (m.leila.mays@nasa.gov):
 - Registration questionnaire
 - Model on-boarding questionnaire
- Format your model's output into the specific JSON format needed for the SEP Scoreboards and verify with the CCMC that it's correct
- Work with the CCMC to routinely send the JSON files to the CCMC's anonymous FTP server or to install your model at the CCMC

If interested in adding your model, feel free contact me:
philip.r.quinn@nasa.gov

COMMUNITY COORDINATED MODELING CENTER

CMMC Pre-onboarding questions for proposals

<https://ccmc.gsfc.nasa.gov/model-onboarding/>

Switch account

* Required

Email *

Your email

PI Name *

Your answer

Draft proposal title *

Your answer

CMMC support letter

Are you requesting a support letter from CMMC? *

☐ Yes

☐ No

Next

Model/Technique Registration

(* = required)

Information about your group/project:

- Name(s) and e-mail(s) (please list primary contact first*)
- Associated Institution/Project name/Group name*
- Website URL(s)
- Logo(s)

Information about your method:

- Forecasting method name*
- Shorthand unique identifier for your method (methodname_version, e.g.

Visual Schema for JSON files submitted to the SEP Scoreboard

NOTE: naming convention for files submitted:

ModelShortName.PredictionWindowStartTimeIssueTime.json

JSON key		Type	Boundaries	Description	Corresponding command line argument for helper script
sep_forecast_submission			required		
model			required	Model information	
short_name		string	required	Short name (e.g. acronym) of model as appear on scoreboard. Consider including version number with acronym if distinction needed (e.g. cluster ID).	model-short-name
space_id		string	required	Link to URL of full model description metadata in CCMC metadata registry in Shared Internal Format (CCMC) to register your model.	space-id
issue_time		datetime*	required	Forecast issue time (e.g. model run is complete and forecast is created).	issue-time
mode		string	required	allowed values: forecast, historical, reanalysis, assimilated, anytime, forecast, anytime, anytime, anytime	mode
triggers			optional	Previous Forecast is based on trigger. This can be repeated. Contact CCMC to add your trigger if it is missing.	
cme			> 1 allowed, optional		
start_time		datetime*	required, if cme used	Timestamp of 1st coronagraph image CME is visible in	cme-start-time
liftoff_time		datetime*	optional	Timestamp of coronagraph image with 1st indication of CME (first seen by CASIS).	cme-liftoff-time
lat		float	optional	CME latitude (deg)	cme-lat
lon		float	optional	CME longitude (deg)	cme-lon
pa		float	optional	CME plane of sky position angle (measured from solar north in Right Ascension direction)	cme-pa
half_width		float	optional	CME half width (deg)	cme-half-width
speed		float	optional	CME speed (km/s)	cme-speed
acceleration		float	optional	CME acceleration (km/s ²)	cme-acceleration
height		float	optional	CME height at which the above parameters were derived (radial distance from Sun center)	cme-height
time_at_height		datetime*	optional	CME time at specified height	
time		datetime*	required, if time_at_height used		cme-time-at-height-time
height		float	required, if time_at_height used	In solar radii	cme-time-at-height-height
coordinates		string	required, if lat or lon used	Coordinate system for CME location parameters (e.g., HECSS or Geocentric)	cme-coordinates
catalog		string	optional	Name of catalog where CME information was pulled from.	cme-catalog
catalog_id		string	required if catalog=DONKI, otherwise optional	Allowed values: ARTISTS, DONKI, HELIOS, INU APN, CACTUS, NRI, CACTUS, SSC, CORONA, STEREO, SOHO, CAME, STEREO, CORA, SPAN, NAJOK, KASO limited to 100 chars and a new catalog name!	cme-catalog-id
uris		string	> 1 allowed, optional	List of uris where CME information can be found, or information was pulled from.	cme-uris
flare			> 1 allowed, optional		
last_data_time		datetime*	required, if flare used	Last time data timestamp that was used to create forecast (relevant for forecasts issued before flare and time)	flare-last-data-time
start_time		datetime*	optional	Flare start time	flare-start-time
peak_time		datetime*	optional	Flare peak time	flare-peak-time
end_time		datetime*	optional	Flare end time	flare-end-time
location		string	optional	Flare location in Stonyhurst coordinates. NONISO/SOLAR format	flare-location
intensity		float	optional	Flare intensity (W/m ² /sr)	flare-intensity
integrated_intensity		float	optional	Flare integrated intensity (W/m ²)	flare-integrated-intensity
noaa_region		integer	optional	Associated NOAA active region number (including the preceding 1)	flare-noaa-region
peak_ratio		float	optional	The peak ratio of the long and short GOES X-ray channels.	
uris		string	> 1 allowed, optional	List of uris where flare information can be found, or information was pulled from.	flare-uris
cme_simulation			> 1 allowed, optional		
model		string	required, if cme_simulation used	Model name	cme-sim-model
simulation_completion_time		datetime*	optional	Simulation completion time	cme-sim-completion-time