

# Geomagnetic Probability Forecast Verification

Geomagnetic Probability forecasts are forecasts of the likelihood (from 1% to 99%) that the daily geomagnetic activity level will reach a particular activity category. The four categories are Quiet to Unsettled, Active, Minor Storm, and Major to Severe Storm. The geomagnetic category assigned to a day is determined by the highest observed K-index for the day. Quiet to Unsettled = K 0 to K 3, Active = K 4, Minor Storm = K 5, and Major to Severe Storm = K 6 to K 9.

**Middle-latitude** forecasts are verified against Fredericksburg, VA observations

**High-latitude forecasts** are verified against College, AK observations. Forecast lead times range from one to three days.

# Middle Latitude Probability 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 Probability Forecasts of
#       Next-Day Middle-Latitude Geomagnetic Category
#
# Total Records: Total number of daily forecast/observation records used to
generate statistic
# Event Days: Total number of days in the sample within each of four
geomagnetic activity
#       categories: Quiet to Unsettled (Q-U), Active (A), Minor Storm
(Mn Stm),
#       Major to Severe Storm (Mj-Svr Stm). See note below for more
information.
# Mean (f): Mean forecast
# Mean (x): Mean observation
# Median (f): Median forecast
# Std Dev (f): Standard deviation of forecasts
# Std Dev (x): Standard deviation of observations
# Std Dev (f-x): Standard deviation of forecasts minus observations
# Mean (f|x=1): Mean forecast given the occurrence of an event
# Mean (f|x=0): Mean forecast given the non-occurrence of an event
# Median (f|x=1): Median forecast given the occurrence of an event
# Median (f|x=0): Median forecast given the non-occurrence of an event
# Std Dev (f|x=1): Standard deviation of forecasts given the occurrence of
an event
# Std Dev (f|x=0): Standard deviation of forecasts given the non-occurrence
of an event
# Discrimination: The difference between [Mean (f|x=1)] and [Mean (f|x=0)]
# ME: Mean error
# RPSsc: Ranked probability score for sample climatology forecasts (smaller
better)
# RPS: Ranked probability score for SEC forecasts (smaller better)
# REL: Reliability (smaller better)
# RES 1: Resolution 1 (larger better). See Verification Glossary for
detailed definition.
# RES 2: Resolution 2 (smaller better). See Verification Glossary for
detailed definition.
#
# Missing data: -99999
#
# Note: The geomagnetic category for the day is determined by the highest
#       observed k-index for the day. Quiet to Unsettled = k 0 to k 3,
#       Active = k 4, Minor Storm = k 5, Major to Severe Storm = k 6 to k
9.
#       Middle latitude forecasts are verified against Fredericksburg, VA
observations.
#
Forecast Type: Likelihood (probability) of the occurrence of geomagnetic
category
Year:                2013
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Start:	1/1/13			
End:	12/31/13			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Events:	305	42	14	4
Mean (f):	0.836	0.114	0.038	0.010
Mean (x):	0.836	0.115	0.038	0.011
Median (f):	0.830	0.100	0.030	0.000
Std Dev (f):	0.098	0.064	0.043	0.018
Std Dev (x):	0.371	0.320	0.192	0.104
Std Dev (f-x):	0.374	0.326	0.193	0.105
Mean (f x=1):	0.841	0.113	0.057	0.015
Mean (f x=0):	0.813	0.114	0.038	0.010
Median (f x=1):	0.870	0.100	0.070	0.030
Median (f x=0):	0.830	0.100	0.030	0.000
Std Dev (f x=1):	0.098	0.059	0.043	0.017
Std Dev (f x=0):	0.095	0.064	0.043	0.018
Discrimination:	0.028	-0.002	0.020	0.005
ME:	0.000	-0.001	0.000	-0.001
RPSsc:	0.195	-99999	-99999	-99999
RPS:	0.198	-99999	-99999	-99999
REL:	0.052	-99999	-99999	-99999
RES 1:	0.050	-99999	-99999	-99999
RES 2:	0.146	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2012			
Start:	1/1/12			
End:	12/31/12			
Total Records:	366	366	366	366
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	293	40	24	9
Mean (f):	0.786	0.144	0.052	0.017
Mean (x):	0.801	0.109	0.066	0.025
Median (f):	0.880	0.100	0.010	0.010
Std Dev (f):	0.184	0.106	0.067	0.035
Std Dev (x):	0.400	0.312	0.248	0.155
Std Dev (f-x):	0.356	0.301	0.239	0.154
Mean (f x=1):	0.828	0.229	0.120	0.049
Mean (f x=0):	0.619	0.134	0.048	0.017
Median (f x=1):	0.880	0.250	0.100	0.050
Median (f x=0):	0.640	0.100	0.010	0.010
Std Dev (f x=1):	0.154	0.107	0.105	0.049
Std Dev (f x=0):	0.198	0.101	0.061	0.034
Discrimination:	0.209	0.095	0.072	0.032
ME:	-0.014	0.035	-0.013	-0.007
RPSsc:	0.266	-99999	-99999	-99999
RPS:	0.223	-99999	-99999	-99999
REL:	0.060	-99999	-99999	-99999
RES 1:	0.103	-99999	-99999	-99999
RES 2:	0.163	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2011
Start:	1/1/11

End:	12/31/11			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	315	37	7	6
Mean (f):	0.776	0.150	0.055	0.019
Mean (x):	0.863	0.101	0.019	0.016
Median (f):	0.840	0.100	0.010	0.010
Std Dev (f):	0.192	0.107	0.078	0.038
Std Dev (x):	0.344	0.302	0.137	0.127
Std Dev (f-x):	0.327	0.298	0.147	0.120
Mean (f x=1):	0.804	0.218	0.141	0.120
Mean (f x=0):	0.599	0.143	0.053	0.017
Median (f x=1):	0.880	0.200	0.170	0.050
Median (f x=0):	0.640	0.100	0.010	0.010
Std Dev (f x=1):	0.167	0.102	0.095	0.189
Std Dev (f x=0):	0.245	0.105	0.076	0.029
Discrimination:	0.205	0.075	0.088	0.103
ME:	-0.087	0.049	0.036	0.002
RPSsc:	0.169	-99999	-99999	-99999
RPS:	0.165	-99999	-99999	-99999
REL:	0.086	-99999	-99999	-99999
RES 1:	0.090	-99999	-99999	-99999
RES 2:	0.079	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2010			
Start:	1/1/10			
End:	12/31/10			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	325	30	8	2
Mean (f):	0.799	0.145	0.042	0.015
Mean (x):	0.890	0.082	0.022	0.005
Median (f):	0.880	0.100	0.010	0.010
Std Dev (f):	0.178	0.115	0.060	0.020
Std Dev (x):	0.313	0.275	0.147	0.074
Std Dev (f-x):	0.323	0.276	0.151	0.077
Mean (f x=1):	0.813	0.222	0.090	0.010
Mean (f x=0):	0.683	0.138	0.041	0.015
Median (f x=1):	0.880	0.200	0.100	0.010
Median (f x=0):	0.740	0.100	0.010	0.010
Std Dev (f x=1):	0.167	0.146	0.076	0.000
Std Dev (f x=0):	0.219	0.109	0.059	0.020
Discrimination:	0.130	0.084	0.049	-0.005
ME:	-0.091	0.062	0.020	0.009
RPSsc:	0.130	-99999	-99999	-99999
RPS:	0.149	-99999	-99999	-99999
REL:	0.043	-99999	-99999	-99999
RES 1:	0.024	-99999	-99999	-99999
RES 2:	0.106	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2009
Start:	1/1/09
End:	12/31/09

Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	352	12	1	0
Mean (f):	0.895	0.076	0.018	0.011
Mean (x):	0.964	0.033	0.003	0.000
Median (f):	0.930	0.050	0.010	0.010
Std Dev (f):	0.085	0.062	0.023	0.006
Std Dev (x):	0.186	0.179	0.052	0.000
Std Dev (f-x):	0.203	0.188	0.058	0.006
Mean (f x=1):	0.896	0.080	0.010	-99999
Mean (f x=0):	0.889	0.076	0.018	0.011
Median (f x=1):	0.930	0.050	-99999	-99999
Median (f x=0):	0.930	0.050	0.010	0.010
Std Dev (f x=1):	0.085	0.053	-99999	-99999
Std Dev (f x=0):	0.077	0.063	0.023	0.006
Discrimination:	0.006	0.004	-0.008	-99999
ME:	-0.069	0.043	0.015	0.011
RPSsc:	0.037	-99999	-99999	-99999
RPS:	0.050	-99999	-99999	-99999
REL:	0.014	-99999	-99999	-99999
RES 1:	0.001	-99999	-99999	-99999
RES 2:	0.036	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year: 2008  
Start: 1/1/08  
End: 12/31/08

Total Records:	366	366	366	366
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	326	32	8	0
Mean (f):	0.797	0.141	0.046	0.016
Mean (x):	0.891	0.087	0.022	0.000
Median (f):	0.840	0.100	0.050	0.010
Std Dev (f):	0.161	0.105	0.050	0.018
Std Dev (x):	0.312	0.283	0.146	0.000
Std Dev (f-x):	0.296	0.265	0.151	0.018
Mean (f x=1):	0.817	0.259	0.071	-99999
Mean (f x=0):	0.633	0.129	0.046	0.016
Median (f x=1):	0.840	0.250	0.050	-99999
Median (f x=0):	0.640	0.100	0.050	0.010
Std Dev (f x=1):	0.145	0.117	0.056	-99999
Std Dev (f x=0):	0.189	0.096	0.049	0.018
Discrimination:	0.184	0.130	0.026	-99999
ME:	-0.093	0.053	0.024	0.016
RPSsc:	0.119	-99999	-99999	-99999
RPS:	0.122	-99999	-99999	-99999
REL:	0.041	-99999	-99999	-99999
RES 1:	0.037	-99999	-99999	-99999
RES 2:	0.081	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year: 2007  
Start: 1/1/07  
End: 12/31/07

Total Records:	365	365	365	365
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Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	317	37	10	1
Mean (f):	0.739	0.169	0.071	0.021
Mean (x):	0.868	0.101	0.027	0.003
Median (f):	0.790	0.150	0.050	0.010
Std Dev (f):	0.158	0.089	0.055	0.023
Std Dev (x):	0.338	0.302	0.163	0.052
Std Dev (f-x):	0.319	0.294	0.161	0.056
Mean (f x=1):	0.761	0.232	0.140	0.050
Mean (f x=0):	0.595	0.162	0.069	0.021
Median (f x=1):	0.790	0.200	0.150	-99999
Median (f x=0):	0.600	0.150	0.050	0.010
Std Dev (f x=1):	0.143	0.094	0.061	-99999
Std Dev (f x=0):	0.173	0.086	0.054	0.023
Discrimination:	0.165	0.071	0.071	0.029
ME:	-0.13	0.068	0.044	0.018
RPSsc:	0.146	-99999	-99999	-99999
RPS:	0.154	-99999	-99999	-99999
REL:	0.054	-99999	-99999	-99999
RES 1:	0.047	-99999	-99999	-99999
RES 2:	0.099	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2006			
Start:	1/1/06			
End:	12/31/06			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	301	49	10	5
Mean (f):	0.717	0.178	0.078	0.027
Mean (x):	0.825	0.134	0.027	0.014
Median (f):	0.790	0.150	0.050	0.010
Std Dev (f):	0.168	0.084	0.060	0.055
Std Dev (x):	0.381	0.341	0.163	0.116
Std Dev (f-x):	0.342	0.322	0.162	0.105
Mean (f x=1):	0.751	0.253	0.150	0.234
Mean (f x=0):	0.557	0.166	0.076	0.024
Median (f x=1):	0.790	0.250	0.150	0.100
Median (f x=0):	0.590	0.150	0.050	0.010
Std Dev (f x=1):	0.135	0.098	0.075	0.269
Std Dev (f x=0):	0.210	0.075	0.058	0.041
Discrimination:	0.194	0.087	0.074	0.210
ME:	-0.107	0.044	0.050	0.013
RPSsc:	0.198	-99999	-99999	-99999
RPS:	0.180	-99999	-99999	-99999
REL:	0.064	-99999	-99999	-99999
RES 1:	0.081	-99999	-99999	-99999
RES 2:	0.116	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2005			
Start:	1/1/05			
End:	12/31/05			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm

Event Days:	255	68	31	11
Mean (f):	0.631	0.221	0.108	0.040
Mean (x):	0.699	0.186	0.085	0.030
Median (f):	0.690	0.200	0.100	0.010
Std Dev (f):	0.191	0.083	0.081	0.055
Std Dev (x):	0.459	0.390	0.279	0.171
Std Dev (f-x):	0.409	0.382	0.267	0.164
Mean (f x=1):	0.689	0.256	0.185	0.128
Mean (f x=0):	0.498	0.213	0.101	0.037
Median (f x=1):	0.690	0.250	0.200	0.100
Median (f x=0):	0.500	0.200	0.100	0.010
Std Dev (f x=1):	0.139	0.083	0.121	0.109
Std Dev (f x=0):	0.226	0.082	0.072	0.051
Discrimination:	0.191	0.043	0.085	0.091
ME:	-0.067	0.034	0.023	0.010
RPSsc:	0.342	-99999	-99999	-99999
RPS:	0.281	-99999	-99999	-99999
REL:	0.069	-99999	-99999	-99999
RES 1:	0.129	-99999	-99999	-99999
RES 2:	0.212	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2004			
Start:	1/1/04			
End:	12/31/04			
Total Records:	366	366	366	366
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	203	101	48	14
Mean (f):	0.620	0.230	0.110	0.041
Mean (x):	0.555	0.276	0.131	0.038
Median (f):	0.650	0.200	0.100	0.010
Std Dev (f):	0.200	0.088	0.084	0.050
Std Dev (x):	0.498	0.448	0.338	0.192
Std Dev (f-x):	0.463	0.442	0.331	0.176
Mean (f x=1):	0.687	0.252	0.155	0.148
Mean (f x=0):	0.538	0.221	0.103	0.036
Median (f x=1):	0.740	0.250	0.150	0.150
Median (f x=0):	0.550	0.200	0.100	0.010
Std Dev (f x=1):	0.164	0.083	0.099	0.117
Std Dev (f x=0):	0.210	0.088	0.080	0.040
Discrimination:	0.149	0.031	0.052	0.112
ME:	0.066	-0.046	-0.022	0.002
RPSsc:	0.425	-99999	-99999	-99999
RPS:	0.371	-99999	-99999	-99999
REL:	0.092	-99999	-99999	-99999
RES 1:	0.146	-99999	-99999	-99999
RES 2:	0.279	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2003			
Start:	1/1/03			
End:	12/31/03			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	15	119	68	22

Mean (f):	0.477	0.303	0.156	0.064
Mean (x):	0.427	0.326	0.186	0.060
Median (f):	0.450	0.300	0.150	0.050
Std Dev (f):	0.206	0.093	0.089	0.076
Std Dev (x):	0.495	0.469	0.390	0.238
Std Dev (f-x):	0.438	0.463	0.374	0.219
Mean (f x=1):	0.589	0.324	0.210	0.185
Mean (f x=0):	0.394	0.292	0.144	0.056
Median (f x=1):	0.600	0.350	0.200	0.100
Median (f x=0):	0.400	0.300	0.150	0.050
Std Dev (f x=1):	0.176	0.072	0.090	0.215
Std Dev (f x=0):	0.186	0.100	0.084	0.047
Discrimination:	0.195	0.032	0.066	0.129
ME:	0.050	-0.023	-0.030	0.003
RPSsc:	0.487	-99999	-99999	-99999
RPS:	0.401	-99999	-99999	-99999
REL:	0.098	-99999	-99999	-99999
RES 1:	0.185	-99999	-99999	-99999
RES 2:	0.303	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2002			
Start:	1/1/02			
End:	12/31/02			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	252	76	25	12
Mean (f):	0.614	0.250	0.100	0.035
Mean (x):	0.690	0.208	0.068	0.033
Median (f):	0.690	0.250	0.100	0.010
Std Dev (f):	0.206	0.110	0.070	0.041
Std Dev (x):	0.463	0.407	0.253	0.179
Std Dev (f-x):	0.445	0.413	0.246	0.172
Mean (f x=1):	0.657	0.266	0.160	0.097
Mean (f x=0):	0.520	0.246	0.096	0.033
Median (f x=1):	0.690	0.250	0.150	0.100
Median (f x=0):	0.500	0.200	0.100	0.010
Std Dev (f x=1):	0.183	0.105	0.076	0.048
Std Dev (f x=0):	0.224	0.111	0.068	0.040
Discrimination:	0.137	0.021	0.064	0.064
ME:	-0.076	0.042	0.032	0.002
RPSsc:	0.337	-99999	-99999	-99999
RPS:	0.314	-99999	-99999	-99999
REL:	0.088	-99999	-99999	-99999
RES 1:	0.111	-99999	-99999	-99999
RES 2:	0.226	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2001			
Start:	1/1/01			
End:	12/31/01			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	246	80	28	11
Mean (f):	0.629	0.228	0.102	0.041



Mean (x):	0.674	0.219	0.077	0.030
Median (f):	0.690	0.200	0.100	0.010
Std Dev (f):	0.203	0.092	0.079	0.074
Std Dev (x):	0.469	0.414	0.266	0.171
Std Dev (f-x):	0.444	0.414	0.262	0.151
Mean (f x=1):	0.677	0.247	0.159	0.238
Mean (f x=0):	0.530	0.222	0.097	0.035
Median (f x=1):	0.740	0.250	0.150	0.200
Median (f x=0):	0.590	0.200	0.050	0.010
Std Dev (f x=1):	0.157	0.100	0.104	0.190
Std Dev (f x=0):	0.247	0.089	0.075	0.058
Discrimination:	0.147	0.025	0.062	0.203
ME:	-0.045	0.008	0.025	0.011
RPSsc:	0.344	-99999	-99999	-99999
RPS:	0.299	-99999	-99999	-99999
REL:	0.102	-99999	-99999	-99999
RES 1:	0.148	-99999	-99999	-99999
RES 2:	0.197	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2000			
Start:	1/1/00			
End:	12/31/00			
Total Records:	366	366	366	366
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	205	108	35	18
Mean (f):	0.574	0.255	0.121	0.050
Mean (x):	0.560	0.295	0.096	0.049
Median (f):	0.640	0.250	0.100	0.010
Std Dev (f):	0.227	0.114	0.092	0.085
Std Dev (x):	0.497	0.457	0.294	0.217
Std Dev (f-x):	0.483	0.455	0.289	0.214
Mean (f x=1):	0.632	0.279	0.180	0.133
Mean (f x=0):	0.501	0.245	0.115	0.046
Median (f x=1):	0.690	0.250	0.150	0.050
Median (f x=0):	0.550	0.200	0.100	0.010
Std Dev (f x=1):	0.197	0.116	0.109	0.195
Std Dev (f x=0):	0.240	0.112	0.088	0.074
Discrimination:	0.131	0.034	0.066	0.088
ME:	0.014	-0.040	0.025	0.001
RPSsc:	0.417	-99999	-99999	-99999
RPS:	0.392	-99999	-99999	-99999
REL:	0.138	-99999	-99999	-99999
RES 1:	0.163	-99999	-99999	-99999
RES 2:	0.254	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	1999			
Start:	1/1/99			
End:	12/31/99			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	240	83	33	9
Mean (f):	0.652	0.225	0.097	0.027
Mean (x):	0.658	0.227	0.090	0.025

Median (f):	0.690	0.200	0.070	0.010
Std Dev (f):	0.195	0.117	0.072	0.033
Std Dev (x):	0.475	0.420	0.287	0.155
Std Dev (f-x):	0.455	0.418	0.280	0.157
Mean (f x=1):	0.695	0.257	0.148	0.038
Mean (f x=0):	0.569	0.215	0.092	0.026
Median (f x=1):	0.740	0.250	0.100	0.050
Median (f x=0):	0.600	0.200	0.050	0.010
Std Dev (f x=1):	0.173	0.126	0.116	0.031
Std Dev (f x=0):	0.208	0.113	0.064	0.033
Discrimination:	0.126	0.042	0.057	0.012
ME:	-0.006	-0.003	0.006	0.002
RPSsc:	0.351	-99999	-99999	-99999
RPS:	0.326	-99999	-99999	-99999
REL:	0.076	-99999	-99999	-99999
RES 1:	0.101	-99999	-99999	-99999
RES 2:	0.250	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	1998			
Start:	1/1/98			
End:	12/31/98			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	259	64	31	11
Mean (f):	0.696	0.183	0.088	0.032
Mean (x):	0.710	0.175	0.085	0.030
Median (f):	0.790	0.150	0.050	0.010
Std Dev (f):	0.195	0.103	0.080	0.065
Std Dev (x):	0.455	0.381	0.279	0.171
Std Dev (f-x):	0.448	0.387	0.281	0.162
Mean (f x=1):	0.727	0.200	0.120	0.153
Mean (f x=0):	0.621	0.180	0.085	0.029
Median (f x=1):	0.790	0.150	0.100	0.100
Median (f x=0):	0.700	0.150	0.050	0.010
Std Dev (f x=1):	0.167	0.106	0.084	0.185
Std Dev (f x=0):	0.235	0.102	0.079	0.054
Discrimination:	0.106	0.020	0.035	0.124
ME:	-0.013	0.008	0.003	0.002
RPSsc:	0.337	-99999	-99999	-99999
RPS:	0.316	-99999	-99999	-99999
REL:	0.083	-99999	-99999	-99999
RES 1:	0.104	-99999	-99999	-99999
RES 2:	0.233	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	1997			
Start:	1/1/97			
End:	12/31/97			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	265	70	21	9
Mean (f):	0.757	0.155	0.068	0.021
Mean (x):	0.726	0.192	0.058	0.025
Median (f):	0.790	0.150	0.050	0.010

Std Dev (f):	0.148	0.087	0.049	0.028
Std Dev (x):	0.447	0.394	0.233	0.155
Std Dev (f-x):	0.426	0.388	0.234	0.145
Mean (f x=1):	0.784	0.186	0.086	0.097
Mean (f x=0):	0.684	0.147	0.067	0.019
Median (f x=1):	0.840	0.150	0.050	0.050
Median (f x=0):	0.750	0.100	0.050	0.010
Std Dev (f x=1):	0.114	0.102	0.059	0.093
Std Dev (f x=0):	0.196	0.081	0.048	0.022
Discrimination:	0.100	0.039	0.019	0.078
ME:	0.031	-0.037	0.011	-0.004
RPSsc:	0.298	-99999	-99999	-99999
RPS:	0.270	-99999	-99999	-99999
REL:	0.057	-99999	-99999	-99999
RES 1:	0.085	-99999	-99999	-99999
RES 2:	0.213	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	1996			
Start:	1/1/96			
End:	12/31/96			
Total Records:	366	366	366	366
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	260	79	25	2
Mean (f):	0.747	0.148	0.078	0.026
Mean (x):	0.710	0.216	0.068	0.005
Median (f):	0.800	0.100	0.050	0.010
Std Dev (f):	0.166	0.097	0.059	0.025
Std Dev (x):	0.454	0.412	0.253	0.074
Std Dev (f-x):	0.434	0.410	0.239	0.076
Mean (f x=1):	0.779	0.174	0.152	0.055
Mean (f x=0):	0.669	0.141	0.073	0.026
Median (f x=1):	0.840	0.150	0.150	0.100
Median (f x=0):	0.700	0.100	0.050	0.010
Std Dev (f x=1):	0.148	0.100	0.074	0.064
Std Dev (f x=0):	0.181	0.095	0.054	0.024
Discrimination:	0.111	0.033	0.079	0.029
ME:	0.037	-0.068	0.010	0.021
RPSsc:	0.280	-99999	-99999	-99999
RPS:	0.257	-99999	-99999	-99999
REL:	0.048	-99999	-99999	-99999
RES 1:	0.071	-99999	-99999	-99999
RES 2:	0.209	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	1995			
Start:	1/1/95			
End:	12/31/95			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	218	83	59	5
Mean (f):	0.664	0.193	0.102	0.041
Mean (x):	0.597	0.227	0.162	0.014
Median (f):	0.700	0.150	0.100	0.050
Std Dev (f):	0.196	0.112	0.073	0.044

Std Dev (x):	0.491	0.420	0.369	0.116
Std Dev (f-x):	0.458	0.419	0.358	0.123
Mean (f x=1):	0.723	0.222	0.143	0.052
Mean (f x=0):	0.577	0.184	0.094	0.041
Median (f x=1):	0.790	0.200	0.150	0.050
Median (f x=0):	0.600	0.150	0.050	0.050
Std Dev (f x=1):	0.174	0.106	0.090	0.032
Std Dev (f x=0):	0.195	0.112	0.067	0.044
Discrimination:	0.146	0.038	0.049	0.011
ME:	0.067	-0.034	-0.060	0.027
RPSsc:	0.399	-99999	-99999	-99999
RPS:	0.368	-99999	-99999	-99999
REL:	0.102	-99999	-99999	-99999
RES 1:	0.133	-99999	-99999	-99999
RES 2:	0.266	-99999	-99999	-99999

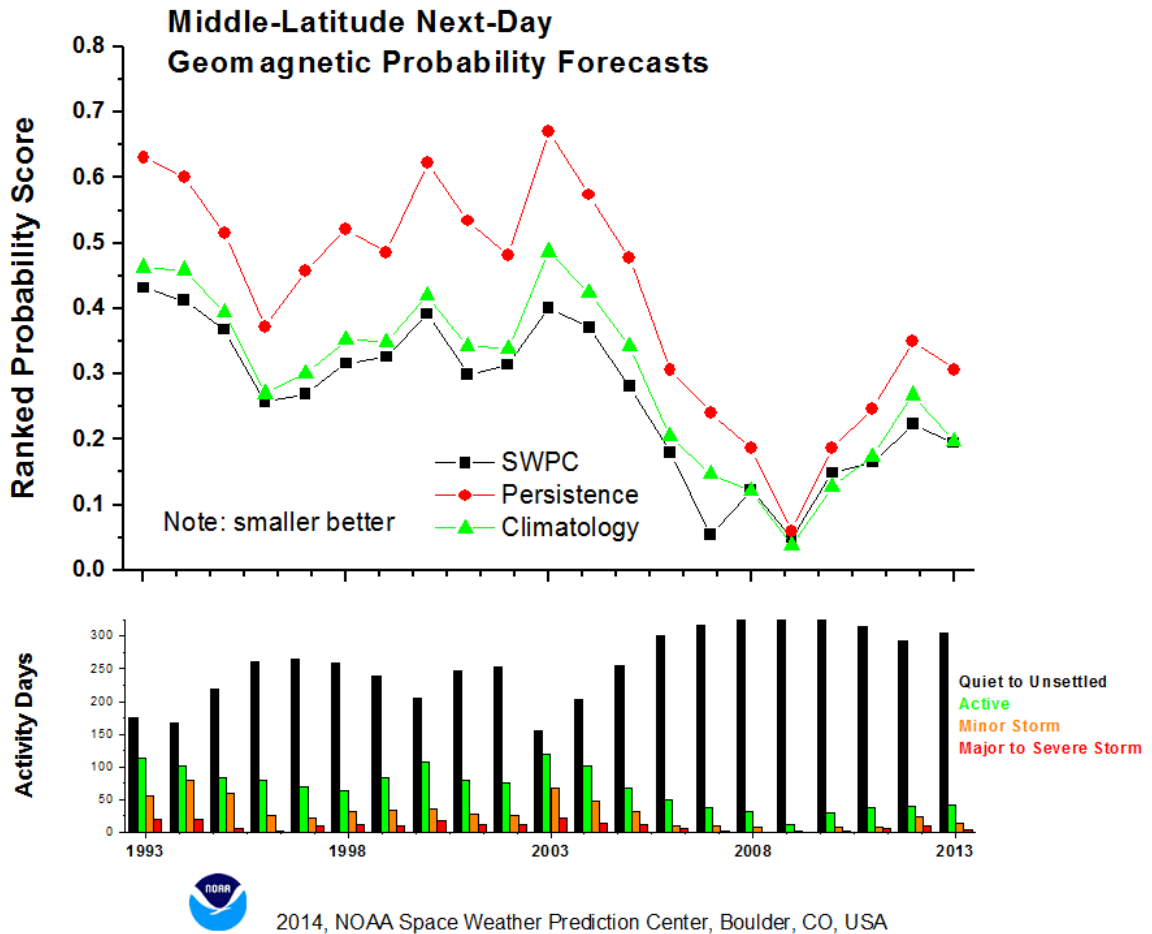
Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	1994			
Start:	1/1/94			
End:	12/31/94			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	166	101	79	19
Mean (f):	0.553	0.233	0.151	0.063
Mean (x):	0.455	0.277	0.216	0.052
Median (f):	0.550	0.250	0.150	0.050
Std Dev (f):	0.216	0.102	0.099	0.065
Std Dev (x):	0.499	0.448	0.412	0.222
Std Dev (f-x):	0.440	0.444	0.393	0.208
Mean (f x=1):	0.664	0.257	0.209	0.164
Mean (f x=0):	0.460	0.224	0.135	0.057
Median (f x=1):	0.700	0.250	0.200	0.150
Median (f x=0):	0.450	0.200	0.100	0.050
Std Dev (f x=1):	0.177	0.095	0.104	0.122
Std Dev (f x=0):	0.201	0.103	0.091	0.056
Discrimination:	0.204	0.034	0.074	0.107
ME:	0.098	-0.044	-0.065	0.011
RPSsc:	0.494	-99999	-99999	-99999
RPS:	0.412	-99999	-99999	-99999
REL:	0.141	-99999	-99999	-99999
RES 1:	0.223	-99999	-99999	-99999
RES 2:	0.271	-99999	-99999	-99999

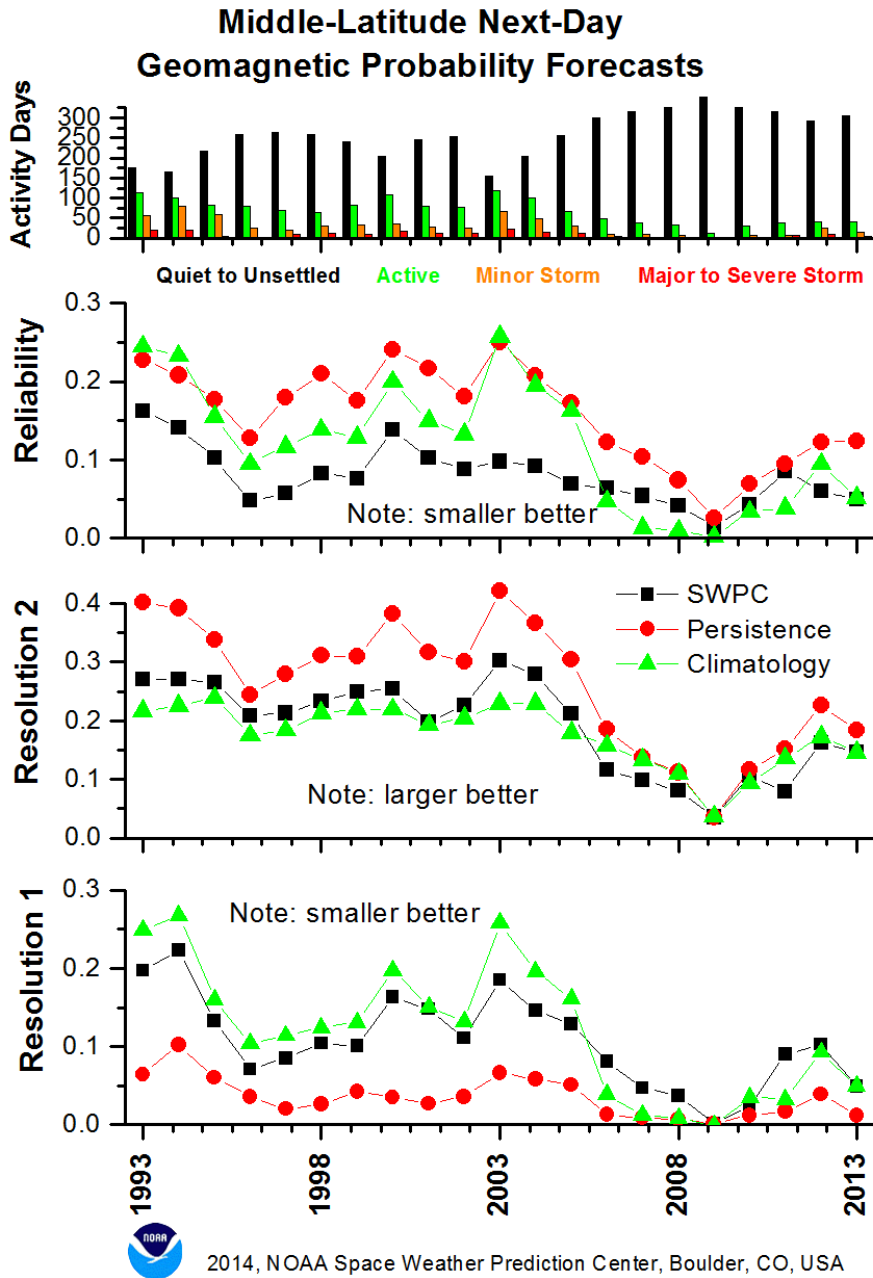
Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	1993			
Start:	1/1/93			
End:	12/31/93			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	175	114	56	20
Mean (f):	0.582	0.230	0.131	0.057
Mean (x):	0.479	0.312	0.153	0.055
Median (f):	0.600	0.250	0.100	0.050
Std Dev (f):	0.212	0.109	0.088	0.064
Std Dev (x):	0.500	0.464	0.361	0.228

Std Dev (f-x):	0.467	0.462	0.353	0.230
Mean (f x=1):	0.662	0.253	0.175	0.087
Mean (f x=0):	0.508	0.220	0.123	0.055
Median (f x=1):	0.700	0.250	0.150	0.050
Median (f x=0):	0.500	0.200	0.100	0.050
Std Dev (f x=1):	0.196	0.101	0.089	0.091
Std Dev (f x=0):	0.198	0.111	0.085	0.062
Discrimination:	0.154	0.033	0.052	0.032
ME:	0.103	-0.082	-0.022	0.002
RPSsc:	0.466	-99999	-99999	-99999
RPS:	0.432	-99999	-99999	-99999
REL:	0.162	-99999	-99999	-99999
RES 1:	0.197	-99999	-99999	-99999
RES 2:	0.270	-99999	-99999	-99999



This plot shows the ranked probability score (RPS) for next-day (1-day lead time) middle-latitude geomagnetic probability forecasts from 1993 to 2013. The annual RPS for SWPC forecasts is compared to forecasts of short-term (30-day) climatology and 1-day persistence. The RPS is the mean square error of probability forecasts for ordinal predictands and is greater than or equal to 0. Smaller values are better. The bottom panel histogram shows the number of days in each geomagnetic activity category per year: Quiet to Unsettled, Active, Minor Storm, and Major to Severe Storm.



These plots show the annual trend, from 1993 to 2013, of various verification metrics for next-day (1-day lead time) middle-latitude geomagnetic probability forecasts. SWPC forecast metrics are compared to those for 30-day climatology forecasts and 1-day persistence forecasts. The top panel plots the number of days in each of four geomagnetic activity categories per year: Quiet to Unsettled, Active, Minor Storm, and Major to Severe Storm. The second panel plots the forecast Reliability (0 or greater with smaller values better), the third panel shows one type of forecast Resolution (0 or greater with larger values better), and the bottom panel plots another type of forecast Resolution (0 or greater with smaller values better). Detailed definitions of these metrics are located in the Verification Glossary.

# High Latitude Probability Forecast Statistics Table

```
# Prepared by the U.S. Dept. of Commerce, NOAA, Space Weather Prediction
Center.
# Please send comments and suggestions to SWPC.Webmaster@sec.noaa.gov
#
#       Annual Verification Statistics for Probability Forecasts of
#       Next-Day High-Latitude Geomagnetic Category
#
# Total Records: Total number of daily forecast/observation records used to
generate statistic
# Event Days: Total number of days in the sample within each of four
geomagnetic activity
#       categories: Quiet to Unsettled (Q-U), Active (A), Minor Storm
(Mn Stm),
#       Major to Severe Storm (Mj-Svr Stm). See note below for more
information.
# Mean (f): Mean forecast
# Mean (x): Mean observation
# Median (f): Median forecast
# Std Dev (f): Standard deviation of forecasts
# Std Dev (x): Standard deviation of observations
# Std Dev (f-x): Standard deviation of forecasts minus observations
# Mean (f|x=1): Mean forecast given the occurrence of an event
# Mean (f|x=0): Mean forecast given the non-occurrence of an event
# Median (f|x=1): Median forecast given the occurrence of an event
# Median (f|x=0): Median forecast given the non-occurrence of an event
# Std Dev (f|x=1): Standard deviation of forecasts given the occurrence of
an event
# Std Dev (f|x=0): Standard deviation of forecasts given the non-occurrence
of an event
# Discrimination: The difference between [Mean (f|x=1)] and [Mean (f|x=0)]
# ME: Mean error
# RPSsc: Ranked probability score for sample climatology forecasts (smaller
better)
# RPS: Ranked probability score for SEC forecasts (smaller better)
# REL: Reliability (smaller better)
# RES 1: Resolution 1 (larger better). See Verification Glossary for
detailed definition.
# RES 2: Resolution 2 (smaller better). See Verification Glossary for
detailed definition.
#
# Missing data: -99999
#
# Note: The geomagnetic category for the day is determined by the highest
#       observed k-index for the day. Quiet to Unsettled = k 0 to k 3,
#       Active = k 4, Minor Storm = k 5, Major to Severe Storm = k 6 to k
9.
#       High latitude forecasts are verified against College, AK
observations.
#
Forecast Type: Likelihood (probability) of the occurrence of geomagnetic
category
Year:                2013
```



Start:	1/1/13			
End:	12/31/13			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Events:	215	52	54	44
Mean (f):	0.408	0.147	0.217	0.229
Mean (x):	0.589	0.142	0.148	0.121
Median (f):	0.450	0.150	0.200	0.200
Std Dev (f):	0.202	0.023	0.060	0.166
Std Dev (x):	0.493	0.350	0.356	0.326
Std Dev (f-x):	0.461	0.349	0.351	0.319
Mean (f x=1):	0.467	0.151	0.241	0.361
Mean (f x=0):	0.322	0.146	0.213	0.211
Median (f x=1):	0.500	0.150	0.250	0.300
Median (f x=0):	0.300	0.150	0.200	0.150
Std Dev (f x=1):	0.175	0.016	0.058	0.204
Std Dev (f x=0):	0.207	0.024	0.059	0.152
Discrimination:	0.146	0.005	0.028	0.151
ME:	-0.182	0.004	0.069	0.108
RPSsc:	0.544	-99999	-99999	-99999
RPS:	0.564	-99999	-99999	-99999
REL:	0.154	-99999	-99999	-99999
RES 1:	0.134	-99999	-99999	-99999
RES 2:	0.410	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2012			
Start:	1/1/12			
End:	12/31/12			
Total Records:	366	366	366	366
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	188	55	64	59
Mean (f):	0.477	0.154	0.192	0.178
Mean (x):	0.514	0.150	0.175	0.161
Median (f):	0.550	0.150	0.200	0.100
Std Dev (f):	0.211	0.026	0.071	0.158
Std Dev (x):	0.500	0.358	0.380	0.368
Std Dev (f-x):	0.476	0.358	0.382	0.356
Mean (f x=1):	0.543	0.155	0.202	0.282
Mean (f x=0):	0.407	0.153	0.190	0.158
Median (f x=1):	0.650	0.150	0.200	0.250
Median (f x=0):	0.450	0.150	0.200	0.100
Std Dev (f x=1):	0.178	0.036	0.069	0.189
Std Dev (f x=0):	0.221	0.024	0.071	0.143
Discrimination:	0.136	0.002	0.013	0.125
ME:	-0.037	0.003	0.017	0.017
RPSsc:	0.608	-99999	-99999	-99999
RPS:	0.568	-99999	-99999	-99999
REL:	0.117	-99999	-99999	-99999
RES 1:	0.157	-99999	-99999	-99999
RES 2:	0.451	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2011
Start:	1/1/11

End:	12/31/11			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	225	58	47	35
Mean (f):	0.674	0.198	0.090	0.038
Mean (x):	0.616	0.159	0.129	0.096
Median (f):	0.730	0.150	0.050	0.010
Std Dev (f):	0.228	0.110	0.096	0.065
Std Dev (x):	0.487	0.366	0.335	0.295
Std Dev (f-x):	0.453	0.357	0.339	0.292
Mean (f x=1):	0.742	0.257	0.117	0.069
Mean (f x=0):	0.565	0.187	0.086	0.035
Median (f x=1):	0.790	0.250	0.100	0.050
Median (f x=0):	0.640	0.150	0.050	0.010
Std Dev (f x=1):	0.181	0.125	0.104	0.103
Std Dev (f x=0):	0.252	0.103	0.095	0.059
Discrimination:	0.177	0.071	0.031	0.035
ME:	0.058	0.039	-0.039	-0.058
RPSsc:	0.497	-99999	-99999	-99999
RPS:	0.470	-99999	-99999	-99999
REL:	0.191	-99999	-99999	-99999
RES 1:	0.218	-99999	-99999	-99999
RES 2:	0.279	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2010			
Start:	1/1/10			
End:	12/31/10			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	245	65	30	25
Mean (f):	0.739	0.175	0.065	0.020
Mean (x):	0.671	0.178	0.082	0.068
Median (f):	0.830	0.150	0.050	0.010
Std Dev (f):	0.224	0.135	0.079	0.035
Std Dev (x):	0.470	0.383	0.275	0.253
Std Dev (f-x):	0.460	0.399	0.271	0.249
Mean (f x=1):	0.783	0.191	0.118	0.042
Mean (f x=0):	0.649	0.172	0.061	0.018
Median (f x=1):	0.840	0.150	0.100	0.010
Median (f x=0):	0.740	0.150	0.010	0.010
Std Dev (f x=1):	0.181	0.131	0.113	0.044
Std Dev (f x=0):	0.271	0.135	0.074	0.033
Discrimination:	0.134	0.019	0.057	0.024
ME:	0.068	-0.003	-0.017	-0.048
RPSsc:	0.412	-99999	-99999	-99999
RPS:	0.401	-99999	-99999	-99999
REL:	0.100	-99999	-99999	-99999
RES 1:	0.112	-99999	-99999	-99999
RES 2:	0.301	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2009
Start:	1/1/09
End:	12/31/09

Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	312	28	13	12
Mean (f):	0.856	0.103	0.028	0.013
Mean (x):	0.855	0.077	0.036	0.033
Median (f):	0.930	0.050	0.010	0.010
Std Dev (f):	0.123	0.079	0.039	0.012
Std Dev (x):	0.353	0.266	0.186	0.179
Std Dev (f-x):	0.337	0.260	0.183	0.177
Mean (f x=1):	0.871	0.166	0.063	0.025
Mean (f x=0):	0.768	0.098	0.027	0.012
Median (f x=1):	0.930	0.150	0.010	0.010
Median (f x=0):	0.840	0.050	0.010	0.010
Std Dev (f x=1):	0.105	0.095	0.074	0.035
Std Dev (f x=0):	0.177	0.075	0.037	0.010
Discrimination:	0.104	0.068	0.037	0.013
ME:	0.002	0.026	-0.008	-0.020
RPSsc:	0.220	-99999	-99999	-99999
RPS:	0.207	-99999	-99999	-99999
REL:	0.029	-99999	-99999	-99999
RES 1:	0.041	-99999	-99999	-99999
RES 2:	0.178	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year: 2008  
Start: 1/1/08  
End: 12/31/08

Total Records:	366	366	366	366
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	225	44	48	49
Mean (f):	0.724	0.179	0.071	0.026
Mean (x):	0.615	0.120	0.131	0.134
Median (f):	0.830	0.150	0.050	0.010
Std Dev (f):	0.214	0.124	0.074	0.033
Std Dev (x):	0.487	0.326	0.338	0.341
Std Dev (f-x):	0.392	0.323	0.328	0.330
Mean (f x=1):	0.829	0.250	0.118	0.058
Mean (f x=0):	0.556	0.169	0.064	0.022
Median (f x=1):	0.850	0.250	0.100	0.050
Median (f x=0):	0.550	0.100	0.050	0.010
Std Dev (f x=1):	0.128	0.121	0.092	0.046
Std Dev (f x=0):	0.218	0.121	0.068	0.028
Discrimination:	0.273	0.081	0.054	0.036
ME:	0.109	0.059	-0.060	-0.107
RPSsc:	0.548	-99999	-99999	-99999
RPS:	0.474	-99999	-99999	-99999
REL:	0.210	-99999	-99999	-99999
RES 1:	0.284	-99999	-99999	-99999
RES 2:	0.264	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year: 2007  
Start: 1/1/07  
End: 12/31/07

Total Records:	365	365	365	365
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Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	217	50	52	46
Mean (f):	0.638	0.214	0.107	0.041
Mean (x):	0.595	0.137	0.142	0.126
Median (f):	0.690	0.200	0.100	0.010
Std Dev (f):	0.199	0.095	0.071	0.043
Std Dev (x):	0.492	0.344	0.350	0.332
Std Dev (f-x):	0.419	0.344	0.342	0.318
Mean (f x=1):	0.726	0.249	0.145	0.086
Mean (f x=0):	0.508	0.209	0.101	0.034
Median (f x=1):	0.790	0.250	0.150	0.100
Median (f x=0):	0.500	0.200	0.100	0.010
Std Dev (f x=1):	0.131	0.097	0.081	0.048
Std Dev (f x=0):	0.211	0.094	0.068	0.038
Discrimination:	0.218	0.040	0.044	0.052
ME:	0.043	0.077	-0.035	-0.085
RPSsc:	0.548	-99999	-99999	-99999
RPS:	0.462	-99999	-99999	-99999
REL:	0.116	-99999	-99999	-99999
RES 1:	0.201	-99999	-99999	-99999
RES 2:	0.346	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2006			
Start:	1/1/06			
End:	12/31/06			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	210	46	43	66
Mean (f):	0.610	0.233	0.114	0.044
Mean (x):	0.575	0.126	0.118	0.181
Median (f):	0.690	0.200	0.100	0.010
Std Dev (f):	0.203	0.093	0.073	0.071
Std Dev (x):	0.495	0.332	0.323	0.385
Std Dev (f-x):	0.456	0.344	0.318	0.371
Mean (f x=1):	0.678	0.236	0.149	0.087
Mean (f x=0):	0.517	0.232	0.109	0.035
Median (f x=1):	0.740	0.200	0.150	0.050
Median (f x=0):	0.550	0.200	0.100	0.010
Std Dev (f x=1):	0.160	0.080	0.071	0.110
Std Dev (f x=0):	0.219	0.094	0.072	0.055
Discrimination:	0.161	0.004	0.040	0.052
ME:	0.034	0.107	-0.004	-0.137
RPSsc:	0.602	-99999	-99999	-99999
RPS:	0.569	-99999	-99999	-99999
REL:	0.175	-99999	-99999	-99999
RES 1:	0.208	-99999	-99999	-99999
RES 2:	0.394	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2005			
Start:	1/1/05			
End:	12/31/05			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm

Event Days:	140	66	63	96
Mean (f):	0.508	0.273	0.151	0.067
Mean (x):	0.384	0.181	0.173	0.263
Median (f):	0.550	0.250	0.150	0.050
Std Dev (f):	0.214	0.090	0.092	0.078
Std Dev (x):	0.487	0.385	0.378	0.441
Std Dev (f-x):	0.443	0.392	0.386	0.420
Mean (f x=1):	0.621	0.281	0.160	0.113
Mean (f x=0):	0.438	0.271	0.150	0.051
Median (f x=1):	0.650	0.300	0.150	0.100
Median (f x=0):	0.450	0.250	0.150	0.050
Std Dev (f x=1):	0.145	0.088	0.073	0.104
Std Dev (f x=0):	0.220	0.091	0.096	0.057
Discrimination:	0.183	0.010	0.010	0.062
ME:	0.125	0.092	-0.021	-0.196
RPSsc:	0.676	-99999	-99999	-99999
RPS:	0.682	-99999	-99999	-99999
REL:	0.224	-99999	-99999	-99999
RES 1:	0.218	-99999	-99999	-99999
RES 2:	0.458	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2004			
Start:	1/1/04			
End:	12/31/04			
Total Records:	366	366	366	366
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	115	52	54	145
Mean (f):	0.492	0.281	0.159	0.068
Mean (x):	0.314	0.142	0.148	0.396
Median (f):	0.500	0.300	0.150	0.050
Std Dev (f):	0.214	0.084	0.097	0.068
Std Dev (x):	0.465	0.350	0.355	0.490
Std Dev (f-x):	0.437	0.358	0.375	0.473
Mean (f x=1):	0.605	0.285	0.141	0.095
Mean (f x=0):	0.441	0.280	0.162	0.051
Median (f x=1):	0.640	0.300	0.150	0.050
Median (f x=0):	0.450	0.300	0.150	0.050
Std Dev (f x=1):	0.162	0.087	0.071	0.084
Std Dev (f x=0):	0.216	0.084	0.101	0.048
Discrimination:	0.164	0.004	-0.021	0.044
ME:	0.178	0.139	0.011	-0.328
RPSsc:	0.703	-99999	-99999	-99999
RPS:	0.881	-99999	-99999	-99999
REL:	0.386	-99999	-99999	-99999
RES 1:	0.207	-99999	-99999	-99999
RES 2:	0.495	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2003			
Start:	1/1/03			
End:	12/31/03			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	57	46	82	180

Mean (f):	0.339	0.347	0.212	0.102
Mean (x):	0.156	0.126	0.225	0.493
Median (f):	0.350	0.350	0.200	0.100
Std Dev (f):	0.219	0.100	0.106	0.097
Std Dev (x):	0.364	0.332	0.418	0.501
Std Dev (f-x):	0.349	0.345	0.431	0.485
Mean (f x=1):	0.526	0.351	0.213	0.127
Mean (f x=0):	0.305	0.346	0.212	0.078
Median (f x=1):	0.590	0.350	0.200	0.100
Median (f x=0):	0.300	0.350	0.200	0.050
Std Dev (f x=1):	0.231	0.079	0.098	0.114
Std Dev (f x=0):	0.199	0.102	0.109	0.067
Discrimination:	0.221	0.005	0.001	0.049
ME:	0.183	0.221	-0.012	-0.391
RPSsc:	0.584	-99999	-99999	-99999
RPS:	0.888	-99999	-99999	-99999
REL:	0.555	-99999	-99999	-99999
RES 1:	0.251	-99999	-99999	-99999
RES 2:	0.334	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2002			
Start:	1/1/02			
End:	12/31/02			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	139	63	66	97
Mean (f):	0.523	0.293	0.136	0.049
Mean (x):	0.381	0.173	0.181	0.266
Median (f):	0.590	0.250	0.100	0.010
Std Dev (f):	0.220	0.106	0.085	0.055
Std Dev (x):	0.486	0.378	0.385	0.442
Std Dev (f-x):	0.477	0.402	0.394	0.431
Mean (f x=1):	0.598	0.272	0.138	0.073
Mean (f x=0):	0.476	0.297	0.136	0.040
Median (f x=1):	0.650	0.250	0.150	0.050
Median (f x=0):	0.500	0.300	0.100	0.010
Std Dev (f x=1):	0.179	0.105	0.073	0.061
Std Dev (f x=0):	0.231	0.106	0.088	0.050
Discrimination:	0.122	-0.025	0.003	0.033
ME:	0.142	0.120	-0.045	-0.217
RPSsc:	0.678	-99999	-99999	-99999
RPS:	0.771	-99999	-99999	-99999
REL:	0.322	-99999	-99999	-99999
RES 1:	0.230	-99999	-99999	-99999
RES 2:	0.448	-99999	-99999	-99999

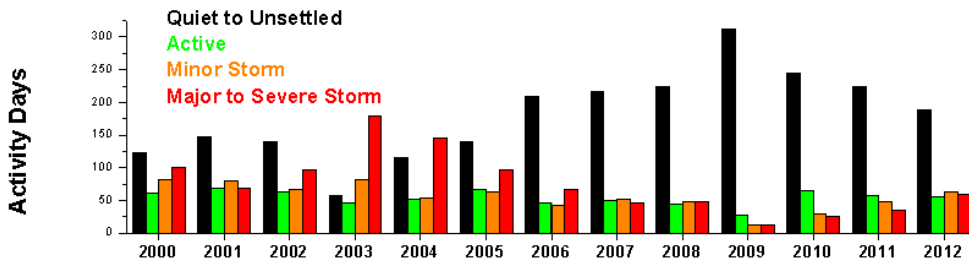
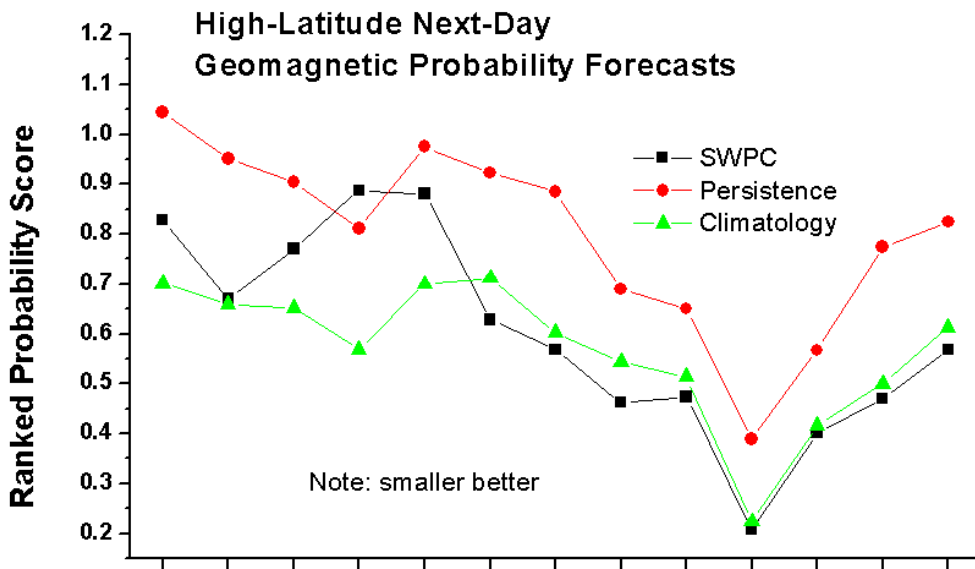
Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2001			
Start:	1/1/01			
End:	12/31/01			
Total Records:	365	365	365	365
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
Event Days:	148	69	80	68
Mean (f):	0.535	0.274	0.136	0.055

Mean (x):	0.405	0.189	0.219	0.186
Median (f):	0.600	0.250	0.100	0.010
Std Dev (f):	0.215	0.094	0.088	0.084
Std Dev (x):	0.492	0.392	0.414	0.390
Std Dev (f-x):	0.485	0.400	0.426	0.367
Mean (f x=1):	0.600	0.280	0.131	0.120
Mean (f x=0):	0.491	0.272	0.137	0.040
Median (f x=1):	0.640	0.250	0.100	0.050
Median (f x=0):	0.550	0.250	0.100	0.010
Std Dev (f x=1):	0.174	0.101	0.073	0.145
Std Dev (f x=0):	0.229	0.092	0.091	0.053
Discrimination:	0.109	0.008	-0.006	0.080
ME:	0.130	0.085	-0.083	-0.131
RPSsc:	0.634	-99999	-99999	-99999
RPS:	0.671	-99999	-99999	-99999
REL:	0.257	-99999	-99999	-99999
RES 1:	0.219	-99999	-99999	-99999
RES 2:	0.414	-99999	-99999	-99999

Forecast Type: Likelihood (probability) of the occurrence of geomagnetic category

Year:	2000			
Start:	1/1/00			
End:	12/31/00			
Total Records:	366	366	366	366
Geomag Category:	Q-U	A	Mn Stm	Mj-Svr Stm
#Event Days:	122	61	82	101
Mean (f):	0.481	0.299	0.155	0.065
Mean (x):	0.333	0.167	0.224	0.276
Median (f):	0.520	0.300	0.150	0.050
Std Dev (f):	0.241	0.122	0.109	0.101
Std Dev (x):	0.472	0.373	0.418	0.448
Std Dev (f-x):	0.488	0.377	0.438	0.441
Mean (f x=1):	0.545	0.334	0.144	0.093
Mean (f x=0):	0.449	0.292	0.159	0.054
Median (f x=1):	0.600	0.300	0.100	0.050
Median (f x=0):	0.490	0.300	0.150	0.050
Std Dev (f x=1):	0.227	0.137	0.099	0.128
Std Dev (f x=0):	0.241	0.118	0.112	0.086
Discrimination:	0.095	0.042	-0.015	0.039
ME:	0.148	0.132	-0.069	-0.211
RPSsc:	0.672	-99999	-99999	-99999
RPS:	0.828	-99999	-99999	-99999
REL:	0.399	-99999	-99999	-99999
RES 1:	0.243	-99999	-99999	-99999
RES 2:	0.429	-99999	-99999	-99999

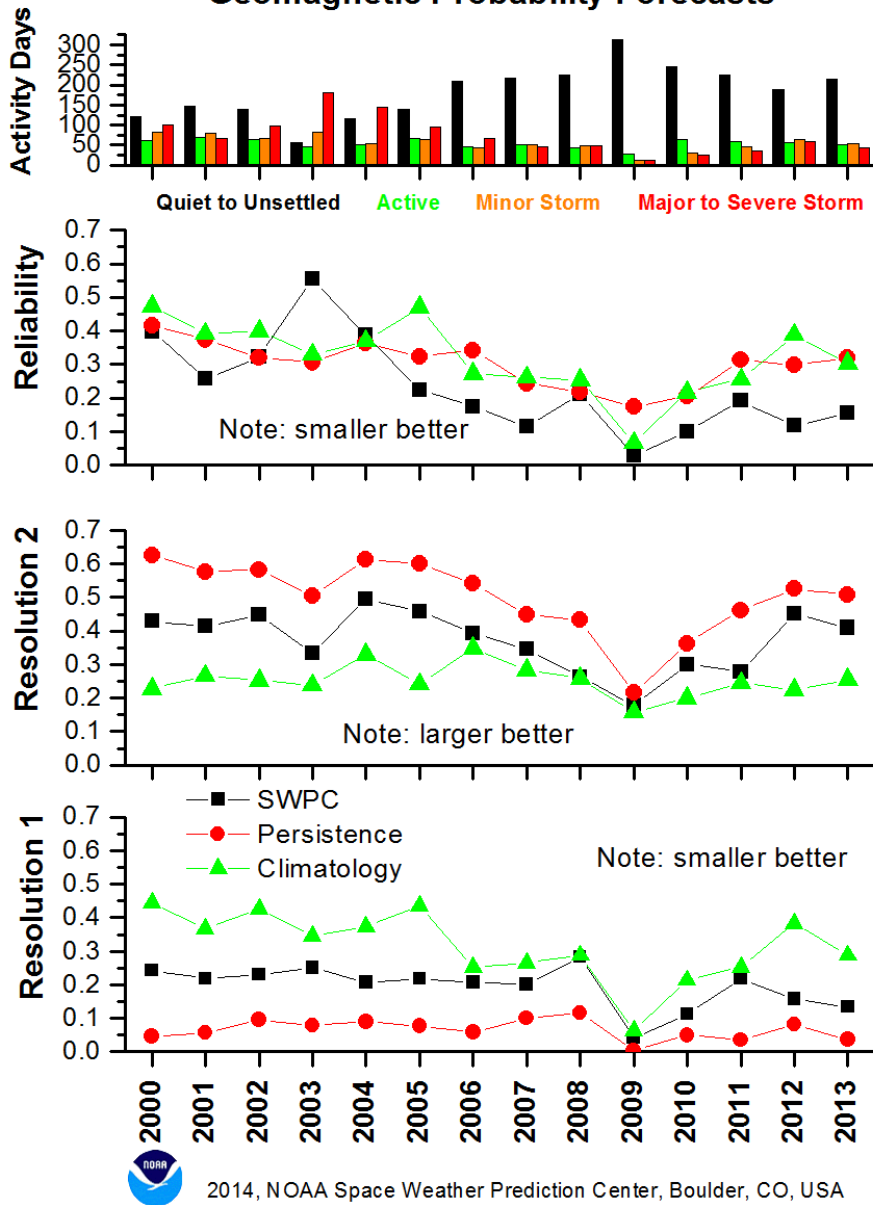


2013, NOAA Space Weather Prediction Center, Boulder, CO, USA

This plot shows the ranked probability score (RPS) for next-day (1-day lead time) high-latitude geomagnetic probability forecasts from 2000 to 2013. The annual RPS for SWPC forecasts is compared to forecasts of short-term (30-day) climatology and 1-day persistence. The RPS is the mean square error of probability forecasts for ordinal predictands and is greater than or equal to 0. Smaller values are better. The bottom panel histogram shows the number of days in each geomagnetic activity category per year: Quiet to Unsettled, Active, Minor Storm, and Major to Severe Storm.



## High-Latitude Next-Day Geomagnetic Probability Forecasts



These plots show the annual trend, from 2000 to 2013, of various verification metrics for next-day (1-day lead time) high-latitude geomagnetic probability forecasts. SWPC forecast metrics are compared to those for 30-day climatology forecasts and 1-day persistence forecasts. The top panel plots the number of days in each of four geomagnetic activity categories per year: Quiet to Unsettled, Active, Minor Storm, and Major to Severe Storm. The second panel plots the forecast Reliability (0 or greater with smaller values better), the third panel shows one type of forecast Resolution (0 or greater with larger values better), and the bottom panel plots another type of forecast Resolution (0 or greater with smaller values better). Detailed definitions of these metrics are located in the Verification Glossary.