



Perspective on the Accuracy of Meteorologists

Why we get a bum rap.

How many times have you heard this?



Bill Murray

@BillMurray



Follow

Fool me once, shame on you. Fool me twice, shame on me. Fool me 350,000 times, you are a weather man.

RETWEETS

771

FAVORITES

389

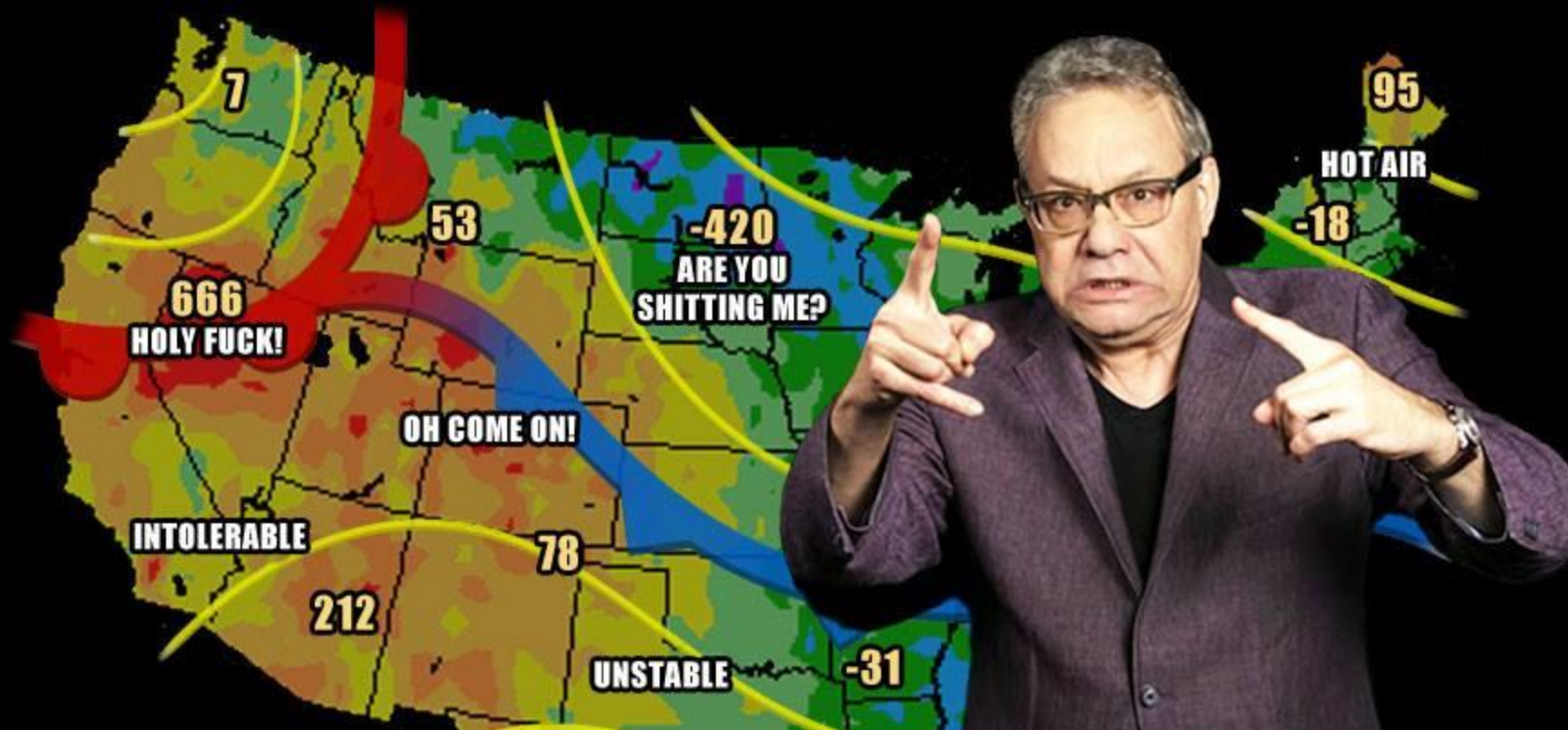


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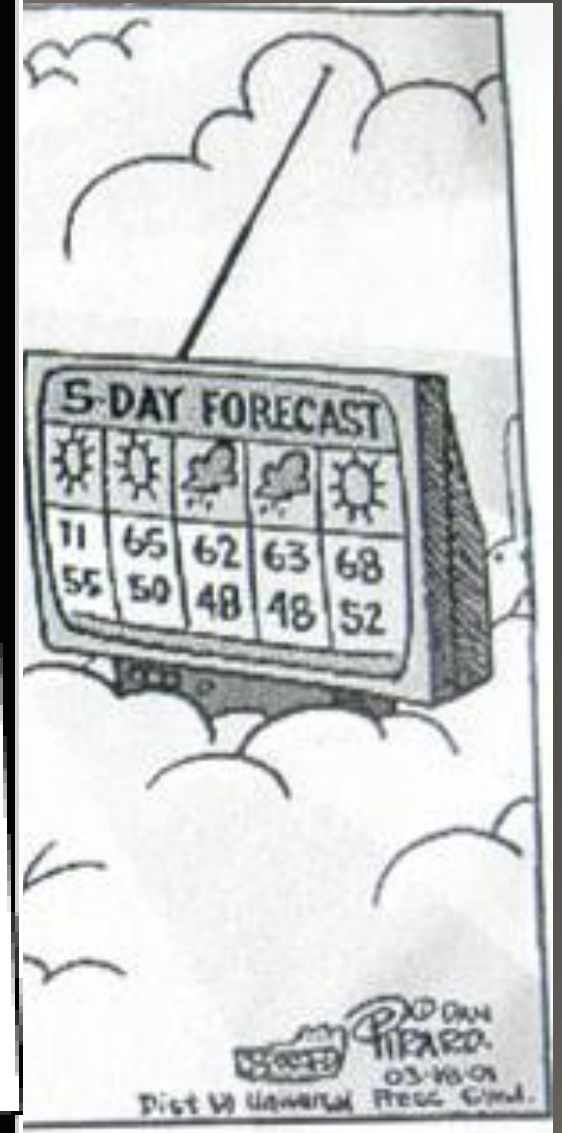
Or the ever popular

*“Wish I had a job I could
be wrong ___% of the time
an still keep my job!”*



**DO YOU KNOW WHAT 'METEOROLOGIST'
MEANS IN ENGLISH?
IT MEANS LIAR.**

~LEWIS BLACK~



"I know I'm just a weather reporter,
but I feel guilty every time it rains."



WHAT A 20% CHANCE OF RAIN REALLY MEANS

**WHY IS IT RAINING?
IT'S ONLY A 20% CHANCE.
THEY ARE NEVER RIGHT!**

**WHY ISN'T IT RAINING?
THEY SAID A CHANCE OF RAIN.
THEY ARE NEVER RIGHT!**



Don't get mad – let's embrace it!

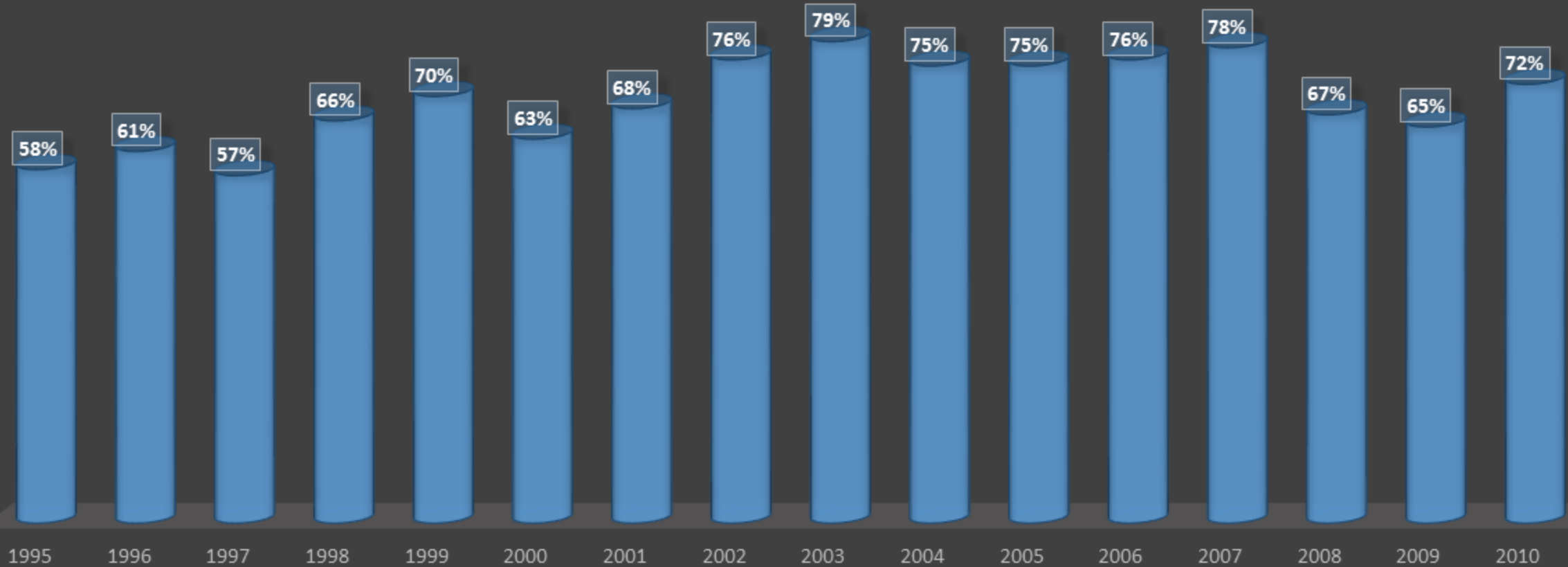
- Weather forecasting has gotten better as forecasters embraced the fact that we can't always be 100% correct
- Ensemble forecasting has helped reduce errors by removing outliers.
- Getting it wrong can be the best learning process a forecaster can go through.
- Yet as forecasts get better, it seems peoples' opinions of our forecasts get worse?
- So let's put this into perspective.

How accurate are we really?

- Depending on methodology most sources of weather forecasts are accurate around 80-90% of the time in day 1 temperatures forecasts.
- My station has kept accuracy records for 10 years and we average about 94% accurate for the day 1 forecast.
- That still means we blow it about 22 days a year.

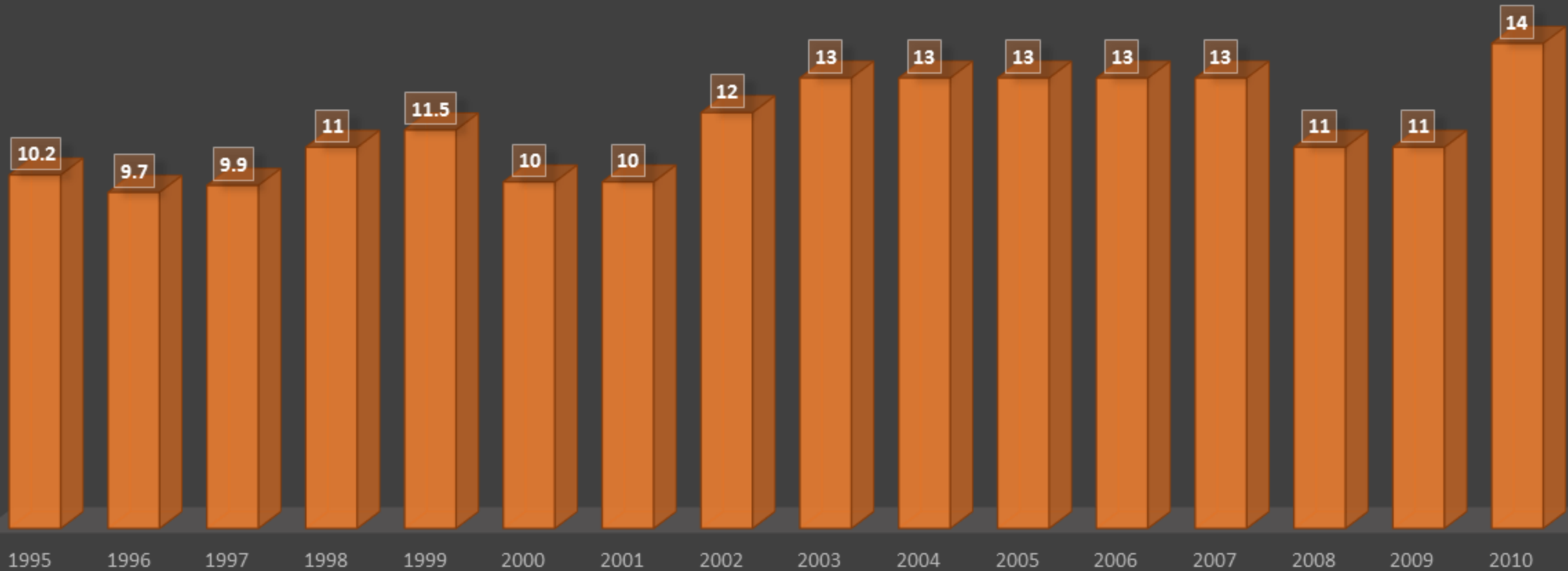
Online Weather Channel	Average Accuracy by Days Previous																													
	0		1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo
The National Weather Service	2.44	4.90	3.26	5.74	2.98	5.21	3.98	5.55	4.22	5.56	3.80	5.65	5.51																	
BBC Weather	3.62	5.06	4.38	5.71	3.81	5.95	4.50	6.31	5.23	7.18																				
The Weather Channel	2.50	5.00	3.38	5.17	3.00	4.40	3.93	4.69	4.32	4.93	4.20	5.78	5.67	5.74	5.95	5.61	6.84	6.05	6.36	6.19										
The Weather Underground	2.68	5.17	3.71	5.62	3.40	5.62	4.07	5.17	4.34	5.88																				
IntelliCast	2.48	5.15	3.36	5.17	3.17	4.48	4.12	4.71	4.51	5.10	4.45	5.75	5.74	5.77	5.61	5.66	6.92	6.16	6.39	6.31										
CNN Weather	2.34	4.73	3.12	5.71	3.24	5.00	3.90	4.83	5.41	5.46																				
MSN Weather	2.65	6.88	3.31	6.50	3.79	6.26	4.07	7.31	4.46	7.34	4.80	5.18	5.56	6.56	8.11	7.66	10.16	9.00	10.03	8.28										
The Weather Network	3.16	5.41	3.79	5.62	3.48	5.10	4.55	5.95	4.05	5.63																				
Unisys	3.16		3.55	3.38	2.98	3.83	4.05	3.38	4.32	4.59	4.10	5.55	5.51	5.03																
Accuweather	2.37	5.22	3.14	6.24	3.52	5.50	3.74	5.17	3.85	5.24	4.58	5.10	5.18	5.51	7.00	9.32	7.65	9.27	6.28	8.08	5.57	9.20	6.97	8.49	7.23	8.11	7.89	8.37	6.65	9.59

TORNADO WARNING ACCURACY



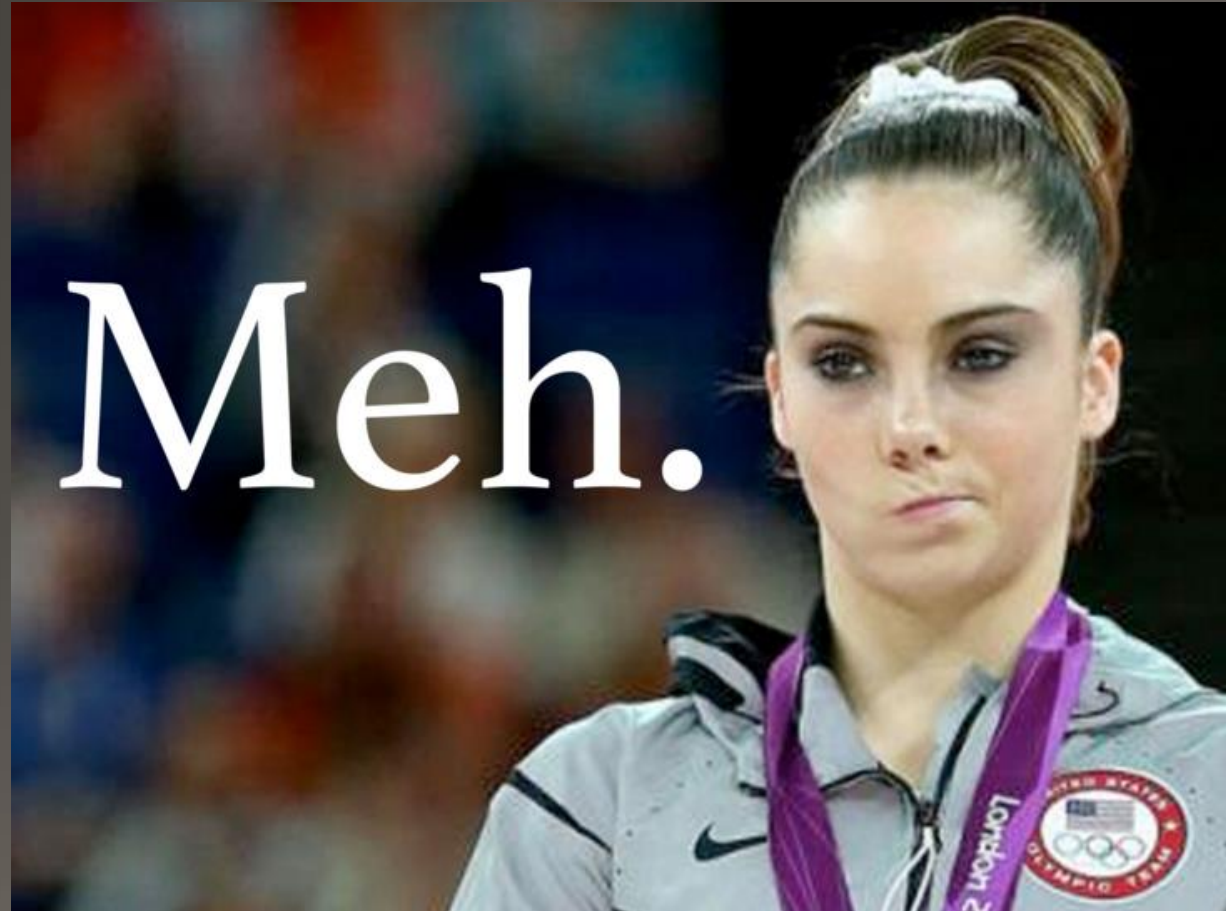
■ Tornado Warning Accuracy Rate

TORNADO WARNING LEAD TIMES



■ Average Lead Time (mins)

So we aren't that bad!



How do we compare to other fields?

- The Medical Field might be a good place to start.
- According to the Journal of Clinical Oncology 44% of some cancer types are misdiagnosed
- The Mayo Clinic found in 2010 that there is a 26% misdiagnosis rate for all illnesses
- Doctors have tough jobs and often times are overly cautious like meteorologists when it comes to life threatening matters.
- If you had a lump you'd get it checked out and not think twice
- Yet people are mad when we issue so many tornado warnings. When on average 75% of those warnings don't produce a tornado.

Sports: What's good for them sucks for us!

- NBA

Field Goal Percentage Leaders - Qualified												
RK	PLAYER	TEAM	GP	MPG	PTS	FGM- FGA	FG%		3PM- 3PA	3P%	FTM- FTA	FT%
1	DeAndre Jordan, C	LAC	82	34.4	11.5	4.6-6.5	.710		0.0-0.0	.250	2.3-5.7	.397
2	Jonas Valanciunas, C	TOR	80	26.2	12.0	4.7-8.2	.572		0.0-0.0	.000	2.7-3.5	.786
3	Marcin Gortat, C	WSH	82	29.9	12.2	5.4-9.5	.566		0.0-0.0	.000	1.5-2.1	.703
4	Timofey Mozgov, C	CLE/DEN	81	25.3	9.7	3.9-7.0	.555		0.0-0.1	.333	1.9-2.7	.718
5	Tyler Zeller, C	BOS	82	21.1	10.2	4.1-7.5	.549		0.0-0.0	.000	1.9-2.3	.823
6	Al Horford, PF	ATL	76	30.5	15.2	6.8-12.7	.538		0.1-0.5	.306	1.4-1.9	.759
7	Anthony Davis, PF	NO	68	36.1	24.4	9.4-17.6	.535		0.0-0.2	.083	5.5-6.8	.805
8	Derrick Favors, PF	UTAH	74	30.8	16.0	6.5-12.4	.525		0.0-0.1	.167	3.0-4.5	.669
9	Nikola Vucevic, C	ORL	74	34.2	19.3	8.5-16.3	.523		0.0-0.1	.333	2.2-2.9	.752
10	Enes Kanter, C	OKC/UTAH	75	28.5	15.5	6.4-12.4	.519		0.2-0.6	.356	2.4-3.1	.782

FREE THROWS!

Free Throws Percentage Leaders - Qualified

RK	PLAYER	TEAM	GP	MPG	PTS	FGM-FGA	FG%	3PM-3PA	3P%	FTM-FTA	FT%
1	Stephen Curry, PG	GS	80	32.7	23.8	8.2-16.8	.487	3.6-8.1	.443	3.9-4.2	.914
2	Jodie Meeks, SG	DET	60	24.4	11.1	3.7-8.9	.416	1.2-3.5	.349	2.4-2.7	.906
3	J.J. Redick, SG	LAC	78	30.9	16.4	5.7-12.0	.477	2.6-5.9	.437	2.3-2.6	.901
4	Jamal Crawford, SG	LAC	64	26.6	15.8	5.2-13.1	.396	1.9-5.7	.327	3.5-3.9	.901
5	Chris Paul, PG	LAC	82	34.8	19.1	6.9-14.3	.485	1.7-4.3	.398	3.5-3.9	.900
6	Danilo Gallinari, SF	DEN	59	24.2	12.4	3.9-9.6	.401	1.8-5.1	.355	2.9-3.2	.895
7	Nick Young, SF	LAL	42	23.8	13.4	4.1-11.3	.366	2.0-5.4	.369	3.1-3.5	.892
8	Dirk Nowitzki, PF	DAL	77	29.6	17.3	6.3-13.8	.459	1.4-3.6	.380	3.3-3.8	.882
9	Jarrett Jack, PG	BKN	80	28.0	12.0	4.5-10.2	.439	0.5-1.8	.267	2.5-2.8	.881
10	Kevin Martin, SG	MIN	39	33.4	20.0	6.8-16.0	.427	1.9-4.9	.393	4.4-4.9	.881

Best Players in the league!

Points Per Game Leaders - Qualified												
RK	PLAYER	TEAM	GP	MPG	PTS	FGM-FGA	FG%	3PM-3PA	3P%	FTM-FTA	FT%	
1	Russell Westbrook, PG	OKC	67	34.4	28.1	9.4-22.0	.426	1.3-4.3	.299	8.1-9.8	.835	
2	James Harden, SG	HOU	81	36.8	27.4	8.0-18.1	.440	2.6-6.9	.375	8.8-10.2	.868	
3	LeBron James, SF	CLE	69	36.1	25.3	9.0-18.5	.488	1.7-4.9	.354	5.4-7.7	.710	
4	Anthony Davis, PF	NO	68	36.1	24.4	9.4-17.6	.535	0.0-0.2	.083	5.5-6.8	.805	
5	DeMarcus Cousins, C	SAC	59	34.1	24.1	8.4-18.1	.467	0.0-0.1	.250	7.2-9.2	.782	
6	Stephen Curry, PG	GS	80	32.7	23.8	8.2-16.8	.487	3.6-8.1	.443	3.9-4.2	.914	
7	LaMarcus Aldridge, PF	POR	71	35.4	23.4	9.3-19.9	.466	0.5-1.5	.352	4.3-5.1	.845	
8	Blake Griffin, PF	LAC	67	35.2	21.9	8.6-17.1	.502	0.1-0.4	.400	4.6-6.4	.728	
9	Kyrie Irving, PG	CLE	75	36.4	21.7	7.7-16.5	.468	2.1-5.0	.415	4.2-4.9	.863	
	Klay Thompson, SG	GS	77	31.9	21.7	7.8-16.9	.463	3.1-7.1	.439	2.9-3.3	.879	

NFL

Completion Percentage Leaders - Qualified

RK	PLAYER	TEAM	COMP	ATT	PCT	YDS	YDS/A	LONG	TD	INT	SACK	RATE	YDS/G
1	Ben Roethlisberger, QB	PIT	67	89	75.3	912	10.25	59	4	2	5	113.1	304
2	Tony Romo, QB	DAL	54	72	75.0	551	7.65	39	3	2	3	98.8	276
3	Tom Brady, QB	NE	116	160	72.5	1,387	8.67	59	11	0	11	121.5	347
4	Brandon Weeden, QB	DAL	71	98	72.4	739	7.54	67	2	2	8	92.2	185
5	Philip Rivers, QB	SD	134	188	71.3	1,613	8.58	68	10	5	14	103.9	323
6	Russell Wilson, QB	SEA	106	150	70.7	1,192	7.95	50	6	3	22	99.1	238
7	Aaron Rodgers, QB	GB	108	153	70.6	1,236	8.08	65	13	2	8	117.4	247
8	Tyrod Taylor, QB	BUF	96	137	70.1	1,097	8.01	51	9	4	14	103.6	219
9	Drew Brees, QB	NO	143	209	68.4	1,616	7.73	80	7	3	15	96.5	323
10	Kirk Cousins, QB	WSH	126	185	68.1	1,224	6.62	43	5	6	6	81.9	245

MLB

Sortable Batting

RK	PLAYER	TEAM	AB	R	H	2B	3B	HR	RBI	SB	CS	BB	SO	AVG	OBP	SLG	OPS	WAR
1	Miguel Cabrera	DET	429	64	145	28	1	18	76	1	1	77	82	.338	.440	.534	.974	5.2
2	Xander Bogaerts	BOS	613	84	196	35	3	7	81	10	2	32	101	.320	.355	.421	.776	4.6
3	Jose Altuve	HOU	638	86	200	40	4	15	66	38	13	33	67	.313	.353	.459	.812	4.5
4	Michael Brantley	CLE	529	68	164	45	0	15	84	15	1	60	51	.310	.379	.480	.859	3.4
5	Lorenzo Cain	KC	551	101	169	34	6	16	72	28	6	37	98	.307	.361	.477	.838	7.2
6	Prince Fielder	TEX	613	78	187	28	0	23	98	0	0	64	88	.305	.378	.463	.841	1.9
7	Jason Kipnis	CLE	565	86	171	43	7	9	52	12	8	57	107	.303	.372	.451	.823	4.6
8	Nelson Cruz	SEA	590	90	178	22	1	44	93	3	2	59	164	.302	.369	.566	.936	5.2
9	Mike Trout	LAA	575	104	172	32	6	41	90	11	7	92	158	.299	.402	.590	.991	9.4
10	Eric Hosmer	KC	599	98	178	33	5	18	93	7	3	61	108	.297	.363	.459	.822	3.6

So what's going on here?

- While we are getting better at forecasting, is our ability to communicate that information keeping pace?
- We are a victim of our own success. The better we forecast the more people expect accuracy.
- We still convey more certainty and precision than we are actually capable of.
- Social Media and Apps! Is more information better or are we watering down our better forecast?

For instance!

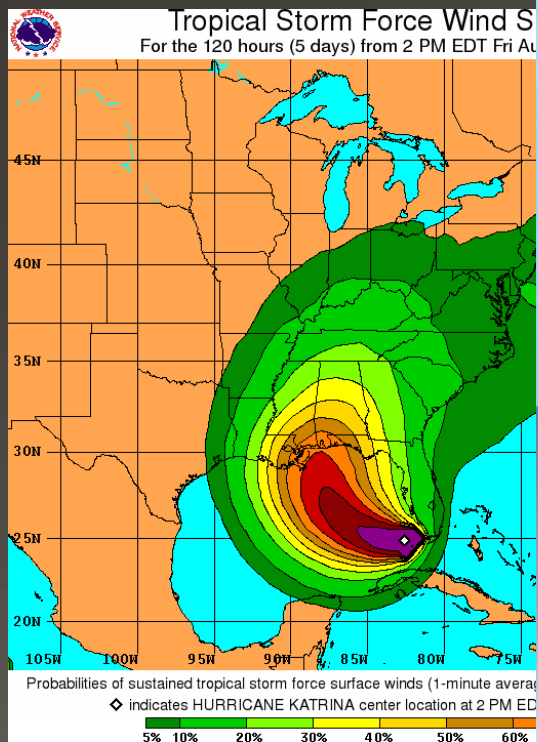


When we should be doing this!



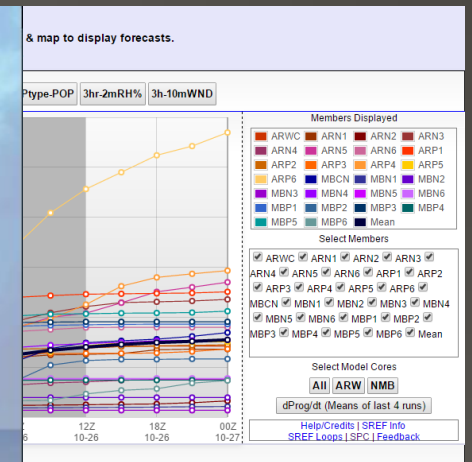
How do we fix this?

- Ensemble forecasts, probabilities and conveying uncertainty!



FIRST WAVE WEATHER COLD FRONT + JOAQUIN

FACTORS	FORECAST CONFIDENCE LEVEL		
JOAQUIN INFLUENCE	LOW	MEDIUM	HIGH
STORM TRACK	LOW	MEDIUM	HIGH
STORM INTENSITY	LOW	MEDIUM	HIGH
FLOOD THREAT	LOW	MEDIUM	HIGH



Questions or Comments To Troll me

