

Role of the broadcaster in communicating forecast uncertainty

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Meteorological products are needed
“that effectively communicate
forecast uncertainty information.”

Failure to provide such information
deprives users of “knowing the
uncertainties of the forecasts upon
which they rely.”

-U.S. National Research Council, 2006

Uncertainty

Uncertainty $\neq$ Not knowing

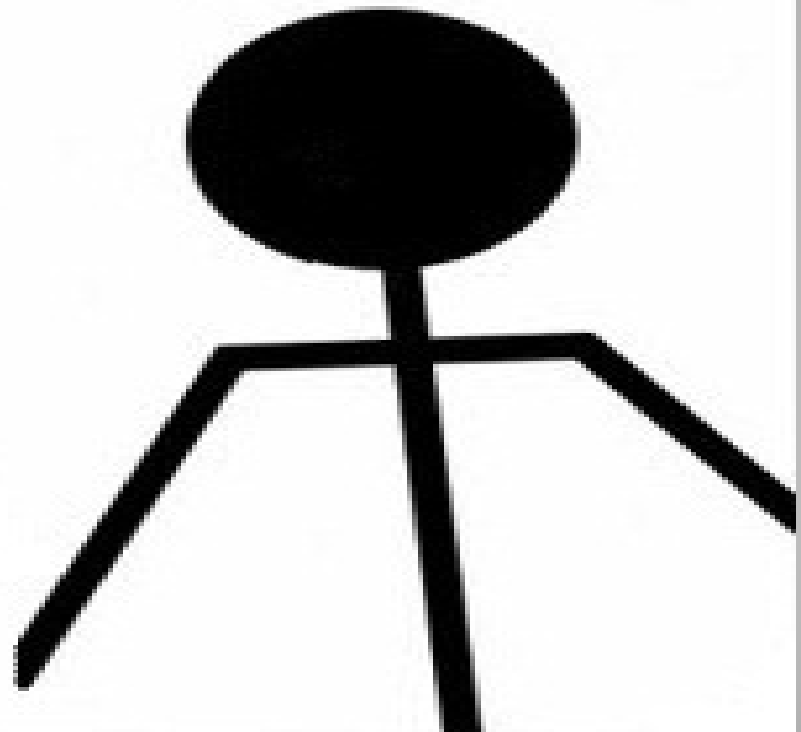
Uncertainty is... a fundamental characteristic of weather, seasonal climate, and hydrological prediction, and no forecast is complete without a description of its uncertainty.

-U.S. National Academies, 2006

Uncertainty



Will it rain
tomorrow?



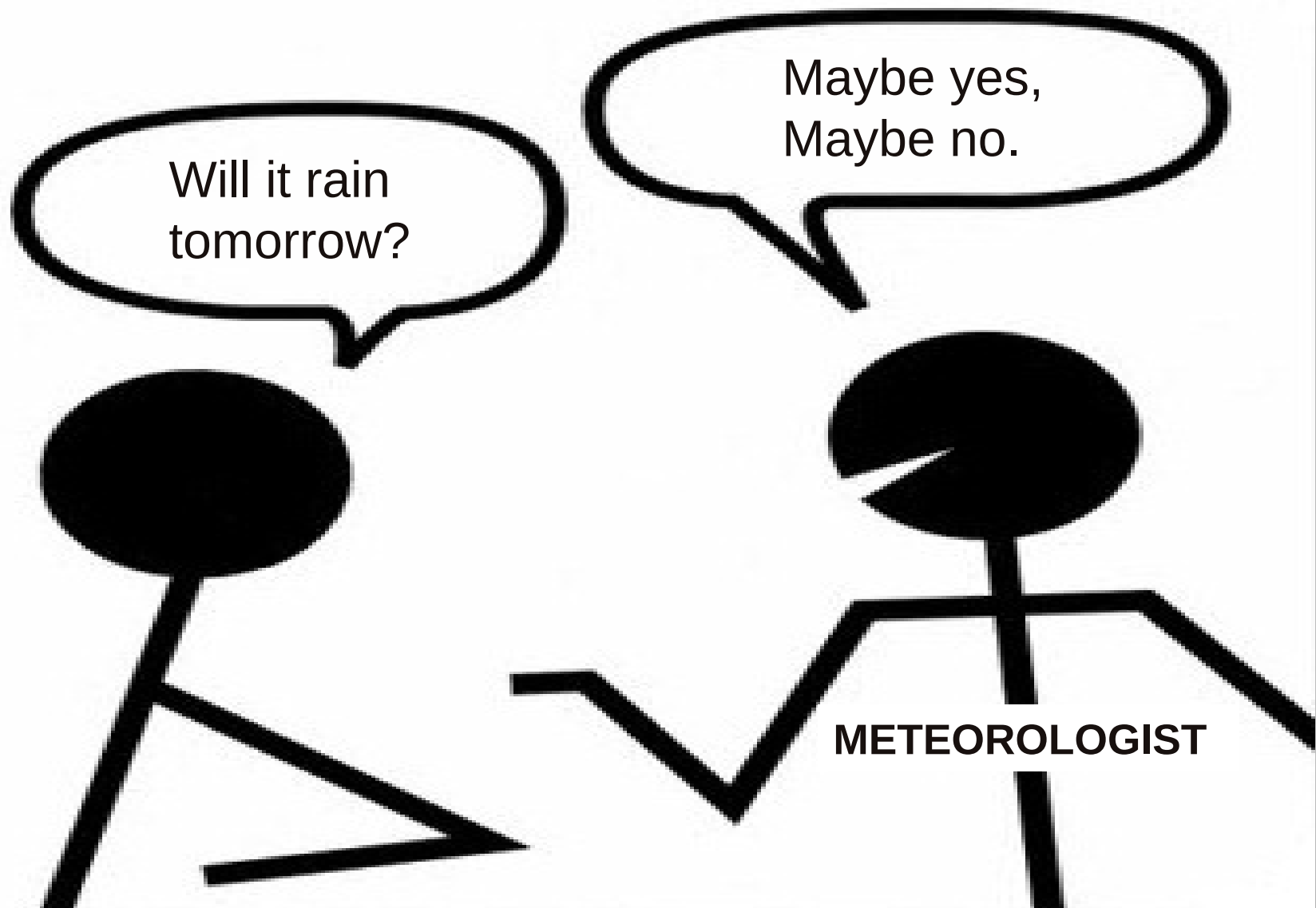
What TV viewers want



What TV viewers want

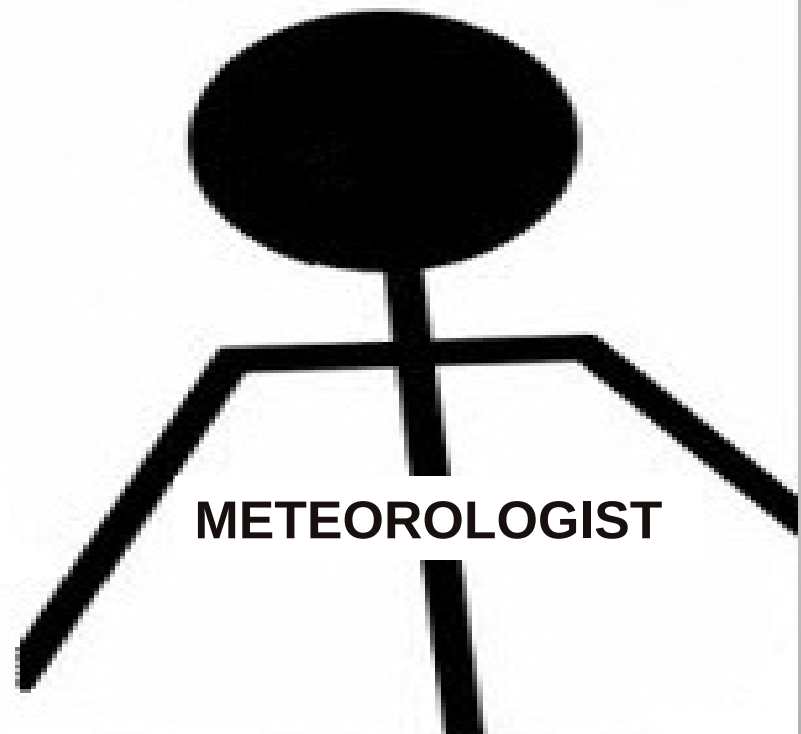


What TV viewers want



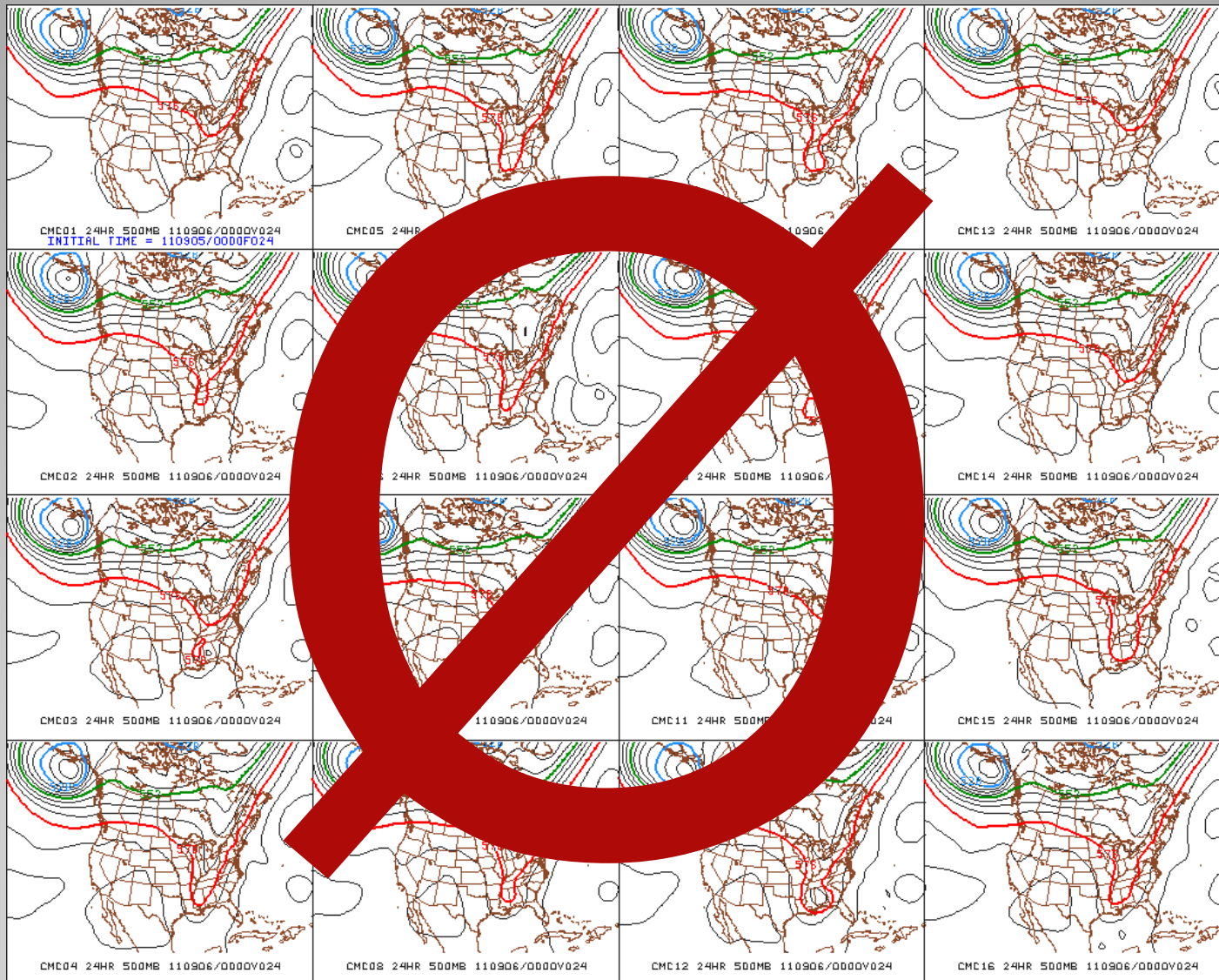
What TV viewers want

Your forecast
is worthless



METEOROLOGIST

What viewers want



Ensembles-500 mb heights

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KFSD  MRF MOS GUIDANCE  9/05/2011 0000 UTC
FHR 24| 36 48 60 72| 84 96|108 120|132 144|156 168|180 192
MON 05| TUE 06| WED 07| THU 08| FRI 09| SAT 10| SUN 11| MON 12 CLIMO
X/N 72| 49 74| 48 79| 50 79| 53 80| 53 80| 55 79| 53 77| 51 75
TMP 67| 50 70| 50 75| 51 74| 55 74| 54 74| 56 73| 54 71
DPT 49| 46 52| 47 55| 49 56| 52 55| 51 57| 53 57| 51 55
CLD CL| CL CL| CL CL| CL CL| CL CL| CL CL| CL CL| CL CL
P12 1| 2 0| 0 2| 5 7| 8 9| 12 11| 15 13| 14 11| 23 17
P24 1| 2| 11| 13| 16| 20| 21| 26 32
Q12 0| 0 0| 0 0| 0 0| 0 0| 0 0| 0 0| 0 0|
Q24 1| 0| 0| 0| 0| 0| 0| 1|
PZP 0| 0 0| 0 0| 0 1| 0 1| 1 1| 1 0| 0 1| 0
PSN 0| 0 0| 0 1| 0 0| 0 0| 0 0| 0 0| 0 0
PRS 2| 0 2| 0 1| 0 1| 0 3| 1 4| 2 3| 1 2
TYP R| R R| R R| R R| R R| R R| R R| R R| R R

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KFSD  MRF MOS GUIDANCE  9/05/2011  0000 UTC
FHR 24| 36 48| 60 72| 84 96|108 120|132 144|156 168|180 192|
MON 05| TUE 06| WED 07| THU 08| FRI 09| SAT 10| SUN 11| MO
X/N 72| 49 74| 49 79| 50 79| 52 78| 52 78| 52 76| 51 77| 51 75|
TMR 67| 51 71| 50 76| 51 74| 54 73| 53 72| 54 71| 52 71|
DPT 50| 46 52| 48 56| 49 56| 51 55| 50 56| 50 55| 49 55|
CLD CL| CL CL| CL CL| CL CL| CL CL| CL CL| CL CL| CL CL|
P12 1| 3 1| 0 3| 5 11| 8 10| 11 12| 15 16| 14 11 23 17
P24 1| 3| 10| 13| 16| 21| 21| 28 32
Q12 0| 0 0| 0 0| 0 0| 0 0| 0 0| 0 0|
Q24 1| 0| 0| 0| 0| 0| 0|
PZP 0| 0 0| 0 0| 0 1| 0 1| 1 1| 0 1 0
PSN 0| 0 0| 0 1| 0 0| 0 0| 0 0| 0 0 0
PRS 2| 0 2| 0 1| 0 1| 0 3| 1 2| 3 1 2
TYP R| R| R| R| R| R| R| R| R| R| R| R| R| R| R| R|

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KFSD  MRF MOS GUIDANCE  9/05/2011 0000 UTC
FHR 24|36 48|60 72|84 96|108 120|132 144|156 168|180 192
MON 05| 05|06 WED 07| THU 08| FRI 09| SAT 10| SUN 11| MO
X/N 72|49 74|49 80|51 80|54 79|51 75|51 75|49 74|51 75
TMP 67| 51 70|50 76|53 75|56 74|52 70|52 70|51 69
DPT 49|46 52|48 57|50 57|53 55|48 51 48 53|47 53
CLD CL|CL CL|CL CL|CL CL|CL CL|CL CL|CL CL|CL CL
P12 1| 1 0| 0 3| 5 7| 8 6| 9 8| 13 13| 14 11 23 17
P24 1| 0 1| 11| 13| 16| 17| 18| 27 32
Q12 0| 0 0| 0 0| 0 0| 0 0| 0 0| 0 0|
Q24 1| 0 0| 0 0| 0 0| 0 1|
PZP 0| 0 0| 0 0| 0 1| 0 1| 1 1| 0 0| 0 1 0
PSN 0| 0 0| 0 0| 1 0| 0 0| 0 0| 0 0| 0 0 0
PRS 2| 0 2| 0 2| 1 0| 1 0| 3| 1 4| 1 2| 1 2
TYP R| R R| R R| R R| R R| R R| R R| R R| R R

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KFSD MRF MOS GUIDANCE 9/05/2011 0000 UTC
 FHR 24| 36 48| 60 72| 84 96|108 120|132 144|156 168|180 192
 MON 05| TUE 06| WED 07| THU 08| FRI 09| SAT 10| SUN 11| MON 12 CLIMO
 X/N 72| 49 74| 48 79| 50 81| 54 80| 53 79| 53 77| 51 75 51 75
 TMP 67| 50 70| 49 75| 52 76| 56 74| 55 73| 54 72| 53 70
 DPT 49| 45 51| 48 55| 49 56| 53 55| 52 57| 51 56| 49 54
 CLD CL| CL CL| CL CL| CL CL| CL CL| CL CL| CL CL CL
 P12 11| 1 0| 0 3| 5 9| 8 8| 9 9| 14 14| 13 23 17
 13| 16| 18| 20| 22
 0| 0 0| 0 0| 0 0
 0| 1 0
 PSN 0| 0 0| 0 0| 0 0
 PRS 2| 0 2| 0 0| 3| 1 2
 TYP R| R R| R R| R R| R R| R R| R R

[illegible][illegible]

Ensembles-Model Output Stats

Due to:

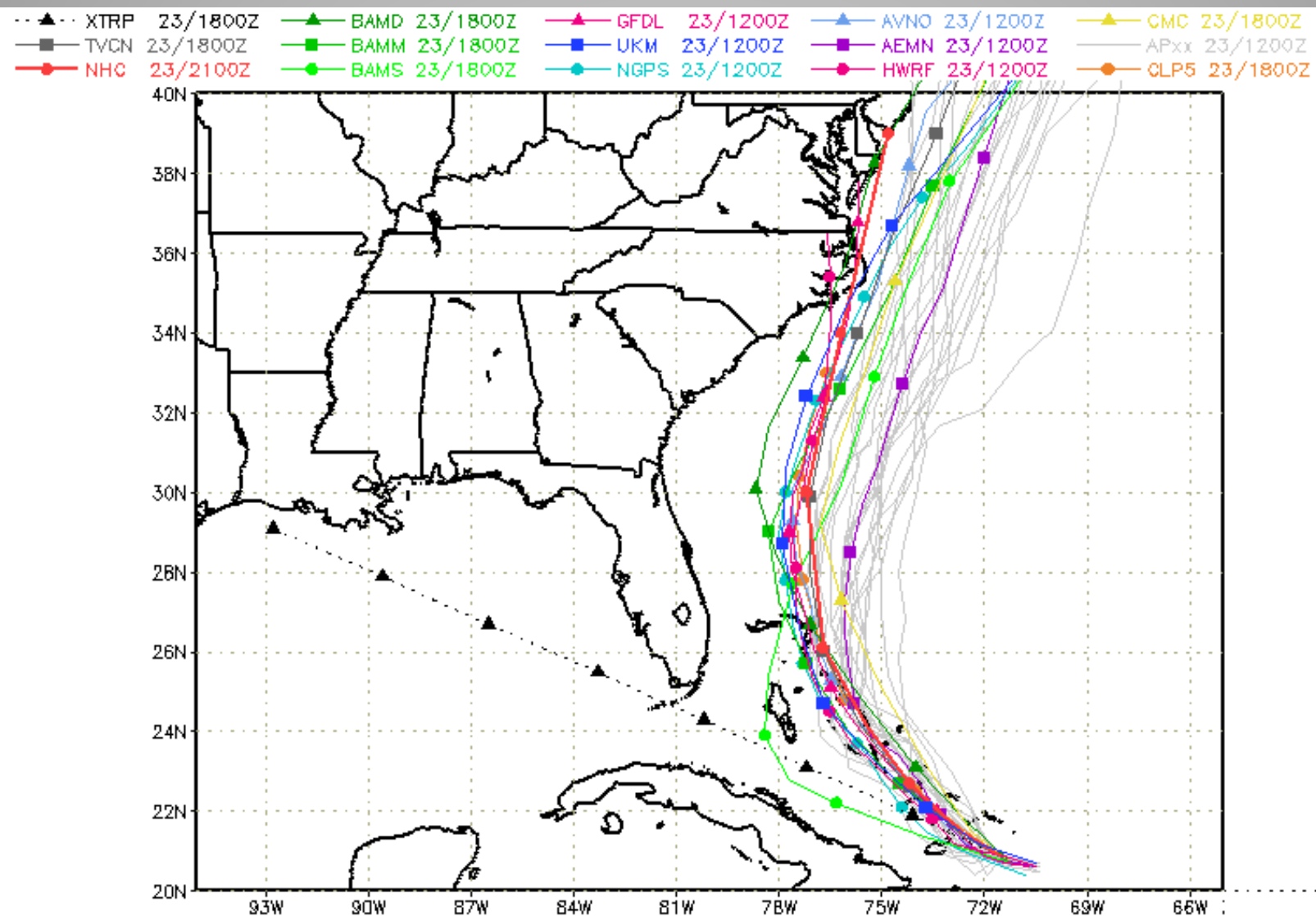
- Shortage of time**
- Small space on screen**
- Requirement of simplicity**
- Need to avoid confusion**
(too many numbers)
- Culture of TV journalism**
(verbal statements rather than conjecture)

TV weathercasts are deterministic

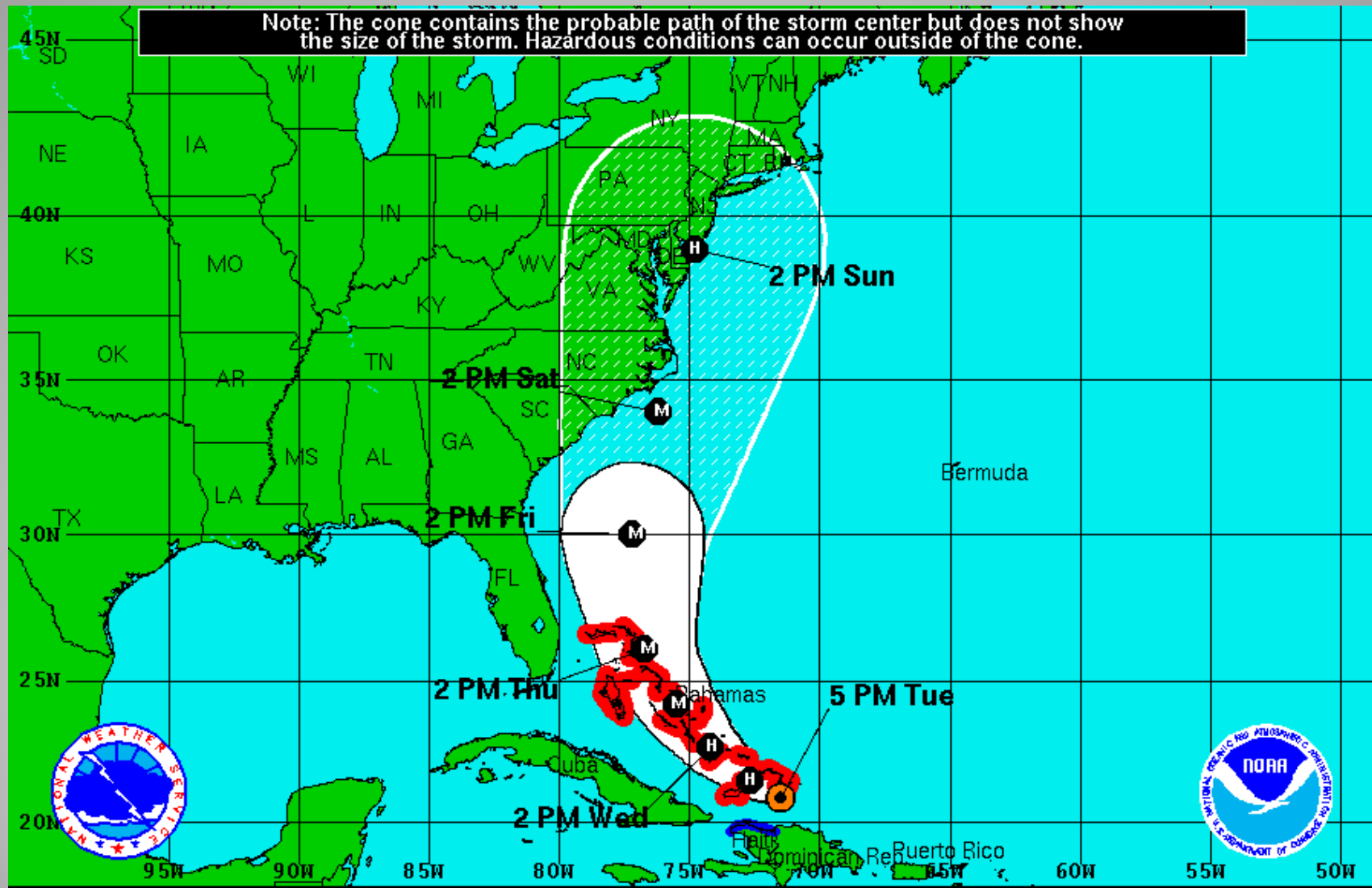
- Odds of an event (percentage)**
- Alternative scenarios/likelihood of occurrence**
- Description of forecast confidence**
- Alternative scenario narrative**
- Expressions of uncertainty**

-U.S. National Academies, 2006

Communicating Uncertainty



Ensembles-Hurricane track



Ensembles-Hurricane tracks



Probability of precipitation next 7 days



Probability and location heavy snowfall



Present an alternate scenario



Verbal expressions of uncertainty

- 1. Improved viewer response based on increased trust and credibility**
- 2. More informed decisions based on better understanding of the forecast**
- 3. Mitigation of losses and better economic efficiency based on risk analysis**

Adapted from Hilderbrand,
NOAA, "Completing the
Forecast"

Desired societal impact