

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

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

### 2004 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  
366

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

Mevents	Xevents	Pevents
65	9	18

Mean observation

Mevents	Xevents	Pevents
0.18	0.025	0.049

Mean, Median, and Standard Deviation of all forecasts

	Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
mean	0.24	0.23	0.22	0.048	0.046	0.043	0.061	0.036	0.032
median	0.15	0.15	0.15	0.010	0.010	0.010	0.010	0.010	0.010
sd	0.22	0.22	0.21	0.068	0.067	0.065	0.167	0.056	0.052

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	0.19	0.19	0.19	0.045	0.043	0.041	0.033	0.030	0.028
median	0.15	0.10	0.10	0.010	0.010	0.010	0.010	0.010	0.010
sd	0.18	0.19	0.19	0.064	0.065	0.064	0.070	0.042	0.047

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	0.40	0.37	0.18	0.15	0.113	0.59	0.15	0.108
median	0.50	0.30	0.30	0.20	0.15	0.100	0.82	0.15	0.150
sd	0.25	0.25	0.25	0.11	0.09	0.079	0.43	0.13	0.076

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

Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
0.252	0.208	0.181	0.134	0.102	0.072	0.558	0.120	0.080

Linear correlation (r) between forecasts and observations

Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
0.44	0.37	0.33	0.30	0.24	0.17	0.72	0.46	0.33

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	0.059	0.26	0.14	0.023	0.063	0.025	0.012	0.070	0.042
MAE	0.050	0.27	0.35	0.021	0.062	0.151	-0.013	0.071	0.150
MSE	0.042	0.12	0.37	0.018	0.023	0.155	-0.017	0.022	0.197
RMSE	0.256	0.13	0.37	0.064	0.024	0.158	0.052	0.039	0.206

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

Mpred1	Mpred2	Mpred3	Xpred1	Xpred2	Xpred3	Ppred1	Ppred2	Ppred3
0.1581	0.0848	0.0504	0.0545	0.0016	-0.0408	0.5212	0.1718	0.0992