UMASEP

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Description

UMASEP uses the correlation between GOES soft X-ray flux and GOES differential proton flux in order to predict threshold crossing time and max SEP intensity within the forecast window after crossing threshold.

Inputs

Soft X-ray Flux: From GOES/EXIS at a 1-minute time cadence.

Differential Proton Flux: From GOES/SEISS at a 5-minute time cadence (1 minute for UMASEP-500).

Type-III Radio Burst Data: From the NOAA/SWPC Event List (SOD version only).

Outputs

Max Proton Intensity: Prediction of the maximum proton intensity a GOES integral channel will reach within the respective forecast window.

Time of Threshold Crossing: Prediction of the time range at which the GOES integral channel will cross the respective threshold.

Model Version	Energy Range (MeV)	Forecast Window (hrs*)
UMASEP-10	>10	7
UMASEP-30	>30	6
UMASEP-50	>50	5
UMASEP-100	>100	3
UMASEP-500	>500	1

* After the start of the threshold crossing.

Forecast Lag Time

Inputs: 1 min for GOES SXR, 5 min for GOES proton flux (1 min for UMASEP-500).

Run Time: Less than 1 minute.

Validation

	H	FAR	TSS	HSS
UMASEP-10	0.82	0.22		
UMASEP-30				
UMASEP-50				
UMASEP-100	0.81	0.30		
UMASEP-500	0.50	0.32		

Interpretation and Caveats

Modules: Well-Connected Prediction (WCP): correlates slopes of SXR flux and differential proton flux. Poorly-Connected Prediction (PCP): uses the gradual rise in differential proton flux and predicts its evolution based on historic events. Runs if no flare data is available. SOlar-Data (SOD): associates SXR flux and Type-III radio bursts. Runs if no proton data is available.

Max, not Peak: UMASEP predicts the *max* proton intensity within the forecast window. This may or may not coincide with the peak intensity of the event.

ESP: Max intensity predictions do not include an ESP phase.

GLE: UMASEP-500 predictions are used as a proxy for GLE predictions.

Prediction Thresholds: UMASEP will not make predictions if the SXR flux (WCP and SOD) or PFU (PCP) is too low.

All-clear: UMASEP will predicts an All-clear if the prediction threshold is not met, if the predicted max intensity is below the operational threshold, or if UMASEP does not find an association between proton flux and SXR flux within the forecast window.

Model Version	WCP SXR Threshold	PCP PFU Threshold	SOD SXR Threshold
UMASEP-10	C1	5.9	M2
UMASEP-30	C9	0.76	N/A
UMASEP-50	M2	0.56	N/A
UMASEP-100	M3.5	0.74	N/A
UMASEP-500	X2.5	N/A	N/A

Additional Links

iSWA Data Tree

CCMC UMASEP Description