

Prepared by the U.S. Dept. of Commerce, NOAA, Space Weather Prediction Center

Please send comments and suggestions to SWPC.Webmaster@noaa.gov

### 2011 Verification Statistics for Daily M flare, X flare, and Proton Event Probability Forecasts

Forecast Type: Likelihood (probability) of the occurrence of an M flare, X flare, or Proton Event

Note: Mpred1 = M flare PREDiction day 1  
Mpred2 = M flare PREDiction day 2  
Mevents = Observed number of M flares,  
etc.

Missing data: NA

Total Records: Total number of daily forecast/observation records used to generate statistics  
365

Event Days: Total number of days in the sample on which at least one (M, X, Proton event) occurred

Mevents	Xevents	Pevents
63	8	22

Mean observation

Mevents	Xevents	Pevents
0.17	0.022	0.06

Mean, Median, and Standard Deviation of all forecasts

	Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
mean	0.22	0.22	0.21	0.036	0.034	0.032	0.058	0.044	0.034
median	0.10	0.10	0.10	0.010	0.010	0.010	0.010	0.010	0.010
sd	0.23	0.22	0.22	0.060	0.056	0.054	0.172	0.127	0.087

Mean, Median and Standard Deviation of forecast given the non-occurrence ( $f|x=0$ ) of an event

	Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
mean	0.18	0.18	0.18	0.035	0.033	0.032	0.030	0.032	0.029
median	0.10	0.10	0.10	0.010	0.010	0.010	0.010	0.010	0.010
sd	0.20	0.20	0.20	0.060	0.055	0.054	0.074	0.084	0.069

Mean, Median and Standard Deviation of forecast given the occurrence ( $f|x=1$ ) of an event

	Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
mean	0.44	0.39	0.35	0.089	0.060	0.031	0.54	0.259	0.12
median	0.45	0.40	0.40	0.100	0.050	0.010	0.82	0.055	0.01
sd	0.23	0.24	0.23	0.056	0.064	0.033	0.45	0.358	0.23

Discrimination: The difference between [Mean (f|x=1)] and [Mean (f|x=0)]

Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
0.25771	0.20720	0.17495	0.05413	0.02697	-0.00071	0.51206	0.22706	0.08987

Linear correlation (r) between forecasts and observations

Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
0.4333	0.3567	0.3049	0.1325	0.0712	-0.0019	0.5943	0.3514	0.2003

Mean Error, Mean Absolute Error, Mean Square Error, and Root Mean Square Errors of forecasts.

	Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
ME	0.050	0.25	0.14	0.014	0.053	0.024	-0.002	0.076	0.067
MAE	0.042	0.26	0.35	0.012	0.052	0.151	-0.016	0.081	0.210
MSE	0.035	0.12	0.37	0.010	0.023	0.153	-0.026	0.044	0.246
RMSE	0.245	0.13	0.38	0.054	0.023	0.156	0.059	0.061	0.258

Forecast skill with respect to observed climatology (same as prediction efficiency)

Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
0.146	0.067	0.015	-0.065	-0.093	-0.138	0.351	0.104	0.015