

10.7 cm Solar Flux Forecast Verification

Forecasts of 10.7 cm solar radio flux are integer forecasts of the daily observed flux at 2800 Mhz (10.7 cm) in solar flux units ($10^{-22}\text{W m}^{-2} \text{Hz}^{-1}$) and are verified against local-noon observations at the [Dominion Radio Astrophysical Observatory](#), Penticton, British Columbia, Canada. Forecast lead times range from 1-day to 7-days. Verification results are provided on forecasts from July 1986 (the beginning of solar cycle 22) through December 2013.

10 cm Solar Flux Forecast Statistics Table

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# Prepared by the U.S. Dept. of Commerce, NOAA, Space Weather Prediction Center.
# Please send comments and suggestions to SWPC.Webmaster@noaa.gov
#
#           Annual Verification Statistics for F10 Solar Flux Forecasts
#
# Lead Time: Forecast lead time
# Total Records: Total number of forecast/observation records used to generate
statistic
# Mean (f): Mean forecast
# Mean (x): Mean observation
# Median (f): Median forecast
# Median (x): Median observation
# Std Dev (f): Standard deviation of forecasts
# Std Dev (x): Standard deviation of observations
# Std Dev (f-x): Standard deviation of forecasts minus observations
# ME: Mean error
# MAE: Mean absolute error
# MSE: Mean square error
# RMSE: Root mean square error
# Linear Assoc: Linear association between forecasts and observations
# Skill: Forecast skill with respect to observed climatology (same as prediction
efficiency)
#
# Missing data: -99999
#
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Forecast Type: F10 Solar Flux (integer)

Year: 2013
Start: 1/1/2013
End: 12/31/2013

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	122.78	122.37	121.56	120.48	119.46	118.45	117.78
Mean (x):	122.75	122.75	122.75	122.75	122.75	122.75	122.75
Median (f):	118	120	120	120	115	115	115
Median (x):	118	118	118	118	118	118	118
Std Dev (f):	20.45	20.03	19.35	18.6	18.02	17.48	17.23
Std Dev (x):	20.39	20.39	20.39	20.39	20.39	20.39	20.39
Std Dev (f-x):	5.45	8.63	11.19	13.72	15.54	17.58	19.25
ME:	0.03	-0.38	-1.2	-2.27	-3.29	-4.3	-4.98
MAE:	4.2	6.63	8.64	10.59	12.16	13.85	15.38

MSE:	29.57	74.45	126.38	192.78	251.67	326.74	394.37
RMSE:	5.44	8.63	11.24	13.88	15.86	18.08	19.86
Linear Assoc:	0.96	0.91	0.84	0.76	0.68	0.58	0.49
Skill:	0.93	0.82	0.7	0.54	0.39	0.21	0.05

Forecast Type: F10 Solar Flux (integer)

Year:	2012						
Start:	1/1/2012						
End:	12/31/2012						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	366	366	366	366	366	366	366
Mean (f):	120	120.23	119.9	119.22	118.57	118.29	118.24
Mean (x):	119.87	119.87	119.87	119.85	119.83	119.82	119.83
Median (f):	115	120	120	120	115	115	115
Median (x):	117	117	117	117	117	117	117
Std Dev (f):	17.51	17.39	17.24	16.61	15.86	15.24	14.7
Std Dev (x):	17.77	17.77	17.77	17.77	17.77	17.77	17.77
Std Dev (f-x):	6.47	9.18	11.47	13.11	14.77	16.36	17.66
ME:	0.12	0.35	0.03	-0.63	-1.26	-1.53	-1.59
MAE:	4.89	7.1	9.04	10.32	11.45	12.59	13.43
MSE:	41.74	84.09	131.25	171.84	219.17	269.31	313.65
RMSE:	6.46	9.17	11.46	13.11	14.8	16.41	17.71
Linear Assoc:	0.93	0.86	0.79	0.71	0.62	0.52	0.42
Skill:	0.87	0.73	0.58	0.46	0.3	0.15	0

Forecast Type: F10 Solar Flux (integer)

Year:	2011						
Start:	1/1/2011						
End:	12/31/2011						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	113.05	112.65	111.86	111.46	110.63	110.29	110.22
Mean (x):	113.41	113.41	113.41	113.59	113.58	113.48	113.47
Median (f):	110	110	105	105	105	105	105
Median (x):	109	109	109	110	110	109	109
Std Dev (f):	24.99	25.27	25.2	25.37	25.01	24.96	24.92
Std Dev (x):	25.12	25.12	25.12	25.12	25.12	25.12	25.12
Std Dev (f-x):	5.61	8.33	10.97	13.3	14.76	16.06	17.29
ME:	-0.36	-0.76	-1.55	-2.13	-2.95	-3.2	-3.25
MAE:	4.07	6.32	8.3	10.1	11.3	12.32	13.22
MSE:	31.47	69.73	122.51	180.81	225.94	267.36	308.57
RMSE:	5.61	8.35	11.07	13.45	15.03	16.35	17.57
Linear Assoc:	0.98	0.95	0.9	0.86	0.83	0.8	0.76

Skill: 0.95 0.89 0.8 0.71 0.64 0.58 0.51

Forecast Type: F10 Solar Flux (integer)

Year: 2010

Start: 1/1/2010

End: 12/31/2010

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	80.39	80.55	80.63	80.71	80.69	80.66	80.52
Mean (x):	80.06	80.06	80.06	80.12	80.11	80.12	80.12
Median (f):	80	80	80	80	80	80	80
Median (x):	80	80	80	80	80	80	80
Std Dev (f):	5.67	5.68	5.61	5.47	5.31	5.23	5.11
Std Dev (x):	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Std Dev (f-x):	2.35	3.32	4.1	4.51	4.87	5.16	5.34
ME:	0.33	0.49	0.56	0.59	0.58	0.55	0.4
MAE:	1.78	2.58	3.19	3.55	3.87	4.14	4.26
MSE:	5.63	11.26	17.09	20.61	23.99	26.88	28.58
RMSE:	2.37	3.36	4.13	4.54	4.9	5.18	5.35
Linear Assoc:	0.92	0.83	0.74	0.68	0.62	0.57	0.53
Skill:	0.83	0.67	0.49	0.39	0.29	0.21	0.15

Forecast Type: F10 Solar Flux (integer)

Year: 2009

Start: 1/1/2009

End: 12/31/2009

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	70.75	70.71	70.66	70.58	70.5	70.44	70.38
Mean (x):	70.6	70.6	70.6	70.6	70.6	70.6	70.6
Median (f):	70	70	70	70	70	70	70
Median (x):	70	70	70	70	70	70	70
Std Dev (f):	3.22	3.17	3.09	2.99	2.85	2.76	2.68
Std Dev (x):	3.31	3.31	3.31	3.31	3.31	3.31	3.31
Std Dev (f-x):	1.33	1.57	1.73	1.93	2.12	2.26	2.37
ME:	0.15	0.1	0.06	-0.03	-0.11	-0.16	-0.22
MAE:	0.94	1.11	1.24	1.35	1.46	1.58	1.67
MSE:	1.79	2.48	3	3.72	4.47	5.11	5.63
RMSE:	1.34	1.58	1.73	1.93	2.12	2.26	2.37
Linear Assoc:	0.92	0.88	0.86	0.82	0.77	0.74	0.71
Skill:	0.84	0.77	0.73	0.66	0.59	0.53	0.49

Forecast Type: F10 Solar Flux (integer)

Year: 2008
Start: 1/1/2008
End: 12/31/2008

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	366	366	366	366	366	366	366
Mean (f):	69.27	69.35	69.41	69.39	69.39	69.4	69.18
Mean (x):	69.05	69.05	69.05	69.05	69.05	69.05	69.05
Median (f):	69	69	69	69	69	69	69
Median (x):	68	68	68	68	68	68	68
Std Dev (f):	3.75	4.01	4.22	4.19	4.16	4.21	5.26
Std Dev (x):	3.47	3.47	3.47	3.47	3.47	3.47	3.47
Std Dev (f-x):	1.54	2.15	2.58	2.85	3.05	3.33	4.72
ME:	0.22	0.3	0.37	0.34	0.34	0.35	0.14
MAE:	1.04	1.29	1.55	1.68	1.77	1.91	2.14
MSE:	2.42	4.69	6.75	8.22	9.42	11.17	22.25
RMSE:	1.55	2.17	2.6	2.87	3.07	3.34	4.72
Linear Assoc:	0.91	0.85	0.79	0.74	0.69	0.64	0.48
Skill:	0.8	0.61	0.44	0.32	0.22	0.07	-0.85

Forecast Type: F10 Solar Flux (integer)

Year: 2007
Start: 1/1/2007
End: 12/31/2007

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	73.39	73.44	73.44	73.32	73.28	73.27	73.32
Mean (x):	73.15	73.15	73.15	73.15	73.15	73.15	73.15
Median (f):	70	70	70	70	70	70	70
Median (x):	71	71	71	71	71	71	71
Std Dev (f):	6.51	6.65	6.72	6.65	6.65	6.65	6.68
Std Dev (x):	6.39	6.39	6.39	6.39	6.39	6.39	6.39
Std Dev (f-x):	2.06	2.84	3.62	4.43	4.95	5.39	5.72
ME:	0.24	0.3	0.3	0.17	0.13	0.12	0.17
MAE:	1.5	2.03	2.53	3	3.39	3.69	3.96
MSE:	4.28	8.14	13.16	19.64	24.41	28.98	32.63
RMSE:	2.07	2.85	3.63	4.43	4.94	5.38	5.71
Linear Assoc:	0.95	0.91	0.85	0.77	0.71	0.66	0.62
Skill:	0.9	0.8	0.68	0.52	0.4	0.29	0.2

Forecast Type: F10 Solar Flux (integer)

Year: 2006
Start: 1/1/2006
End: 12/31/2006

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	80.16	80.43	80.55	80.44	80.23	80.04	79.96
Mean (x):	79.97	79.97	79.97	79.97	79.97	79.97	79.97
Median (f):	80	80	80	80	80	80	80
Median (x):	78	78	78	78	78	78	78
Std Dev (f):	7.63	7.71	7.61	7.48	7.27	6.94	6.72
Std Dev (x):	7.51	7.51	7.51	7.51	7.51	7.51	7.51
Std Dev (f-x):	3.09	4.33	5.15	5.89	6.54	7.05	7.49
ME:	0.19	0.46	0.58	0.47	0.25	0.07	-0.01
MAE:	2.22	3.1	3.75	4.39	5.01	5.56	6.03
MSE:	9.58	18.87	26.76	34.76	42.7	49.59	55.87
RMSE:	3.1	4.34	5.17	5.9	6.54	7.04	7.47
Linear Assoc:	0.92	0.84	0.77	0.69	0.61	0.53	0.45
Skill:	0.83	0.67	0.53	0.38	0.24	0.12	0.01

Forecast Type: F10 Solar Flux (integer)

Year: 2005

Start: 1/1/2005

End: 12/31/2005

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	92.04	92.32	92.23	91.71	91.64	91.23	90.9
Mean (x):	91.7	91.7	91.7	91.7	91.7	91.7	91.7
Median (f):	90	90	90	90	90	85	85
Median (x):	88	88	88	88	88	88	88
Std Dev (f):	14.04	13.83	13.74	14.18	13.43	13	12.43
Std Dev (x):	14.27	14.27	14.27	14.27	14.27	14.27	14.27
Std Dev (f-x):	4.46	6.51	8.36	10.95	11.1	12.09	12.9
ME:	0.34	0.62	0.53	0.01	-0.06	-0.47	-0.8
MAE:	3.31	4.7	5.88	7.18	7.76	8.74	9.52
MSE:	19.98	42.6	69.92	119.49	122.82	145.99	166.62
RMSE:	4.47	6.53	8.36	10.93	11.08	12.08	12.91
Linear Assoc:	0.95	0.89	0.82	0.7	0.68	0.61	0.54
Skill:	0.9	0.79	0.66	0.41	0.4	0.28	0.18

Forecast Type: F10 Solar Flux (integer)

Year: 2004

Start: 1/1/2004

End: 12/31/2004

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	366	366	366	366	366	366	366
Mean (f):	107.17	107.6	107.68	107.72	107.49	107.31	106.98

Mean(x):	106.46	106.46	106.46	106.46	106.42	106.46	106.46
Median (f):	105	105	105	105	105	105	105
Median (x):	104	104	104	104	104	104	104
Std Dev (f):	17.54	17.25	16.83	16.39	15.71	14.83	14.5
Std Dev (x):	17.51	17.51	17.51	17.51	17.51	17.51	17.51
Std Dev (f-x):	5.21	7.96	10.46	12.35	14.15	15.46	16.82
ME:	0.7	1.14	1.22	1.26	1.02	0.85	0.52
MAE:	4.04	6.27	8.17	9.56	10.93	11.98	12.75
MSE:	27.57	64.56	110.66	153.79	200.8	238.96	282.4
RMSE:	5.25	8.04	10.52	12.41	14.17	15.46	16.8
Linear Assoc:	0.96	0.9	0.82	0.74	0.62	0.55	0.46
Skill:	0.91	0.9	0.64	0.5	0.34	0.22	0.08

Forecast Type: F10 Solar Flux (integer)

Year:	2003						
Start:	1/1/2003						
End:	12/31/2003						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	128.82	129.25	129.32	128.86	128.74	128.27	127.63
Mean (x):	128.79	128.79	128.79	128.79	128.79	128.79	128.79
Median (f):	125	125	125	125	125	125	120
Median (x):	125	125	125	125	125	125	125
Std Dev (f):	27.38	27.11	26.53	26.46	24.71	23.92	23.23
Std Dev (x):	29.58	29.58	29.58	29.58	29.58	29.58	29.58
Std Dev (f-x):	9.37	13.37	17.87	22.09	24.08	25.85	26.93
ME:	0.03	0.46	0.53	0.06	-0.05	-0.51	-1.16
MAE:	5.81	9.13	12.43	15.11	16.81	18.29	19.07
MSE:	87.59	178.58	318.95	486.94	578.3	667.14	724.83
RMSE:	9.35	13.36	17.85	22.06	24.04	25.82	26.92
Linear Assoc:	0.94	0.89	0.8	0.69	0.62	0.55	0.5
Skill:	0.9	0.79	0.63	0.44	0.33	0.23	0.17

Forecast Type: F10 Solar Flux (integer)

Year:	2002						
Start:	1/1/2002						
End:	12/31/2002						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	179.75	180.18	180.51	180.78	181.22	181.64	181.88
Mean (x):	179.53	179.53	179.53	179.53	179.53	179.53	179.53
Median (f):	180	175	175	180	180	180	175
Median (x):	179	179	179	179	179	179	179

Std Dev (f):	29.44	29.49	29.33	28.96	28.8	28.59	28.31
Std Dev (x):	29.33	29.33	29.33	29.33	29.33	29.33	29.33
Std Dev (f-x):	8.13	12.09	15.23	18.58	21.43	23.79	25.6
ME:	0.21	0.65	0.98	1.25	1.69	2.11	2.35
MAE:	6.13	9.46	11.8	14.4	16.67	19.18	20.85
MSE:	66.02	146.18	232.4	345.93	461.03	569.01	658.97
RMSE:	8.13	12.09	15.24	18.6	21.47	23.85	25.67
Linear Assoc:	0.96	0.92	0.87	0.8	0.73	0.66	0.61
Skill:	0.92	0.83	0.73	0.6	0.46	0.34	0.23

Forecast Type: F10 Solar Flux (integer)

Year:	2001						
Start:	1/1/2001						
End:	12/31/2001						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	179.96	179.49	178.78	178.15	177.41	176.74	176.15
Mean (x):	181.45	181.45	181.45	181.45	181.45	181.45	181.45
Median (f):	170	170	170	170	170	175	175
Median (x):	173	173	173	173	173	173	173
Std Dev (f):	39.11	38.35	37.18	35.88	33.98	32.37	30.88
Std Dev (x):	41.09	41.09	41.09	41.09	41.09	41.09	41.09
Std Dev (f-x):	10.33	14.92	19.6	23.18	26.71	29.57	31.93
ME:	-1.49	-1.97	-2.67	-3.3	-4.05	-4.71	-5.3
MAE:	7.56	11.27	14.6	17.74	20.13	22.56	24.44
MSE:	108.56	225.76	390.3	546.58	727.91	894.14	1044.75
RMSE:	10.42	15.03	19.76	23.38	26.98	29.9	32.32
Linear Assoc:	0.97	0.93	0.88	0.83	0.76	0.7	0.64
Skill:	0.94	0.87	0.77	0.68	0.57	0.47	0.38

Forecast Type: F10 Solar Flux (integer)

Year:	2000						
Start:	1/1/2000						
End:	12/31/2000						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	366	366	366	366	366	366	366
Mean (f):	179.33	179.3	179.19	179.03	178.75	178.87	178.82
Mean (x):	179.54	179.54	179.54	179.54	179.54	179.54	179.54
Median (f):	180	180	180	180	180	180	180
Median (x):	178	178	178	178	178	178	178
Std Dev (f):	28.95	29.06	29.09	28.58	27.99	27.24	26.84
Std Dev (x):	28.66	28.66	28.66	28.66	28.66	28.66	28.66
Std Dev (f-x):	8.79	13.57	18.14	22.21	25.69	28.61	30.88

ME:	-0.21	-0.24	-0.35	-0.52	-0.8	-0.68	-0.73
MAE:	6.58	10.4	13.55	16.69	19.59	21.9	23.43
MSE:	77.01	183.65	328.3	492.05	658.92	816.96	951.31
RMSE:	8.78	13.55	18.12	22.18	25.67	28.58	30.84
Linear Assoc:	0.95	0.89	0.8	0.7	0.59	0.48	0.38
Skill:	0.91	0.78	0.6	0.4	0.2	0	-0.16

Forecast Type: F10 Solar Flux (integer)

Year: 1999

Start: 1/1/1999

End: 12/31/1999

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	364	364	364	364
Mean (f):	153.43	153.48	153.13	153.04	152.61	152.6	152.56
Mean (x):	153.69	153.69	153.69	153.81	153.82	153.83	153.84
Median (f):	150	150	150	150	150	150	150
Median (x):	151	151	151	151	151	151	151
Std Dev (f):	30.57	30.15	29.44	28.6	27.83	26.9	25.91
Std Dev (x):	31.58	31.58	31.58	31.58	31.58	31.58	31.58
Std Dev (f-x):	9.01	13.46	17	20.01	22.47	24.36	26.09
ME:	-0.26	-0.21	-0.56	-0.78	-1.21	-1.23	-1.28
MAE:	6.6	10.38	13.33	15.91	17.63	19.03	20.39
MSE:	80.98	180.58	288.5	400.08	504.75	593.07	680.27
RMSE:	9	13.44	16.99	20	22.47	24.35	26.08
Linear Assoc:	0.96	0.91	0.85	0.78	0.72	0.66	0.6
Skill:	0.92	0.82	0.71	0.6	0.49	0.41	0.32

Forecast Type: F10 Solar Flux (integer)

Year: 1998

Start: 1/1/1998

End: 12/31/1998

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	356	355	354	353
Mean (f):	117.79	117.53	117.24	116.59	116.27	115.88	115.68
Mean (x):	118.14	118.14	118.14	118.13	118.17	118.18	118.22
Median (f):	115	115	115	115	115	115	115
Median (x):	115	115	115	115	115	115	115
Std Dev (f):	21.42	21.33	21.12	20.94	20.75	20.56	20.42
Std Dev (x):	22.03	22.03	22.03	22.03	22.03	22.03	22.03
Std Dev (f-x):	5.74	8.44	10.75	12.62	14.26	15.82	17.06
ME:	-0.35	-0.61	-0.9	-1.54	-1.9	-2.3	-2.55
MAE:	4.27	6.37	8.07	9.61	10.88	12	12.93
MSE:	32.96	71.41	116.09	161.28	206.32	254.86	296.52

RMSE:	5.74	8.45	10.77	12.7	14.36	15.96	17.22
Linear Assoc:	0.97	0.92	0.87	0.83	0.78	0.73	0.68
Skill:	0.93	0.85	0.75	0.66	0.57	0.47	0.39

Forecast Type: F10 Solar Flux (integer)

Year: 1997

Start: 1/1/1997

End: 12/31/1997

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	351	351	351	351
Mean (f):	81.05	81.01	80.73	80.59	80.27	79.93	79.54
Mean (x):	81.05	81.05	81.05	81.36	81.35	81.33	81.33
Median (f):	76	76	76	76	75	75	75
Median (x):	76	76	76	76	76	76	76
Std Dev (f):	11.98	12.12	11.89	11.67	11.35	10.8	10.21
Std Dev (x):	11.93	11.93	11.93	11.93	11.93	11.93	11.93
Std Dev (f-x):	3	4.44	5.58	6.76	7.36	7.69	8.09
ME:	0	-0.04	-0.32	-0.77	-1.07	-1.4	-1.79
MAE:	2.03	2.91	3.68	4.41	4.93	5.21	5.54
MSE:	8.96	19.68	31.21	46.13	55.1	60.93	68.42
RMSE:	2.99	4.44	5.59	6.79	7.42	7.81	8.27
Linear Assoc:	0.97	0.93	0.89	0.84	0.8	0.78	0.74
Skill:	0.94	0.86	0.78	0.67	0.61	0.57	0.52

Forecast Type: F10 Solar Flux (integer)

Year: 1996

Start: 1/1/1996

End: 12/31/1996

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	366	366	366	352	351	350	349
Mean (f):	72.09	72.03	71.86	71.58	71.46	71.26	71.09
Mean (x):	72.03	72.03	72.03	71.71	71.69	71.68	71.69
Median (f):	70	70	70	70	70	70	70
Median (x):	70	70	70	70	70	70	70
Std Dev (f):	5.67	5.51	5.23	4.77	4.58	4.19	3.76
Std Dev (x):	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Std Dev (f-x):	1.86	2.97	3.94	4.69	5.22	5.53	5.62
ME:	0.07	0	-0.16	-0.13	-0.23	-0.42	-0.61
MAE:	1.21	1.76	2.28	2.59	2.9	3.17	3.29
MSE:	3.47	8.77	15.52	21.94	27.26	30.66	31.87
RMSE:	1.86	2.96	3.94	4.68	5.22	5.54	5.65
Linear Assoc:	0.95	0.86	0.74	0.59	0.46	0.36	0.29
Skill:	0.89	0.73	0.52	0.26	0.06	-0.06	-0.1

Forecast Type: F10 Solar Flux (integer)

Year: 1995

Start: 1/1/1995

End: 12/31/1995

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	77.3	77.27	77.09	77.05	76.82	76.75	76.59
Mean (x):	77.18	77.18	77.18	77.18	77.18	77.18	77.18
Median (f):	75	75	75	75	75	75	75
Median (x):	75	75	75	75	75	75	75
Std Dev (f):	7.02	7.12	7.02	6.88	6.68	6.44	6.29
Std Dev (x):	6.98	6.98	6.98	6.98	6.98	6.98	6.98
Std Dev (f-x):	2.38	3.39	4.12	4.58	5.12	5.51	5.79
ME:	0.12	0.09	-0.09	-0.13	-0.37	-0.44	-0.59
MAE:	1.69	2.43	3.04	3.5	3.85	4.15	4.38
MSE:	5.66	11.49	16.92	20.93	26.24	30.45	33.83
RMSE:	2.38	3.39	4.11	4.58	5.12	5.52	5.82
Linear Assoc:	0.94	0.88	0.83	0.78	0.72	0.67	0.62
Skill:	0.88	0.76	0.65	0.57	0.46	0.37	0.3

Forecast Type: F10 Solar Flux (integer)

Year: 1994

Start: 1/1/1994

End: 12/31/1994

Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	85.98	86.28	86.26	86.3	86.44	86.42	86.61
Mean (x):	85.75	85.75	85.75	85.75	85.75	85.75	85.75
Median (f):	84	84	83	83	82	82	84
Median (x):	83	83	83	83	83	83	83
Std Dev (f):	13.13	13.24	13.21	13.14	13.12	13.39	13.65
Std Dev (x):	13.12	13.12	13.12	13.12	13.12	13.12	13.12
Std Dev (f-x):	3.22	4.77	6.21	7.38	8.06	8.69	9.11
ME:	0.22	0.53	0.51	0.55	0.69	0.66	0.86
MAE:	2.26	3.43	4.45	5.39	6.06	6.63	7.08
MSE:	10.41	23.01	38.77	54.66	65.3	75.66	83.47
RMSE:	3.23	4.8	6.23	7.39	8.08	8.7	9.14
Linear Assoc:	0.97	0.93	0.89	0.84	0.81	0.79	0.77
Skill:	0.94	0.87	0.77	0.68	0.62	0.56	0.51

Forecast Type: F10 Solar Flux (integer)

Year: 1993

Start:	1/1/1993						
End:	12/31/1993						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	365	365	365	365
Mean (f):	109.8	109.83	109.82	109.69	109.98	110.04	110.21
Mean (x):	109.7	109.7	109.7	109.7	109.7	109.7	109.7
Median (f):	105	105	105	105	105	105	105
Median (x):	105	105	105	105	105	105	105
Std Dev (f):	21.53	21.92	22.34	22.72	23	23.17	23.26
Std Dev (x):	21.26	21.26	21.26	21.26	21.26	21.26	21.26
Std Dev (f-x):	5.7	8.73	11.45	13.45	15.01	16.3	17.45
ME:	0.1	0.13	0.12	-0.01	0.27	0.34	0.51
MAE:	4.22	6.41	8.42	10.08	11.15	12.29	13.13
MSE:	32.36	75.93	130.81	180.46	224.74	265.16	303.87
RMSE:	5.69	8.71	11.44	13.43	14.99	16.28	17.43
Linear Assoc:	0.97	0.92	0.86	0.82	0.77	0.73	0.7
Skill:	0.93	0.83	0.71	0.6	0.5	0.41	0.33

Forecast Type: F10 Solar Flux (integer)

Year:	1992						
Start:	1/1/1992						
End:	12/31/1992						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	366	366	366	366	366	366	366
Mean (f):	150.51	150.45	150.12	149.64	149.46	149.35	149.92
Mean (x):	150.78	150.78	150.78	150.78	150.78	150.78	150.78
Median (f):	140	140	140	140	140	140	135
Median (x):	137	137	137	137	137	137	137
Std Dev (f):	42.64	42.64	42.6	42.57	42.46	42.81	42.47
Std Dev (x):	42.7	42.7	42.7	42.7	42.7	42.7	42.7
Std Dev (f-x):	8.76	13.11	17.35	20.31	22.94	26.04	27.3
ME:	-0.27	-0.33	-0.67	-1.15	-1.32	-1.43	-0.86
MAE:	6.25	9.83	13.18	15.69	17.72	19.83	21.02
MSE:	76.59	171.44	300.58	412.59	526.41	678.24	743.73
RMSE:	8.75	13.09	17.34	20.31	22.94	26.04	27.27
Linear Assoc:	0.98	0.95	0.92	0.89	0.86	0.82	0.8
Skill:	0.96	0.91	0.84	0.77	0.71	0.63	0.59

Forecast Type: F10 Solar Flux (integer)

Year:	1991						
Start:	1/1/1991						
End:	12/31/1991						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7

Median (f):	210	210	210	210	210	210	210
Median (x):	210	210	210	210	210	210	210
Std Dev (f):	34.74	34.71	34.2	32.82	31.67	30.19	29.4
Std Dev (x):	34.45	34.45	34.45	34.45	34.45	34.45	34.45
Std Dev (f-x):	12.47	17.08	21.72	25.76	29.67	33.09	36.17
ME:	-0.25	-0.63	-1.06	-1.15	-0.66	-0.69	-0.47
MAE:	9.49	13.02	17.05	19.87	23.41	26.74	29.13
MSE:	155.05	291.38	471.56	663.01	878.56	1092.61	1304.96
RMSE:	12.45	17.07	21.72	25.75	29.64	33.06	36.12
Linear Assoc:	0.94	0.88	0.8	0.71	0.6	0.48	0.37
Skill:	0.87	0.75	0.6	0.44	0.26	0.08	-0.1

Forecast Type: F10 Solar Flux (integer)

Year:	1988						
Start:	1/1/1988						
End:	12/31/1988						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	-99999	-99999	-99999	-99999
Mean (f):	140.85	140.38	139.79	-99999	-99999	-99999	-99999
Mean (x):	141.53	141.53	141.53	-99999	-99999	-99999	-99999
Median (f):	136	135	134	-99999	-99999	-99999	-99999
Median (x):	137	137	137	-99999	-99999	-99999	-99999
Std Dev (f):	32.89	32.8	32.37	-99999	-99999	-99999	-99999
Std Dev (x):	33.14	33.14	33.14	-99999	-99999	-99999	-99999
Std Dev (f-x):	6.82	10.7	13.84	-99999	-99999	-99999	-99999
ME:	-0.68	-1.15	-1.74	-99999	-99999	-99999	-99999
MAE:	4.93	8.02	10.21	-99999	-99999	-99999	-99999
MSE:	46.8	115.45	193.93	-99999	-99999	-99999	-99999
RMSE:	6.84	10.75	13.93	-99999	-99999	-99999	-99999
Linear Assoc:	0.98	0.95	0.91	-99999	-99999	-99999	-99999
Skill:	0.96	0.9	0.82	-99999	-99999	-99999	-99999

Forecast Type: F10 Solar Flux (integer)

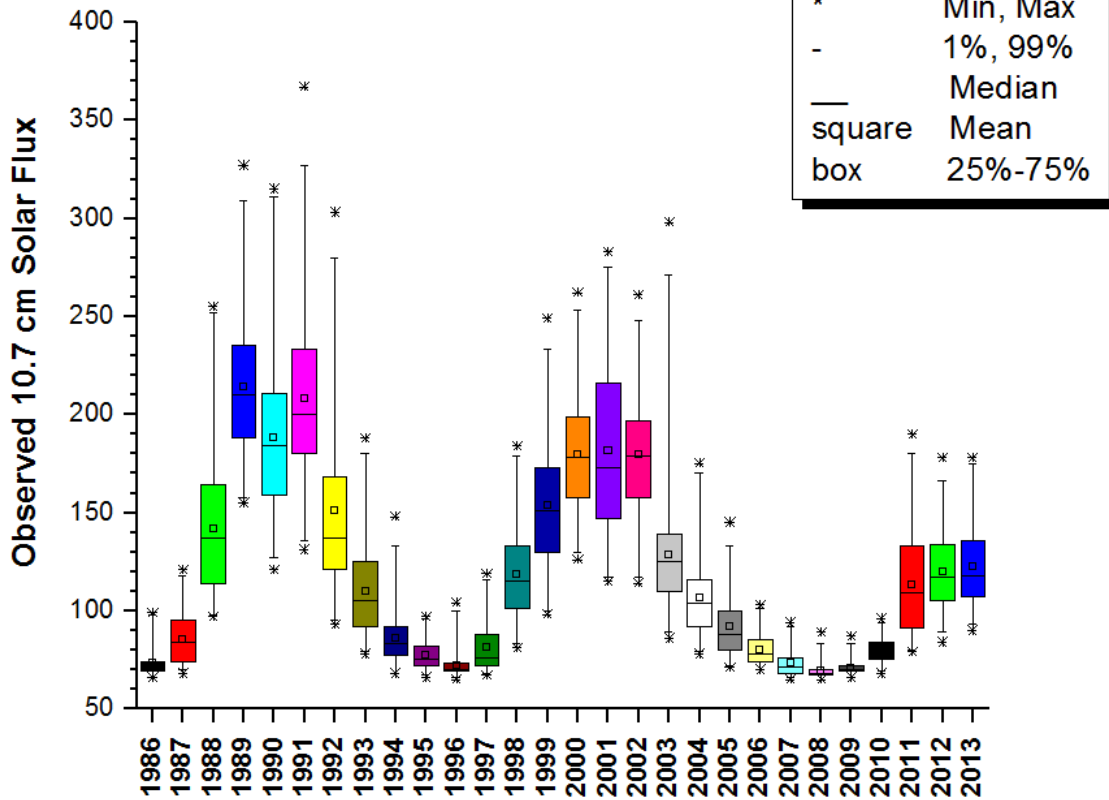
Year:	1987						
Start:	1/1/1987						
End:	12/31/1987						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	365	365	365	-99999	-99999	-99999	-99999
Mean (f):	85.46	85.17	84.81	-99999	-99999	-99999	-99999
Mean (x):	85.52	85.52	85.52	-99999	-99999	-99999	-99999
Median (f):	84	84	83	-99999	-99999	-99999	-99999
Median (x):	84	84	84	-99999	-99999	-99999	-99999
Std Dev (f):	11.98	11.68	11.42	-99999	-99999	-99999	-99999

Std Dev (x):	12.18	12.18	12.18	-99999	-99999	-99999	-99999
Std Dev (f-x):	2.82	4.21	5.53	-99999	-99999	-99999	-99999
ME:	-0.06	-0.35	-0.71	-99999	-99999	-99999	-99999
MAE:	1.9	2.93	3.83	-99999	-99999	-99999	-99999
MSE:	7.94	17.79	31.04	-99999	-99999	-99999	-99999
RMSE:	2.82	4.22	5.57	-99999	-99999	-99999	-99999
Linear Assoc:	0.97	0.94	0.89	-99999	-99999	-99999	-99999
Skill:	0.95	0.88	0.79	-99999	-99999	-99999	-99999

Forecast Type: F10 Solar Flux (integer)

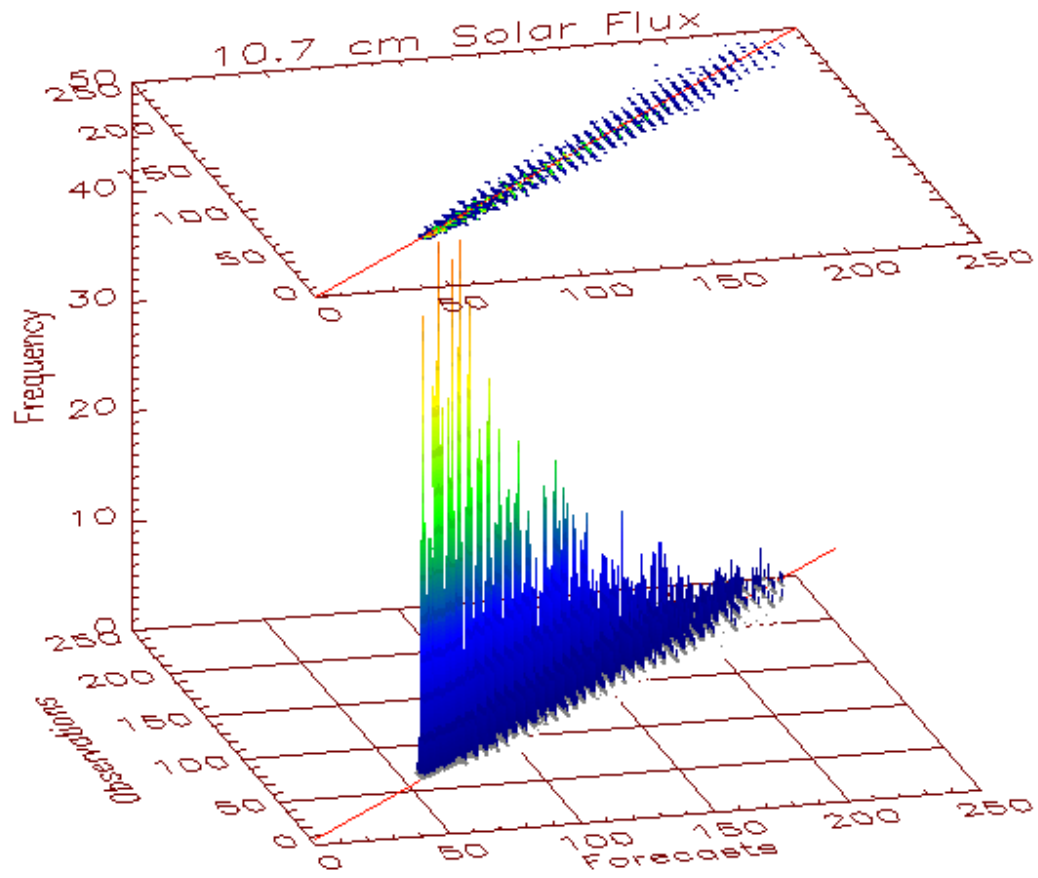
Year:	1986						
Start:	7/1/1986						
End:	12/31/1986						
Lead Time:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total Records:	184	184	184	-99999	-99999	-99999	-99999
Mean (f):	73.27	73.09	72.97	-99999	-99999	-99999	-99999
Mean (x):	73.41	73.41	73.41	-99999	-99999	-99999	-99999
Median (f):	71	72	71	-99999	-99999	-99999	-99999
Median (x):	72	72	72	-99999	-99999	-99999	-99999
Std Dev (f):	6.76	6.49	6.43	-99999	-99999	-99999	-99999
Std Dev (x):	7.02	7.02	7.02	-99999	-99999	-99999	-99999
Std Dev (f-x):	1.73	2.74	3.48	-99999	-99999	-99999	-99999
ME:	-0.14	-0.32	-0.44	-99999	-99999	-99999	-99999
MAE:	1.11	1.75	2.16	-99999	-99999	-99999	-99999
MSE:	3	7.56	12.22	-99999	-99999	-99999	-99999
RMSE:	1.73	2.75	3.5	-99999	-99999	-99999	-99999
Linear Assoc:	0.97	0.92	0.87	-99999	-99999	-99999	-99999
Skill:	0.94	0.85	0.75	-99999	-99999	-99999	-99999

10.7 cm Solar Flux

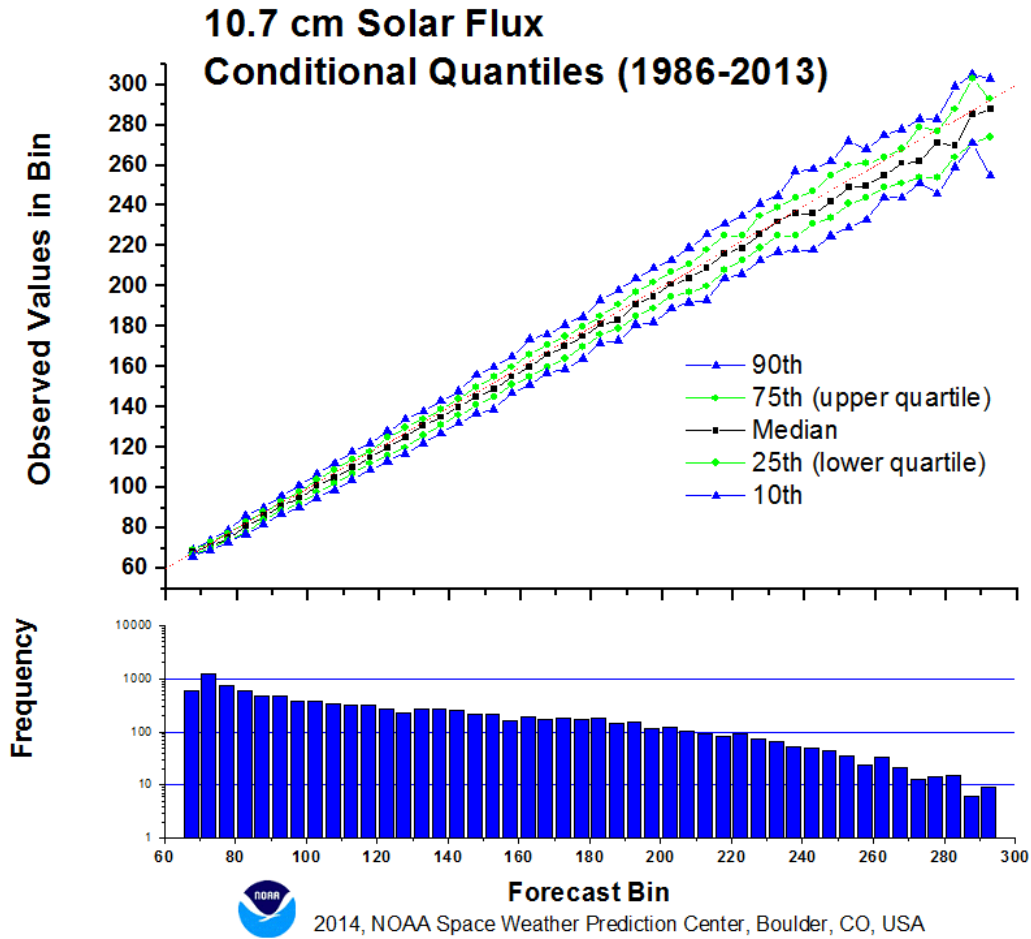


2014, NOAA Space Weather Prediction Center, Boulder, CO, USA

Box plots of the annual distribution of daily 10.7 cm solar flux observations at Penticton, Canada from 1986 through 2013. Stars indicate the minimum and maximum values observed in the year, the small square indicates the mean observed value, and the horizontal line within the box indicates the median. The box contains the observed values from the lower quartile (25%) to the upper quartile (75%) of the distribution and includes 50% of the observed values. The box “whiskers” encompass 98% of the observed values (1% to 99% of the distribution).

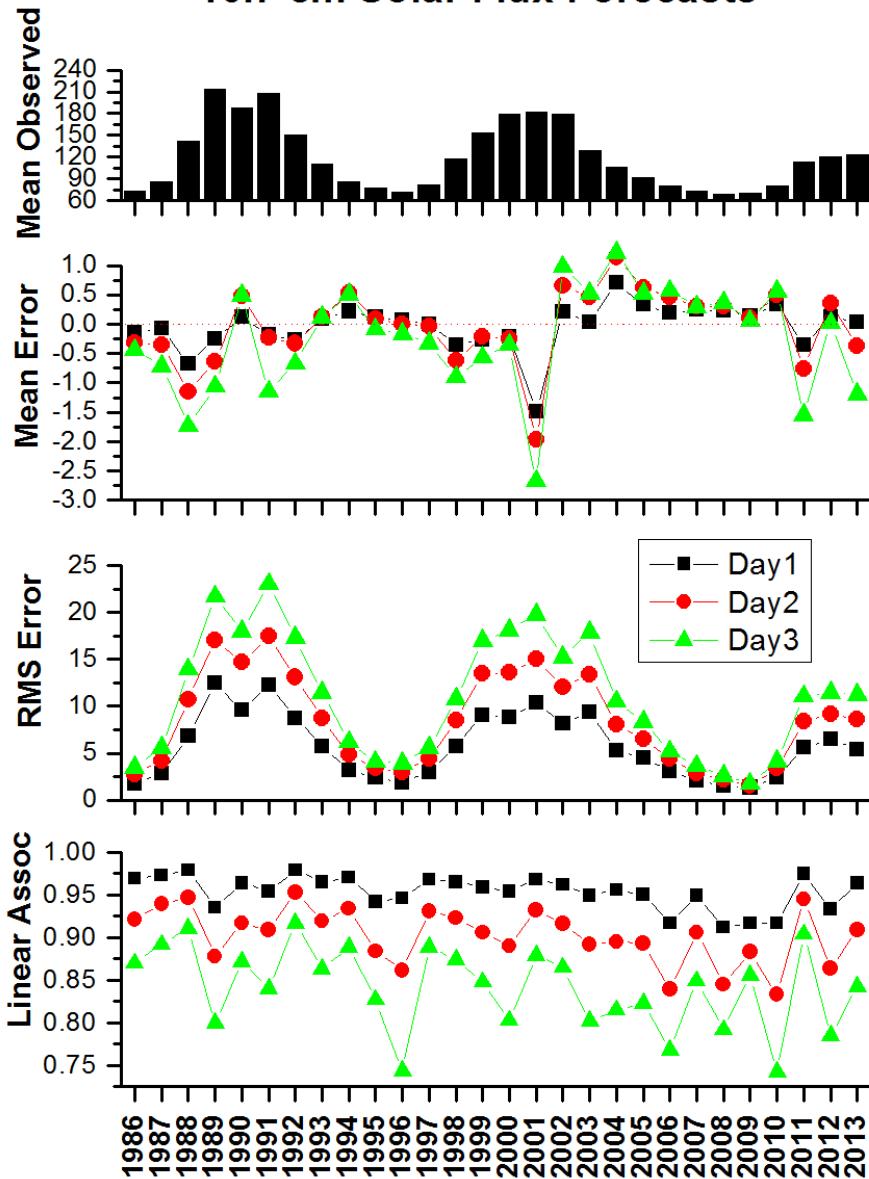


This plot shows the joint distribution of next-day 10.7 cm forecasts and their corresponding observations from 1986 through 2013. Forecasts are plotted on the X-axis against observations on the Y-axis. The frequency of occurrence of a particular forecast/observation pair is plotted vertically on the Z-axis. Contours of equal frequency are projected onto a 2-dimensional plane above the joint distribution.



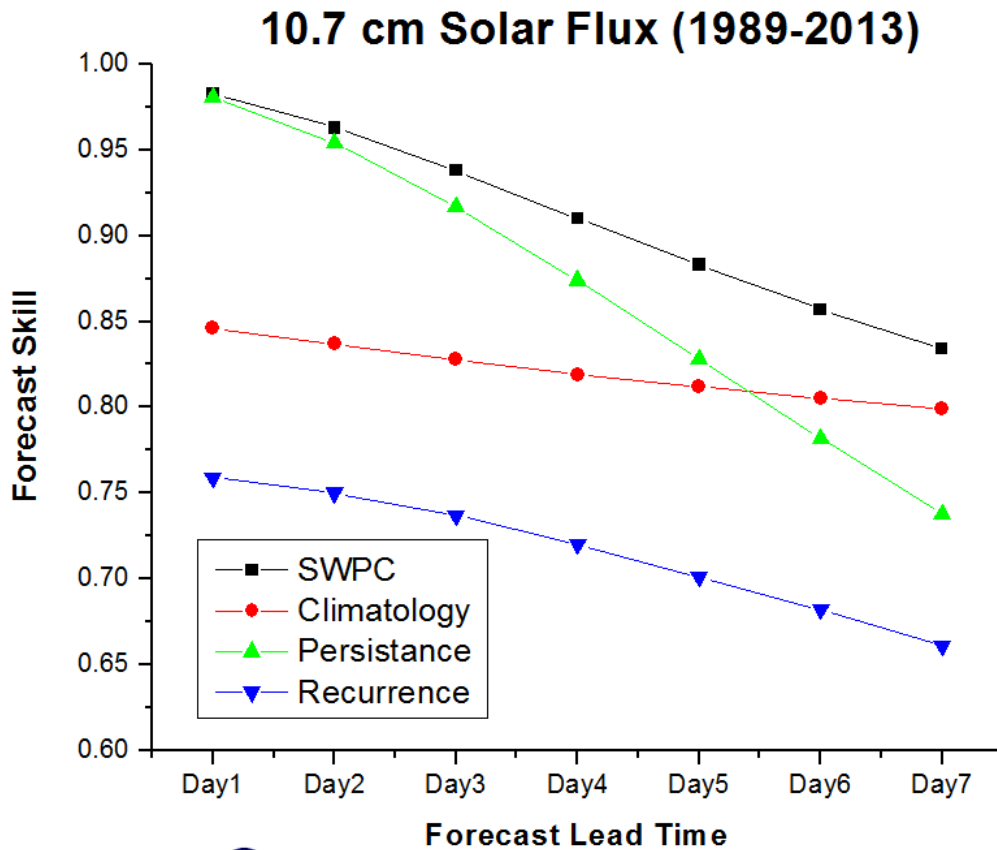
This “conditional quantile” plot shows the distribution of observed 10.7 cm values associated with forecasts grouped in 5-unit bins. The period covered is from 1986 to 2013. Distributions of the observed values are plotted on the Y-axis against 5-unit forecast bins along the X-axis. The observed distribution quantiles include the 10th, 25th (lower quartile), median, 75th (upper quartile), and 90th. A second graph directly below the quantile plot shows the number of forecasts in each bin. Note that the Y-axis of this lower graph is logarithmic.

10.7 cm Solar Flux Forecasts



2014, NOAA Space Weather Prediction Center, Boulder, CO, USA

This plot shows the annual trend, from 1986 to 2013, of various verification metrics for forecasts of 10.7 cm solar flux with lead times of one to three days. The top panel plots the mean of the observed value during the year, the second panel plots the mean error (or bias) of the forecasts, the third panel shows the root mean square error of the forecasts, and the bottom panel displays the linear association (correlation) between the forecasts and observations.



2014, NOAA Space Weather Prediction Center, Boulder, CO, USA

This plot shows SWPC forecast skill as a function of lead-time for forecasts of 10.7 cm solar flux during the period 1989 to 2013. The skill of forecasts produced by SWPC is compared to that of forecasts produced by short-term (30-day) climatology, 1-day persistence, and 27-day recurrence. This skill metric is based on the relative error of the forecasts with respect to constant forecasts of sample climatology (the mean observation during the period) and is sometimes called the "prediction efficiency". The upper bound for this metric is "one" and there is no lower bound. Negative values indicate no skill above constant forecasts of sample climatology.