The Forecasting Solar Particle Events and Flares (FORSPEF) tool: an operational integrated solution for solar radiation storms

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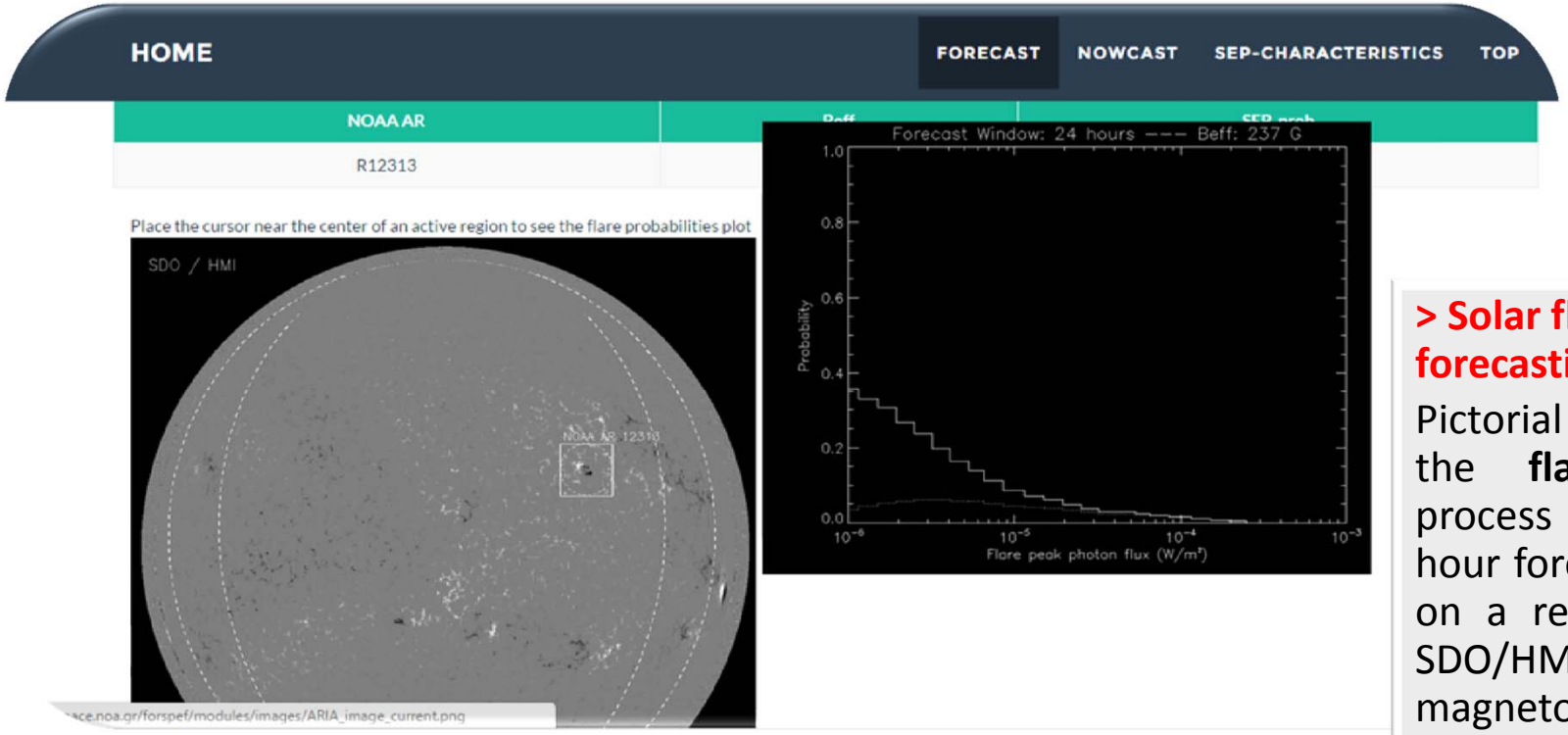
Special Session SS2:
Solar-Terrestrial Coupling and Space Weather: State-of-the-Art and Future Prospects

The FORSPEF tool

Operational



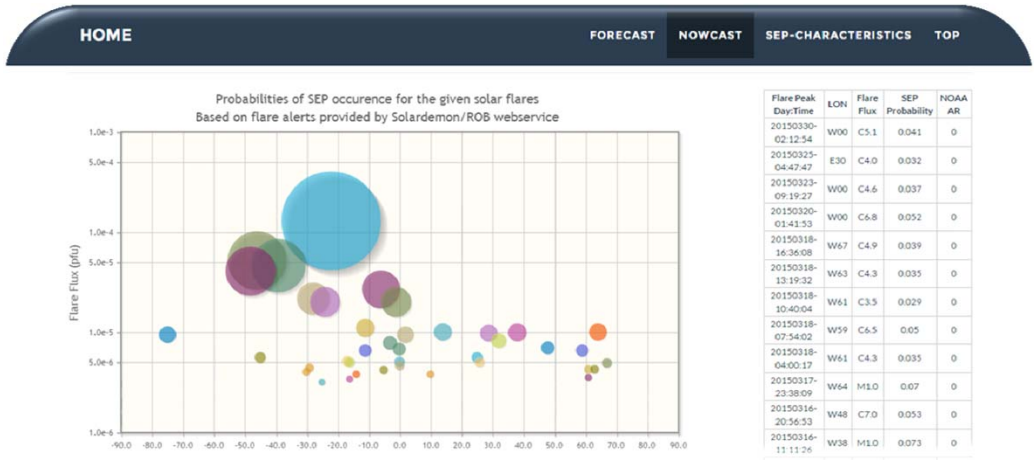
> Solar flare forecasting

Pictorial outputs of the **flare-prediction** process with a 24-hour forecast window on a recent full-disk SDO/HMI magnetogram.

http://tromos.space.noa.gr/forspef

The FORSPEF tool

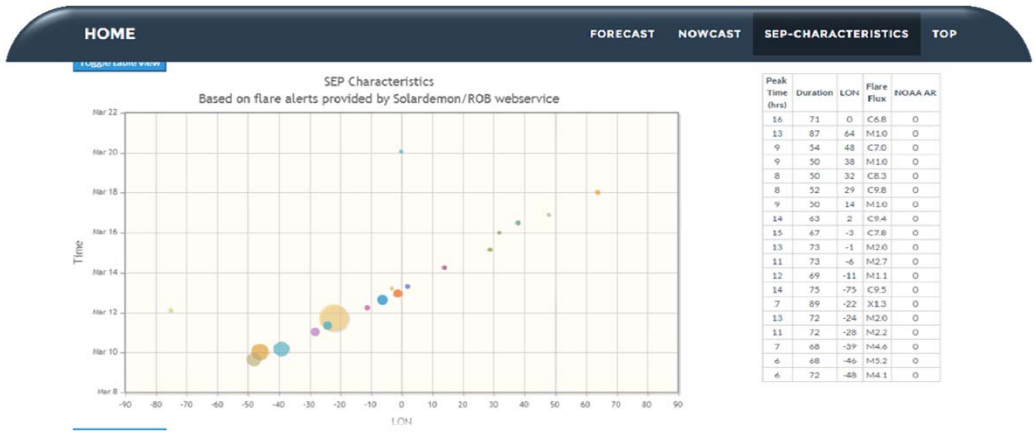
Operational



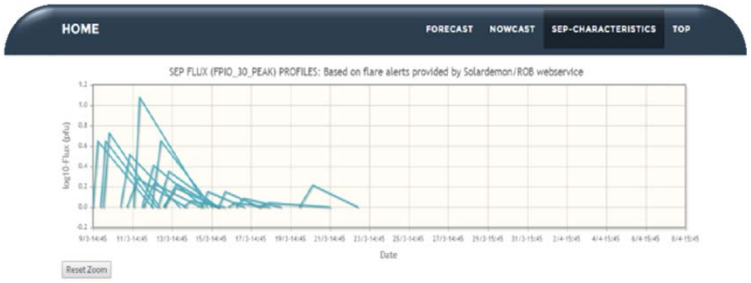
Flare Peak Day:Time	LON	Flare Flux	SEP Probability	NOAA AR
20150330-02:12:54	W00	C5.1	0.041	0
20150325-04:47:47	E30	C4.0	0.032	0
20150323-09:19:27	W00	C4.6	0.037	0
20150320-01:41:53	W00	C6.8	0.052	0
20150318-16:36:08	W67	C4.9	0.039	0
20150318-13:19:32	W63	C4.3	0.035	0
20150318-10:40:04	W61	C3.5	0.029	0
20150318-07:54:02	W59	C6.5	0.05	0
20150318-04:00:17	W61	C4.3	0.035	0
20150317-23:38:09	W64	M1.0	0.07	0
20150316-20:56:53	W48	C7.0	0.053	0
20150316-11:11:26	W38	M1.0	0.073	0

> SEP Nowcasting

Illustrations of the derived SEP characteristics for a given flare and/or CME.



Peak Time (hrs)	Duration	LON	Flare Flux	NOAA AR
16	71	0	C6.8	0
13	87	64	M1.0	0
9	54	48	C7.0	0
9	50	38	M1.0	0
8	50	32	C8.3	0
8	52	29	C9.8	0
9	50	14	M1.0	0
14	63	2	C9.4	0
15	67	-3	C7.8	0
13	73	-1	M2.0	0
11	73	-6	M2.7	0
12	69	-11	M1.1	0
14	75	-75	C9.5	0
7	89	-22	X1.3	0
13	72	-24	M2.0	0
11	72	-28	M2.2	0
7	68	-39	M4.6	0
6	68	-46	M5.2	0
6	72	-48	M4.1	0



Summary

Operational

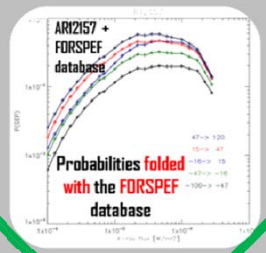
Solar Flare

Forecasting

Probabilities of Solar Flare and CME occurrence based on AR SDO/HMI data

SEP

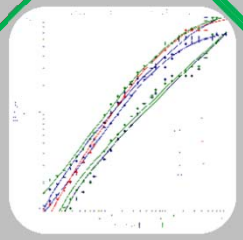
Probabilities of SEP event Occurrence based on SF Probabilities

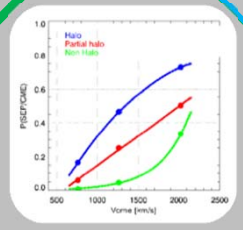


FORSPEF Tool

Integrated web-based tool

Nowcasting





Probabilities of SEP event Occurrence & Characteristics

For a given Solar Flare

For a given CME

SEP / Flares

SEP / CMEs

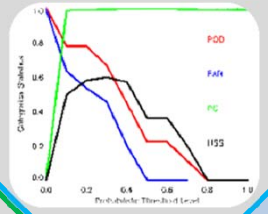
Core

Database

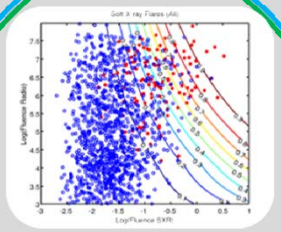
Range: 1984-2013
Solar Flares: 20459
CMEs: 3680
SEP events:314
AR magnetograms: 55691

Validation

Categorical & Probabilistic Scores for each module



Nowcasting



Probabilities of SEP event Occurrence based on Type III bursts

SEP / Radio

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