Visual Schema for JSON files submitted to the SEP Scoreboard

NOTE: naming convention for files submitted:
ModelShortName.PredictionWindowStartTime.IssueTime.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 to appear on scoreboard. Consider including version number with acronym if distinction needed. 16 character limit.	model-short-name
spase_id	string	required	Link to URL of full model description metadata in CCMC metadata registry in SPASE format (contact CCMC to register your model).	spase-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, nowcast, simulated_realtime_forecast, simulated_realtime_nowcast	mode
triggers		optional	Provide if forecast is issued based on a trigger. This can be expanded. 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 liftoff (used by CACTUS)	cme-liftoff-time
lat	float	optional	CME latitude (deg)	cme-lat
lon	float	optional	CME longtiude (deg)	cme-lon
pa	float	optional	CME plane-of-sky position angle (measured from solar north in degrees counter-clockwise)	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 (solar radii from Sun center)	cme-height
time_at_height	datetime*	optional	CME time at specificied 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 lat/lon parameters (e.g. HEEQ or Carrington)	cme-coordinates
catalog	string	optional	Name of catalog where CME information was pulled from. allowed values: ARTEMIS, DONKI, HELCATS, JHU APL, CACTUS_NRL, CACTUS_SIDC, CORIMP, SEEDS, SOHO_CDAW, STEREO_COR1, SWPC, MLSO_KCOR (contact us to add a new catalog name)	cme-catalog
catalog_id	string	required if catalog=DONKI, otherwise op	id that uniquely identifies this CME data in the catalog	cme-catalog-id
urls	string	> 1 allowed, optional	List of urls where CME information can be found, or information was pulled from	cme-urls
derivation_technique		optional		
process	string	required if derivation_technique used	automated/manual	
method	string	required if derivation_technique used	SWPC_CAT, StereoCAT, Plane-of-sky, FlareDerived	
measurement_type	string	optional	allowed values: LE (leading edge), TE (Trailing Edge), RHB (Right Hand Boundary), LHB (Left Hand Boundary), BW (Black White Boundary), COR (Prominence Core), DIS (Disconnection Front), SH (Shock Front)	
flare		> 1 allowed, optional		
last_data_time	datetime*	required, if flare used	Last data time timestamp that was used to create forecast (relevant for forecasts issued before flare end times)	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. N00W00/S00E00 format	flare-location
intensity	float	optional	Flare intensity (W/m^2)	flare-intensity
integrated_intensity	float	optional	Flare integrated intensity (J/m^2)	flare-integrated-intensity
noaa_region	integer	optional	Associated NOAA active region (including the preceding 1)	flare-noaa-region
peak_ratio	float	optional	The peak ratio of the long and short GOES X-ray channels	
catalog	string	optional	Name of catalog where flare information was pulled from. allowed values: SolarSoft Latest Events, DONKI, Solar, Demon, COMESEP, SWPC (contact us to add a new catalog name)	flare-catalog
catalog_id	string	required if catalog=DONKI, otherwise op	id that uniquely identifies this flare data in the catalog	flare-catalog-id
urls	string	> 1 allowed, optional	List of urls where flare information can be found, or information was pulled from	flare-urls
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
urls	string	> 1 allowed, optional	List of urls where simulation information can be found, or information was pulled from	cme-sim-urls
particle_intensity		> 1 allowed, optional		
observatory	string	required, if particle_intensity used	Name of observatory/spacecraft/model data are from	pi-observatory
instrument	string	required, if particle_intensity used	Name of instrument data are from	pi-instrument
last_data_time	datetime*	required, if particle_intensity used	Last time data timestamp used to create forecast	pi-last-data-time
intensity	float	optional	Intensity value	
units	string	required, if intensity used	units for intensity value	
energy_channel	float	required, if intensity used	energy channel info for the intensity value	
min	float	required, if intensity used	min of energy channel range	
max	float	required, if intensity used	max of energy channel range. -1 represented an unbounded integral channel	
units	string**	required, if intensity used	energy channel units	
species	string	required, if intensity used	allowed values: electron, proton, helium, helium3, helium4, oxygen, iron, ion	
forecast_issue_time	datetime*	optional	For alert systems based on model inputs, the intensity value is a model forecast. Enter the issue time for that forecasted intensity value here.	
ongoing_events		> 1 allowed, optional	If an ongoing event triggers your forecast, list the properties you used	
start_time	datetime*	required, if ongoing_events used	start time	pi-ongoing-events-start-time
threshold	float	required, if ongoing_events used	threshold used to define the event in pfu	pi-ongoing-events-threshold
energy_min	float	required, if ongoing_events used	min of energy channel range in MeV	pi-ongoing-events-energy-min
energy_max	float	required, if ongoing_events used	max of energy channel range in MeV. -1 represented an unbounded integral channel	pi-ongoing-events-energy-max
inputs		> 1 allowed, optional	Provide if key model inputs are not represented in the triggers field	
magnetic_connectivity		> 1 allowed, optional	Provide if specific magnetic connectivity information was used to produce your forecast	
method	string	required, if magnetic_connectivity used	allowed values: Parker Spiral, PFSS-Parker Spiral, WSA, WSA-ENLIL, ADAPT-WSA-ENLIL (contact us to add your method to this format)	magcon-method
lat	float	optional	latitude (deg) position of magnetic field line footpoint linking the observing spacecraft to the Sun (in Stonyhurst coordinates).	magcon-lat
lon	float	required, if magnetic_connectivity used	longitude (deg) position of magnetic field line footpoint linking the observing spacecraft to the Sun (in Stonyhurst coordinates).	magcon-lon
connection_angle		optional	angle between the related solar event and the foot point of the magnetic field line linking the observing spacecraft to the Sun.	
great_circle	float	optional	great circle distance between the solar event and the magnetic connectivity footpoint (deg)	magcon-angle-great-circle
lat	float	optional	connection angle lat = solar event lat - magnetic connectivity footpoint lat (deg)	magcon-angle-lat
lon	float	required, if connection_angle used	connection angle lon = solar event lon - magnetic connectivity footpoint lon (deg)	magcon-angle-lon
solar_wind		optional	Use if a certain solar wind speed was assumed to compute the magnetic connectivity	
observatory	string	optional	Name of observatory/spacecraft data are from	magcon-solar-wind-observatory

Field	Type	Requirement	Description	Key
speed	float	required, if solar_wind used	Assumed solar wind speed to compute magnetic connectivity	magcon-solar-wind-speed
magnetogram		> 1 allowed, optional	Provide if a magnetogram was used to produce your forecast	
observatory	string	required, if magnetogram used	Name of observatory/spacecraft data are from	magnetogram-observatory
instrument	string	required, if magnetogram used	Name of instrument data are from	magnetogram-instrument
products		optional		
product	string	> 1 allowed, optional	Name of data product used	magnetogram-product
last_data_time	datetime*	required, if products used, > 1 allowed	Last time data timestamp available at the time of forecast	magnetogram-product-last-data-time
coronagraph		> 1 allowed, optional	Provide if a coronagraph was used to produce your forecast	
observatory	string	required, if coronagraph used	Name of observatory/spacecraft data are from	
instrument	string	required, if coronagraph used	Name of instrument data are from	
products		optional		
product	string	> 1 allowed, required, if products used	Name of data product used	
last_data_time	datetime*	> 1 allowed, required, if products used	Last time data timestamp available at the time of forecast	
forecasts		> 1 allowed, at least 1 required	>1 allowed such that forecasts for multiple energy channels can be submitted in one file (if they have the same issue time)	
energy_channel		required	Each forecast is defined by the energy channel specified	
min	float	required	min of energy channel range	energy-min
max	float	required	max of energy channel range. -1 represented an unbounded integral channel	energy-max
units	string**	required	energy channel units	energy-units
species	string	required	allowed values: electron, proton, helium, helium3, helium4, oxygen, iron, ion	species
location	string	required	allowed values: mercury, venus, earth, mars, psp, stereoa, stereob, dawn, juno, L1, L2, L4, L5	location
prediction_window		required	all forecast values provided are relevant only in this prediction window	prediction-window
start_time	datetime*	required	start of forecast prediction window	(first value given for 'prediction-window')
end_time	datetime*	required	end of forecast prediction window	(second value given for 'prediction-window')
peak_intensity		optional		
intensity	float	required, if peak_intensity used	forecast peak intensity at onset value	peak-intensity
units	string**	required, if peak_intensity used	forecast peak intensity at onset value units	peak-intensity-units
uncertainty	float	optional	forecast peak intensity at onset uncertainty value (same units as peak intensity) (for symmetric uncertainties) (cannot be used with either uncertainty_low or uncertainty_high)	peak-intensity-uncertainty
uncertainty_low	float	required, if uncertainty_high used	forecast peak intensity at onset lowest uncertainty value (same units as peak intensity) (for asymmetric uncertainties)	peak-intensity-uncertainty-low
uncertainty_high	float	required, if uncertainty_low used	forecast peak intensity at onset highest uncertainty value (same units as peak intensity) (for asymmetric uncertainties)	peak-intensity-uncertainty-high
time	datetime*	optional	forecast time that the peak intensity value will be reached	peak-intensity-time
peak_intensity_esp		optional		
intensity	float	required, if peak_intensity_esp used	forecast peak intensity value in the vicinity of shock passage (ESP)	peak-intensity-esp
units	string**	required, if peak_intensity_esp used	forecast peak intensity ESP units	peak-intensity-esp-units
uncertainty	float	optional	forecast peak intensity ESP uncertainty value (same units as intensity) (for symmetric uncertainties) (cannot be used with either uncertainty_low or uncertainty_high)	peak-intensity-esp-uncertainty
uncertainty_low	float	required, if uncertainty_high used	forecast peak intensity ESP lowest uncertainty value (same units as intensity) (for asymmetric uncertainties)	peak-intensity-esp-uncertainty-low
uncertainty_high	float	required, if uncertainty_low used	forecast peak intensity ESP highest uncertainty value (same units as intensity) (for asymmetric uncertainties)	peak-intensity-esp-uncertainty-high
time	datetime*	optional	forecast time that peak intensity ESP value will be reached	peak-intensity-esp-time
peak_intensity_max		optional		
intensity	float	required, if peak_intensity used	forecast max peak intensity for the entire prediction window value	peak-intensity-max
units	string**	required, if peak_intensity used	forecast max peak intensity value units	peak-intensity-max-units
uncertainty	float	optional	forecast max peak intensity uncertainty value (same units as intensity) (for symmetric uncertainties) (cannot be used with either uncertainty_low or uncertainty_high)	peak-intensity-max-uncertainty
uncertainty_low	float	required, if uncertainty_high used	forecast max peak intensity lowest uncertainty value (same units as intensity) (for asymmetric uncertainties)	peak-intensity-max-uncertainty-low
uncertainty_high	float	required, if uncertainty_low used	forecast max peak intensity highest uncertainty value (same units as intensity) (for asymmetric uncertainties)	peak-intensity-max-uncertainty-high
time	datetime*	optional	forecast time that the max peak intensity value will be reached	peak-intensity-max-time
event_lengths		> 1 allowed, optional	must fall within prediction window	
start_time	datetime*	required	time that the intensity exceeds threshold_start	event-length-start-time
end_time	datetime*	optional, unless fluences is used	time that the intensity drops below threshold_end	event-length-end-time
threshold_start	float	required	threshold used to extract start time	event-length-threshold
threshold_end	float	optional	threshold used to extract end time, if not provided assume threshold_end=threshold_start	
threshold_units	string**	required	units of threshold	event-length-threshold-units
fluences		> 1 allowed, optional	corresponds to event lengths	
fluence	float	required, if fluence used	forecast fluence value (corresponds to event length)	fluence
units	string**	required, if fluence used	forecast fluence units	fluence-units
uncertainty_low	float	required, if uncertainty_high used	forecast fluence's lowest uncertainty value (same units as fluence) (for asymmetric uncertainties)	fluence-uncertainty-low
uncertainty_high	float	required, if uncertainty_low used	forecast fluence's highest uncertainty value (same units as fluence) (for asymmetric uncertainties)	fluence-uncertainty-high
fluence_spectra		> 1 allowed, optional		
start_time	datetime*	required if fluence_spectra used	time that the intensity exceeds threshold_start	
end_time	datetime*	required if fluence_spectra used	time that the intensity drops below threshold_end	
threshold_start	float	required if fluence_spectra used	threshold used to extract start time	
threshold_end	float	required if fluence_spectra used	threshold used to extract end time	
threshold_units	string**	required if fluence_spectra used	units of threshold	
fluence_units	string**	required if fluence_spectra used	units of threshold	
fluence_spectrum		required if fluence_spectra used, > 1 allowed		
energy_min	float	required if fluence_spectra used	low edge of energy bin in MeV	
energy_max	float	required if fluence_spectra used	high edge of energy bin in MeV, -1 represented an unbounded integral channel	
fluence	float	required if fluence_spectra used	fluence value that corresponds to energy bin (defined by energy_min, energy_max), and calculated between start_time and end_time	
threshold_crossings		> 1 allowed, optional	multiple threshold_crossings can be provided for the same forecast energy channel	
crossing_time	datetime*	required, if threshold_crossings used	forecast threshold crossing time	thresh-crossing-times
uncertainty	float	optional	forecast crossing time uncertainty in hours	thresh-uncertainties
threshold	float	required, if threshold_crossings used	the particle intensity exceeds this threshold (e.g. 10 pfu)	crossing-thresholds
threshold_units	string**	required, if threshold_crossings used	units of threshold	crossing-threshold-units
probabilities		> 1 allowed, optional	multiple probabilities can be provided for the same forecast energy channel	
probability_value	float	required, if probabilities used	forecast probability value (range 0 to 1)	probabilities
uncertainty	float	optional	plus/minus error bar for probabilty_value (in probability_value units)	prob-uncertainties
threshold	float	required, if probabilities used	the SEP probability_value forecast is for the particle intensity to exceed this threshold value (e.g. 10 pfu)	prob-thresholds
threshold_units	string**	required, if probabilities used	units of threshold	prob-threshold-units
all_clear		optional	If you do not provide an all-clear forecast do not enter this key.	

				Type	Requirement	Description	JSON key
			all_clear_boolean	boolean	required, if all_clear used	There are three situations for setting all_clear_boolean=false: (1) for >10MeV energy channel, your forecast of peak intensity OR threshold crossing exceeds 10 pfu OR your probabilty forecast for a threshold of 10 pfu exceeds your custom probability_threshold; (2) for the >100MeV energy channel, your forecast of peak intensity OR threshold crossing exceeds 1 pfu OR your probabilty forecast for a threshold of 1 pfu exceeds your custom probability_threshold; (3) for your custom (non-integral) energy channel, your forecast peak intensity OR threshold crossing exceeds your custom threshold. Custom cases (3) are being stored but will not be used in the all-clear scoreboard display.	all-clear
			threshold	float	required, if all_clear used	particle intensity threshold value all_clear_boolean refers to. Can be (1) 10 pfu for >10MeV channel (2) 1 pfu for >100MeV channel (3) custom	all-clear-threshold
			threshold_units	string**	required, if all_clear used	units of threshold	all-clear-threshold-units
			probability_threshold	float	optional	probability threshold value all_clear_boolean refers to. Must specify this threshold if setting all_clear_boolean based on probability forecast.	all-clear-probability-threshold
		alert			optional		
			alert_type	string	required, if alerts used	allowed values: quiet, warning, alert	
			flux_threshold		required, if alerts used		
				min	float	required, if alerts used	
				max	float	required, if alerts used	
				units	string**	required, if alerts used	
			probability_threshold		optional		
				min	float	required, if probability_threshold	
				max	float	required, if probability_threshold	
		sep_profile		string	optional	Text file with 2 - 4 columns: datetime* string, predicted SEP intensity for this energy channel (float), optional uncertainty (if symmetric) or uncertainty_low (if asymmetric) (float) value, optional uncertainty_high (float) value. Please name the file uniquely. To accomplish this, we suggest including your model name and issue time in the filename. **Guideline: ModelShortName.PredictionWindowStartTime.IssueTime.EnergyChannel.txt** Models that produce ensemble SEP profile forecasts can provide a list of text files	sep-profile
		native_id		string	optional	Specify only if forecast has a native id from your model run	native-id
	source_info				optional	Information specific to native/raw outputs from observations and models that produce profiles.	
		native_id		string	optional	Specify only if forecast has a native id from your model run	
		native_flux_type		string	optional	allowed values: differential, integral	
	status				optional		
		current_status		string	required, if status used	give the current status of the model/observations	
		comment		string	optional	give more details regarding the current status of the model/observations	
	observations				optional		
		all_clear			optional	use this field for observations helpful for interpreting SEP forecasts/observations. also use the inputs field above to define the observatory and instrument used	
			all_clear_boolean	boolean	required, if all_clear used	true or false	
			all_clear_type	string	required, if all_clear used	allowed values: cme (more can be added upon request)	
		alert			optional		
			alert_type	string	required, if alert used	allowed values: ALERT, OBSERVER ALERT, CANCEL ALERT, SUMMARY	
			start_time	datetime*	required, if alert used	start time of the alert, usually this is the observation start time	
			end_time	datetime*	optional	optional end time of alert, usually this is the observation end time	
			comment	string	optional	give more details regarding the alert	

*datetime expected in UTC and in the format(s):"YYYY-MM-DDTHH:MM:SSZ"

**units string format: Example: "MeV^-1*s^-1*cm^-2*sr^-1". Another example: "pfu" where 1 pfu = 1 s^-1*cm^-2*sr^-1

JSON filename guideline: ModelShortName.PredictionWindowStartTime.IssueTime.json

Profile text filename guideline: ModelShortName.PredictionWindowStartTime.IssueTime.EnergyChannel.txt

Please do not use colons (:) in your filenames