¿Cómo contar la predicción probabilistica?

How to tell probabilities in weather forecasting?

Part II: From body language to percentages

From 100% qualitative to 100% quantitative probability communication

1. Filtered information
2. Verbal communication
3. Body language
4. Meteorological scenarios
5. Impact matrices
6. Numerical non- or quasi probabilistic
7. 100% probabilistic

1. Filtered information

AP (in Bracknell 1975): *-I always understand and remember your Radio 4 forecasts for the UK!*

Met Office meteorologist: *-We have a rule not to use more than 30-35 words on radio forecasts.*

Filtering away less predictable and less important information makes the forecasts. . .

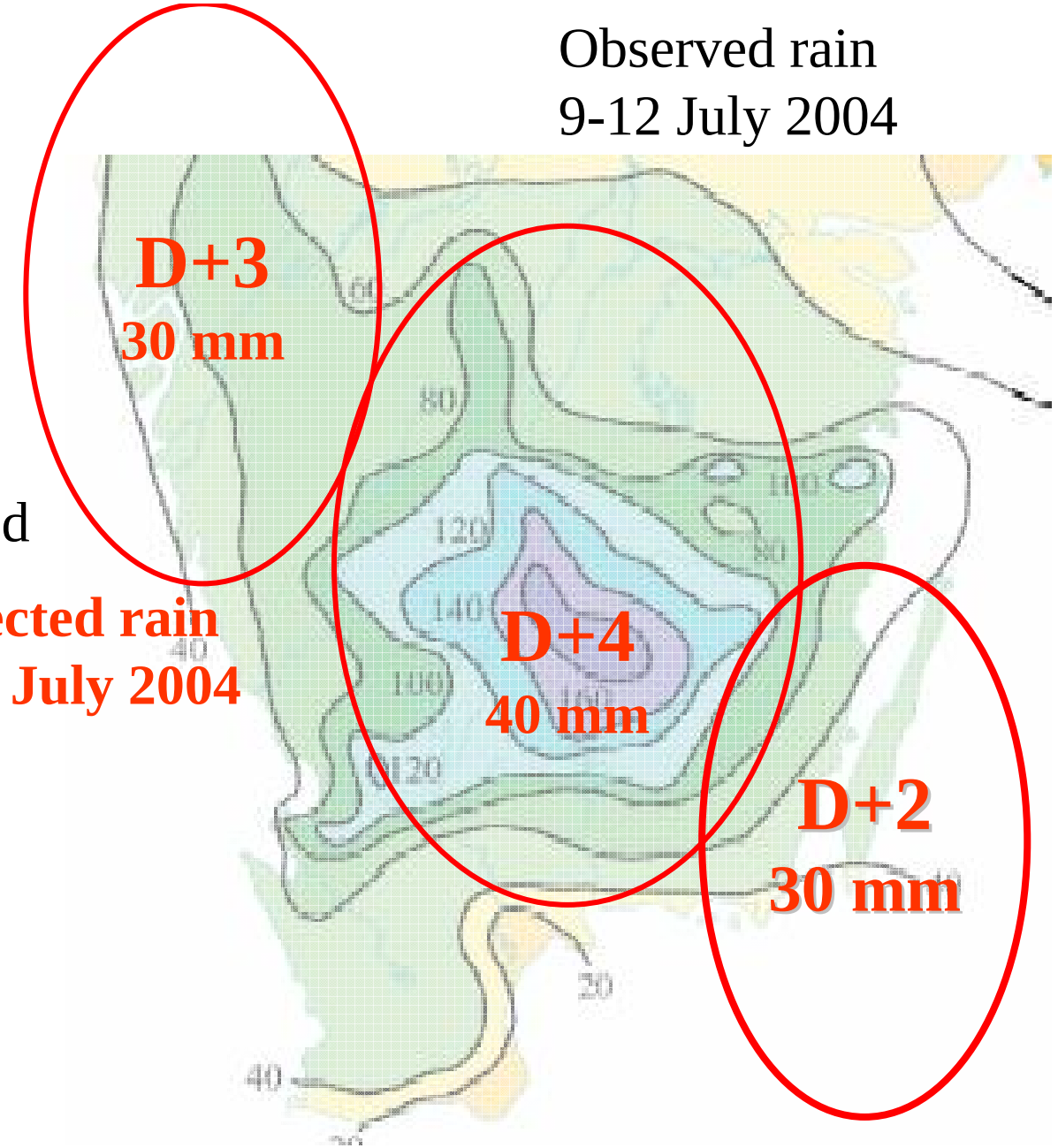
1 . . easier to understand and remember

2 . . appear more consistent and thus more trustworthy

3 . . verify better since less reliable details have been removed

A case of over-confident and detailed forecasts from the (SMHI) meteorological service) which left the public and clients very confused

Observed rain
9-12 July 2004



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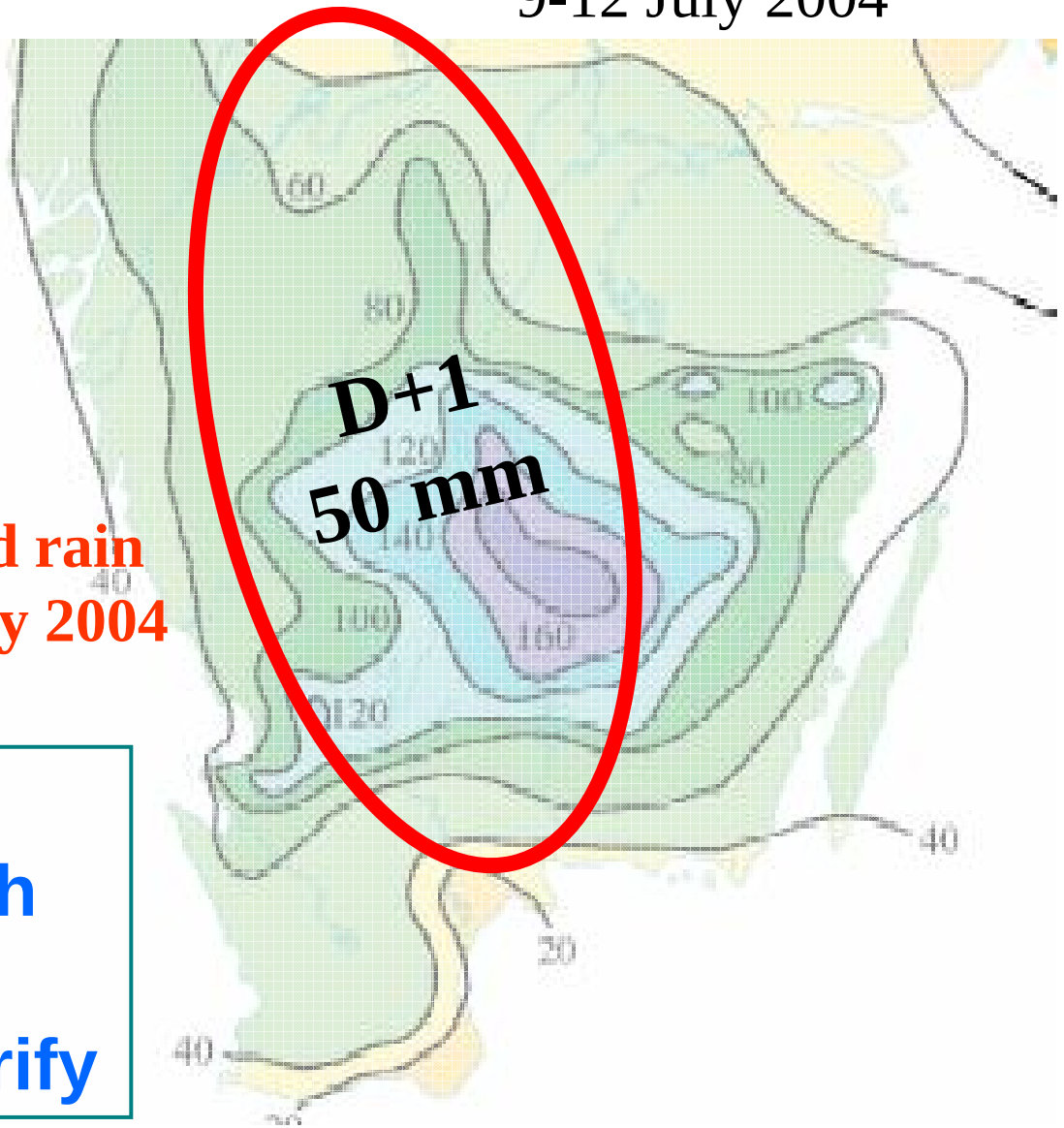

Expected rain for 9 July 2004

Sense morale:
Details and high confidence are fine - if they verify

The SMHI hydrological forecast service was less detailed and confident and therefore kept the confidence of their clients throughout

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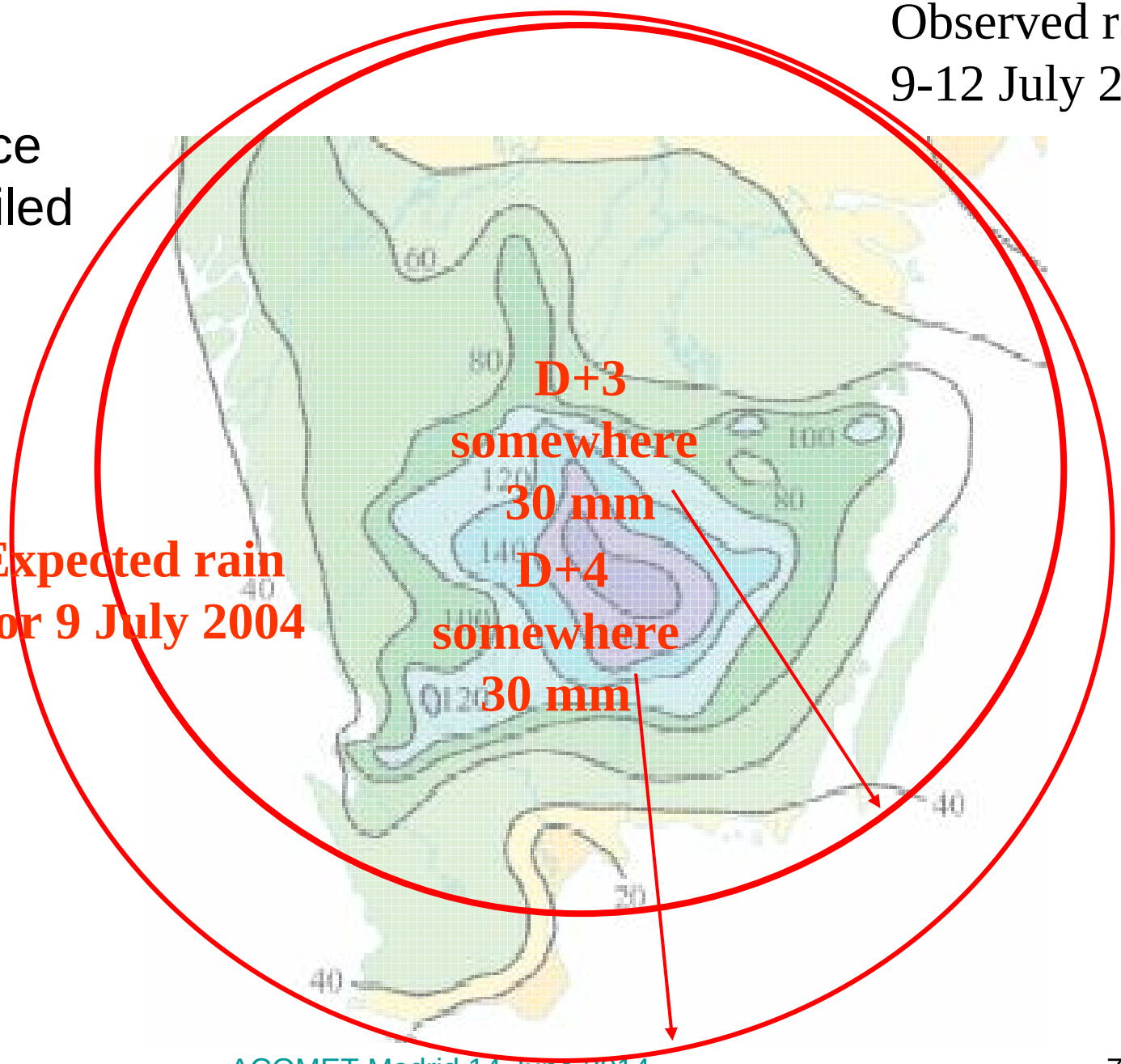

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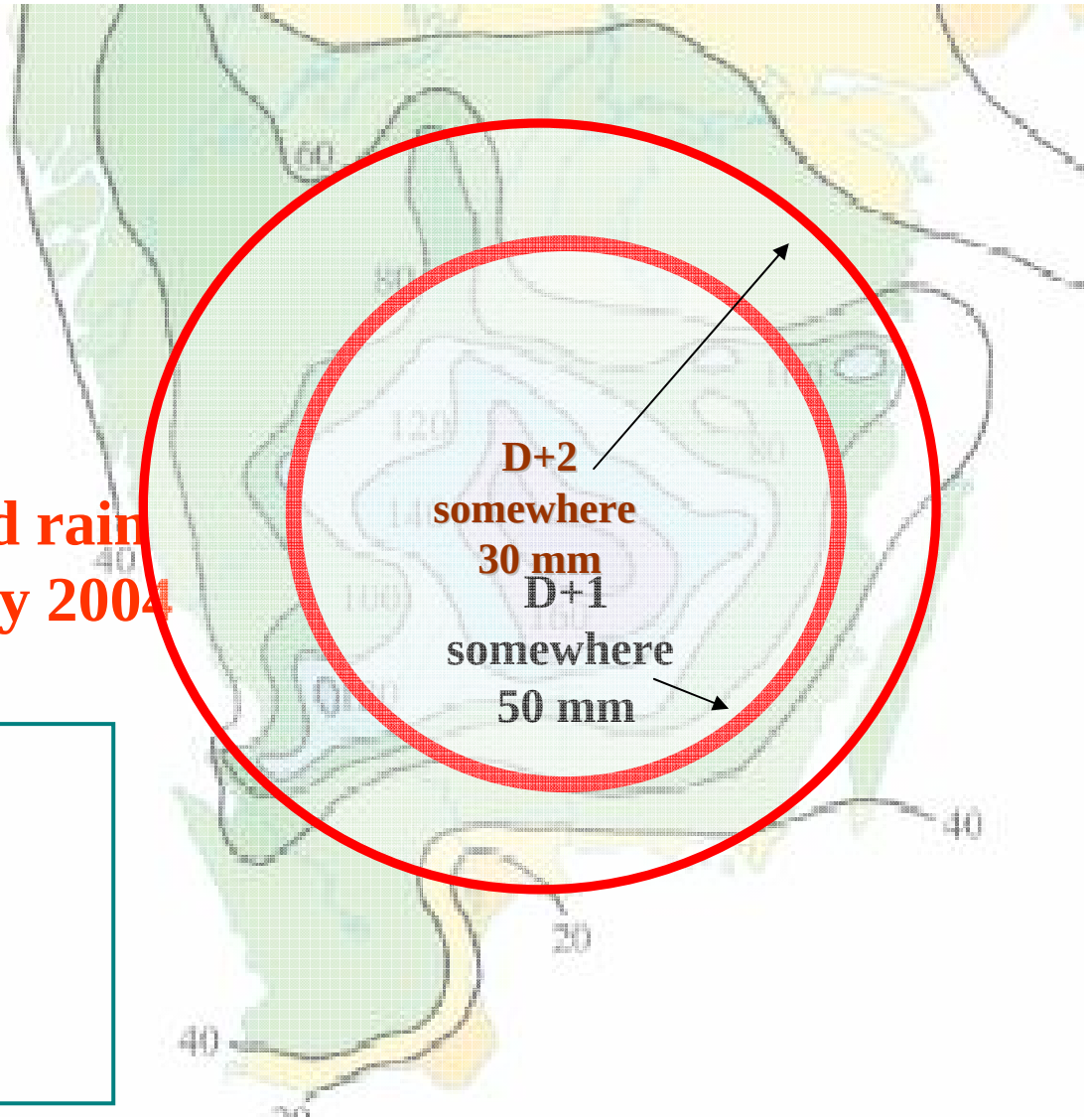
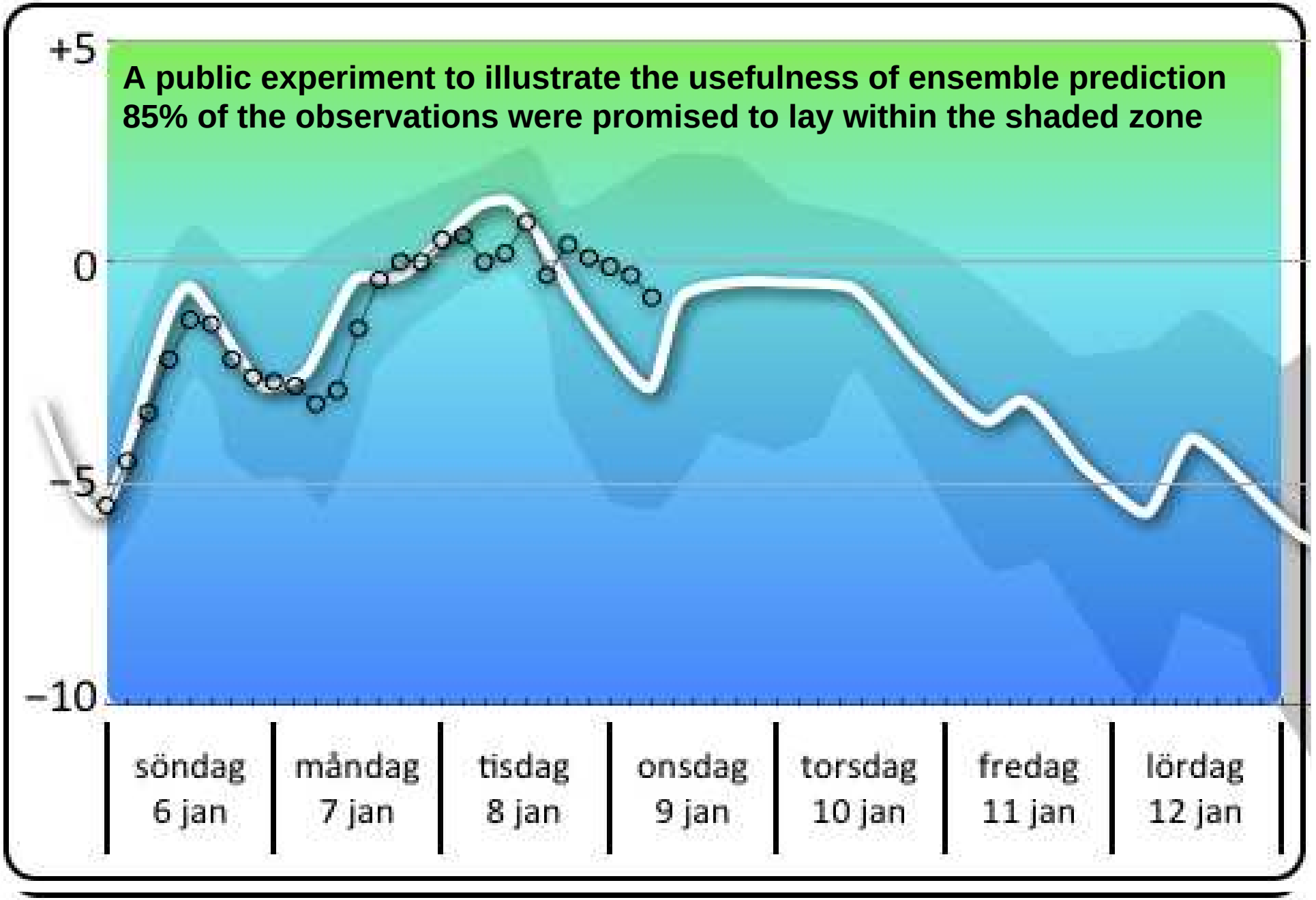


Sense morale:
Do not promise more than you can honour


A public experiment to illustrate the usefulness of ensemble prediction
85% of the observations were promised to lay within the shaded zone
+5
0
−5
−10
söndag 6 jan
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tisdag 8 jan
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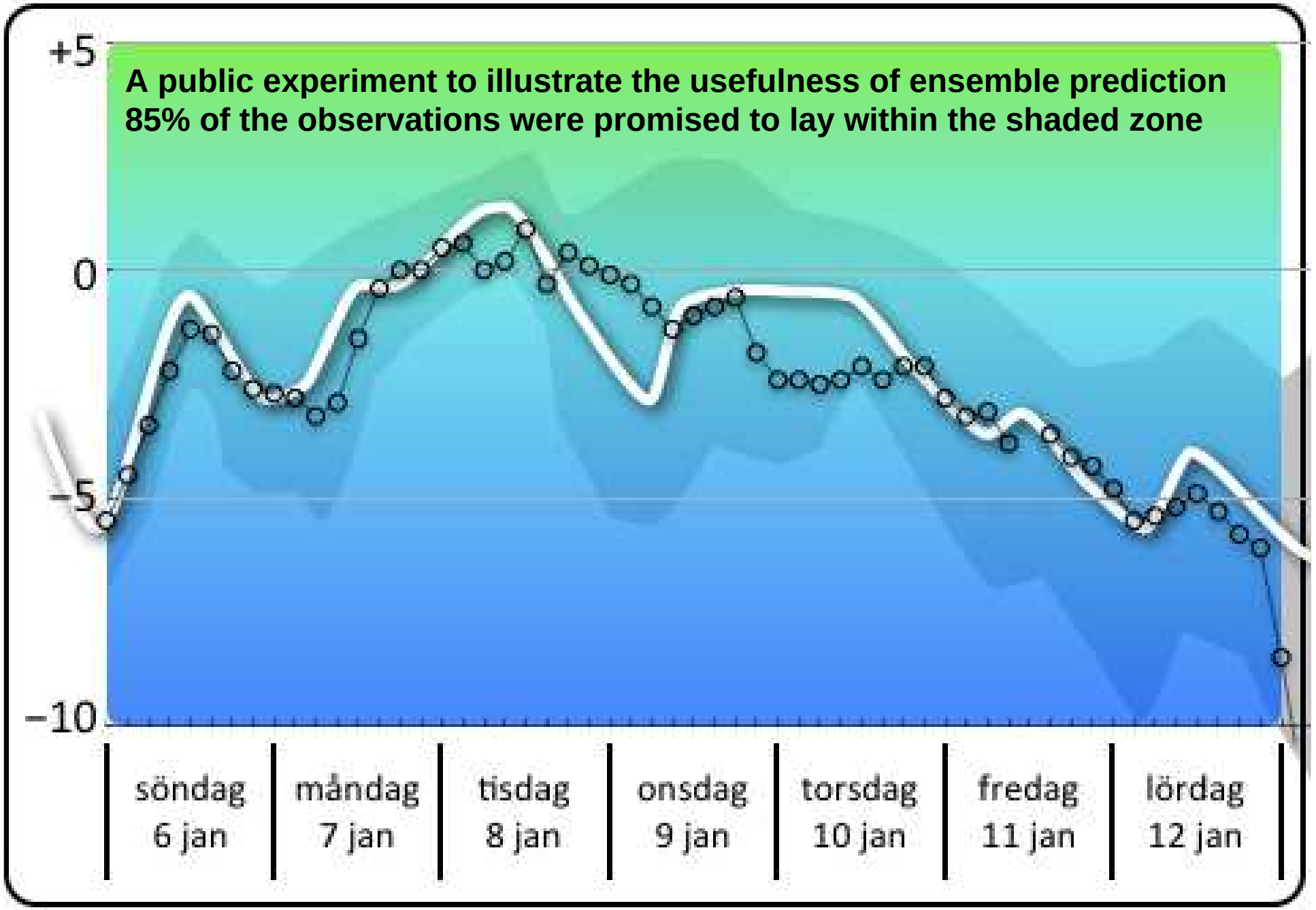
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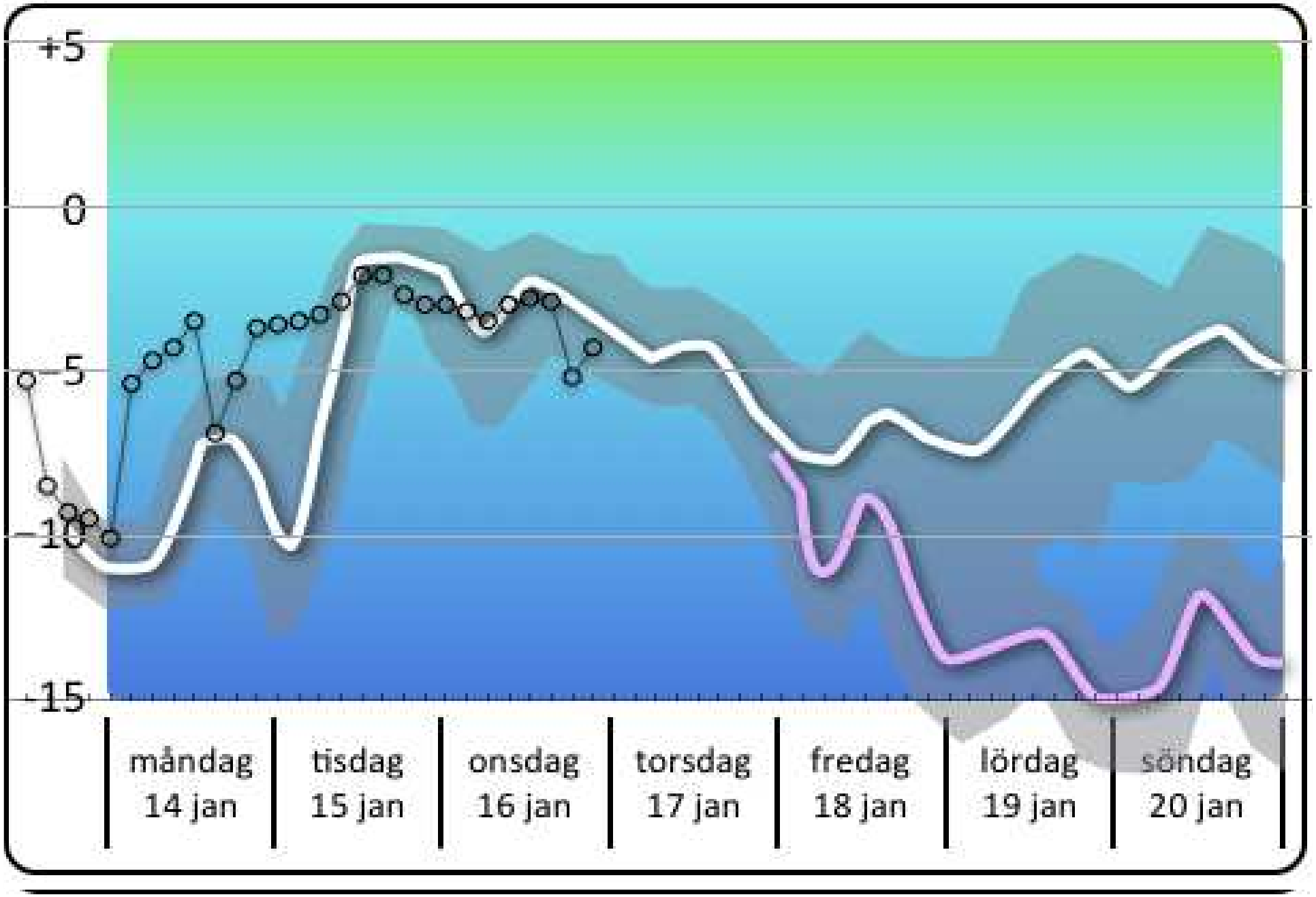
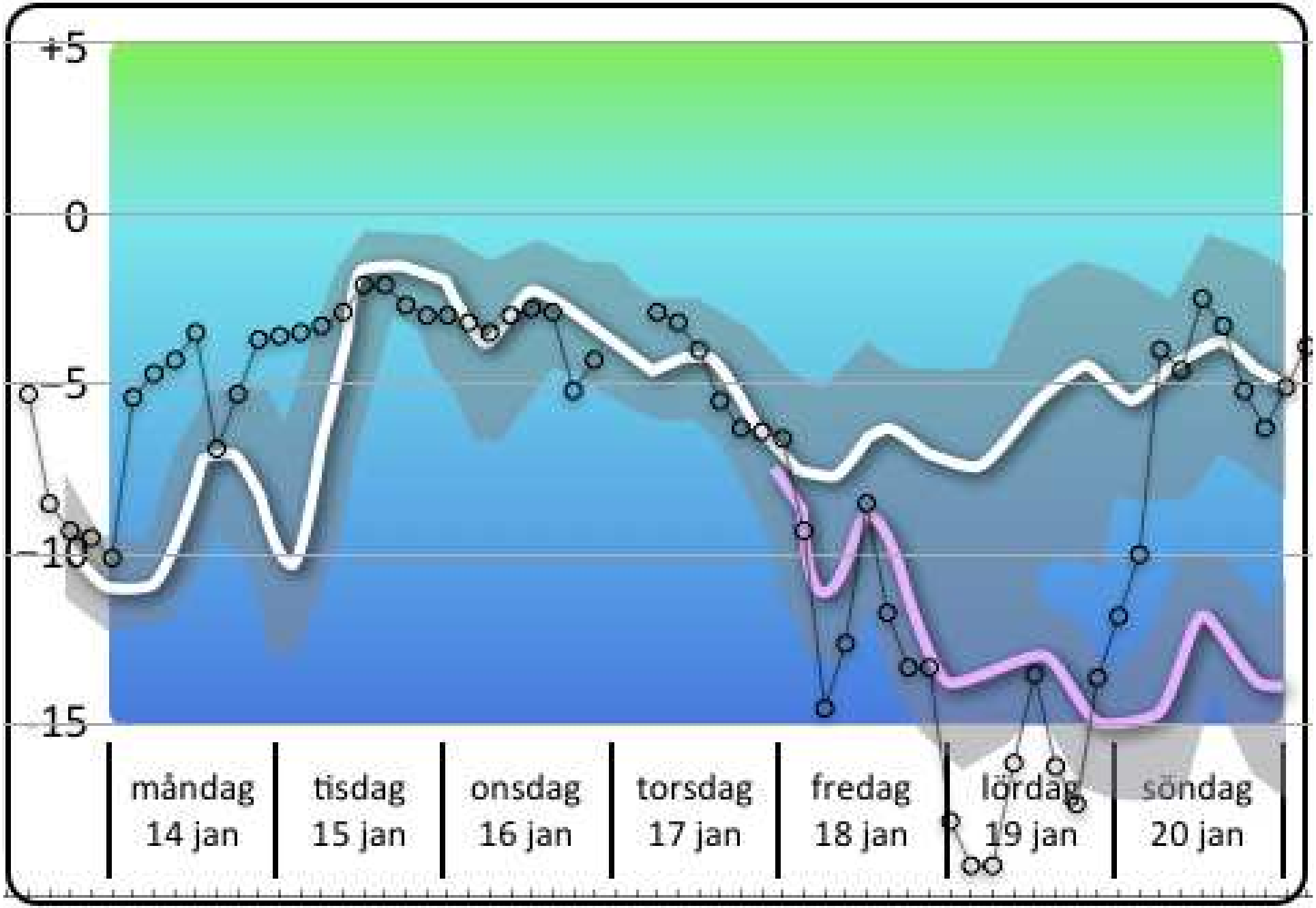


Anders Persson



Anders Persson

2. Verbal communication

Qualitative probabilities: “likely”, “probable”, “possible", "local”.. .

More elaborate expression: “I wouldn’t be surprised”, “it cannot be excluded”, “I cannot guarantee” . .

Base rate: “It is ten times more likely than normal….”

Protective: “If I were you, I wouldn’t go ahead . . . “

Framing: “I am absolutely sure there will be heavy showers somewhere in the region. . . “

“The framing effect”

People react differently
to a statement like:

“-There is a small risk of rain”

than to

”- A great chance of dry weather”

The famous half empty/full bottle

3. Use body language and/or colloquial language

In a situation like this, with warm and moist air from Bay of Biscay there might be heavy flooding. …

…or 20% risk of snow in the Scottish Highlands

…or 80% risk of thunderstorms in southern Finland

4. Meteorological scenarios

By telling a “story” the forecaster implicitly conveys a probability while at the same time displaying his knowledge and experience:

1. Cold air from Greenland will arrive, but a developing low over the British Isles might push it away….
2. The low clouds will disperse and give frost. However, close to lakes and rivers, the clouds might stay…
3. **Don’t say**: ***“The EC and US models indicate a cold outbreak, but the UK model keeps the mild weather”***

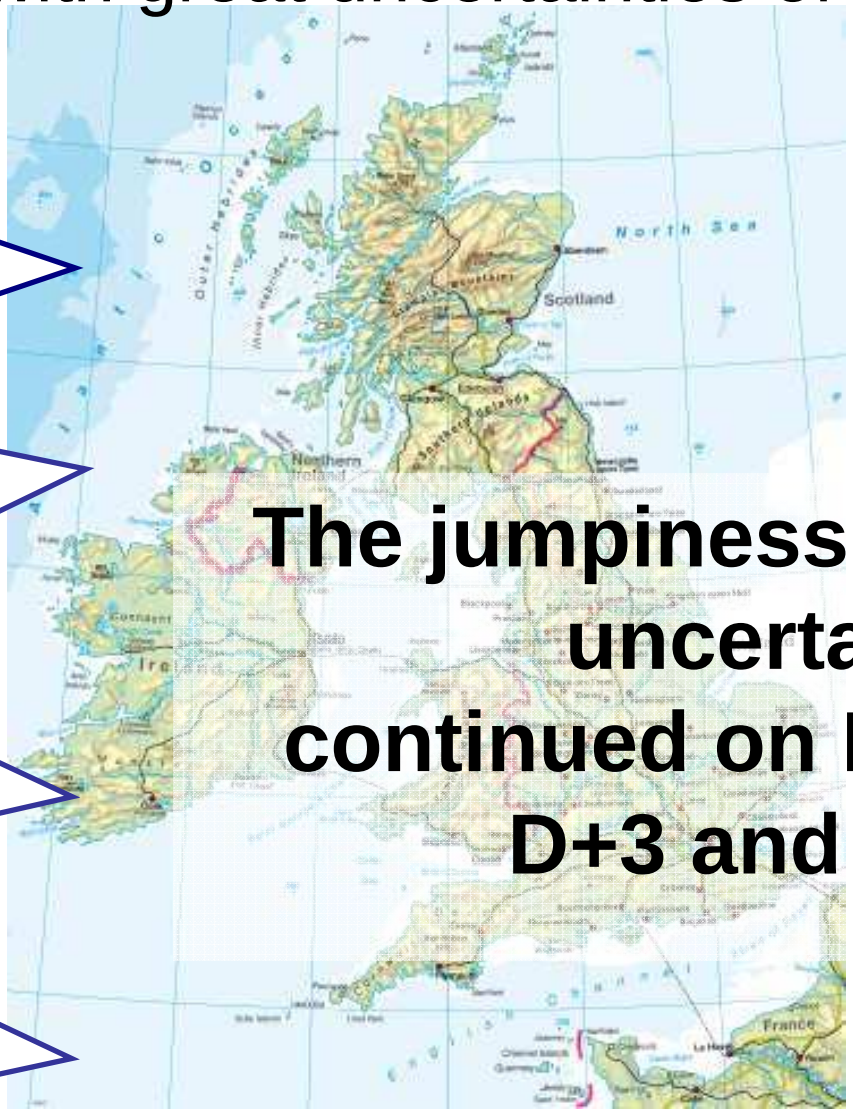
In mid-December 2011 British meteorologists faced a difficult weather situation with great uncertainties of the track of an approaching severe storm:

D+8 forecast 7 December

D+5 forecast 10 December

D+6 forecast 9 December

D+7 forecast 8 December

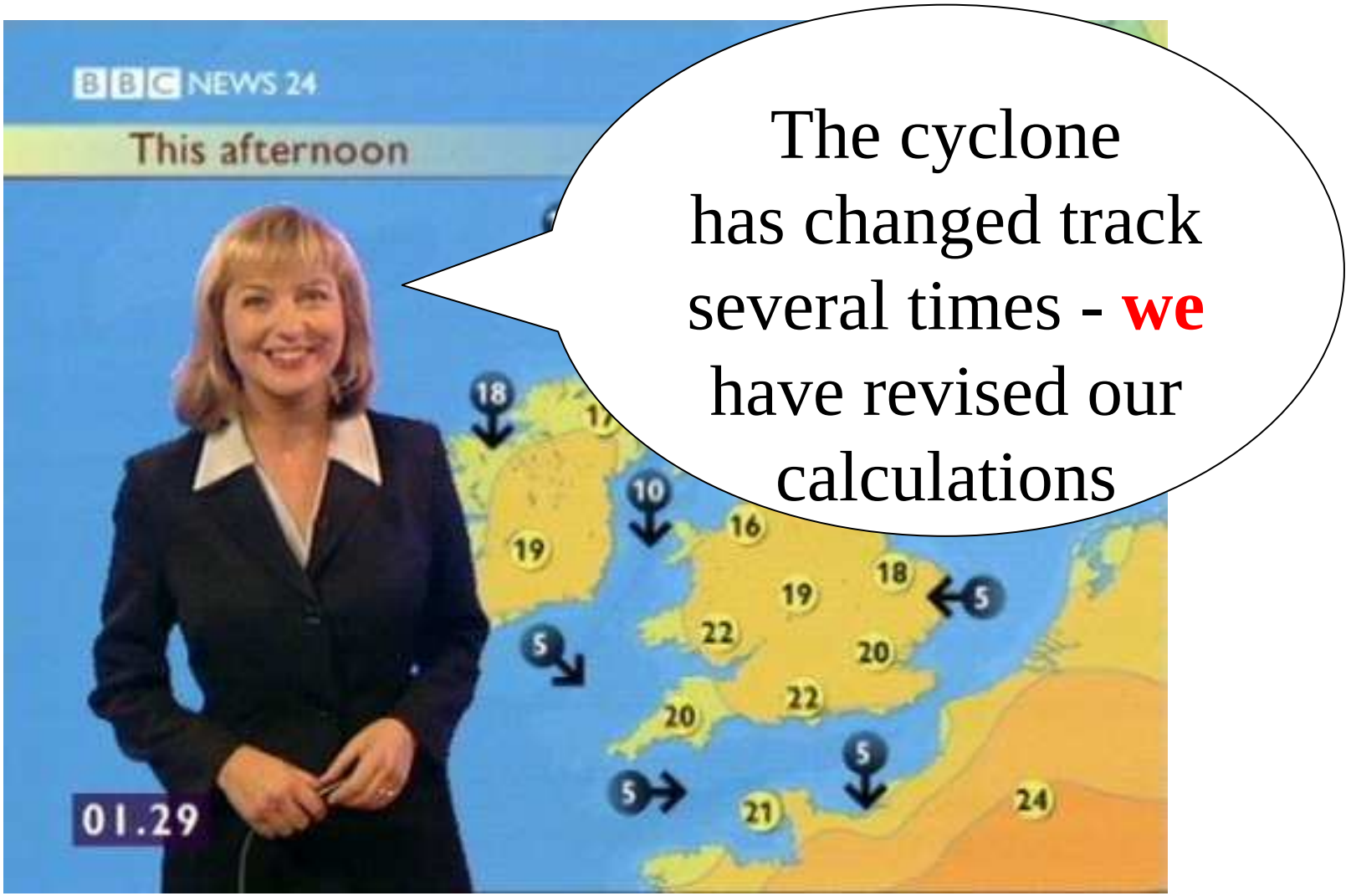


The jumpiness and uncertainty continued on D+4, D+3 and D+2

“Some terrible weather will threaten us on Thursday-Friday”

The BBC forecasters avoided going into detail and did not show any isobar maps

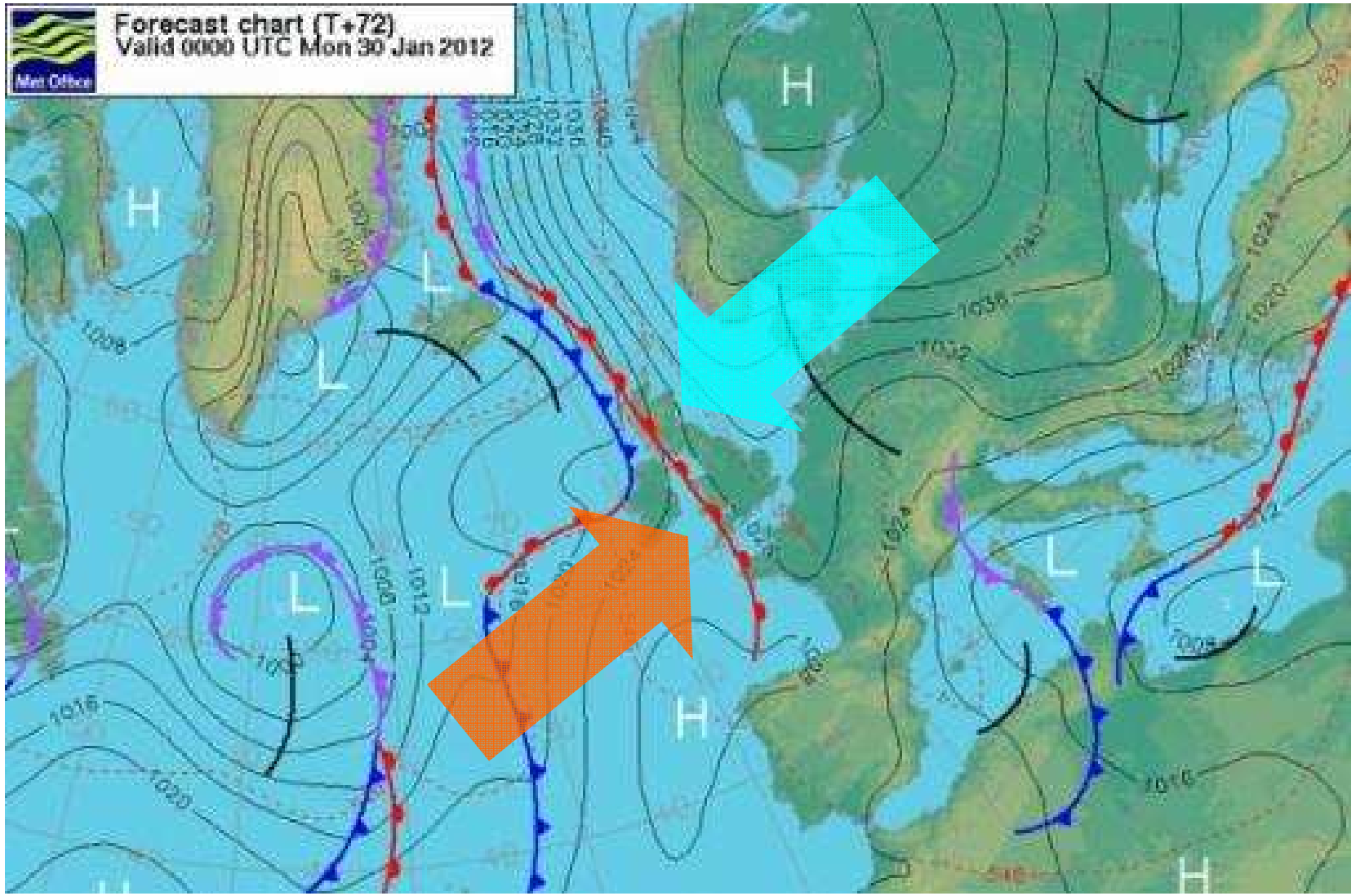
They took an active responsibility for the problems



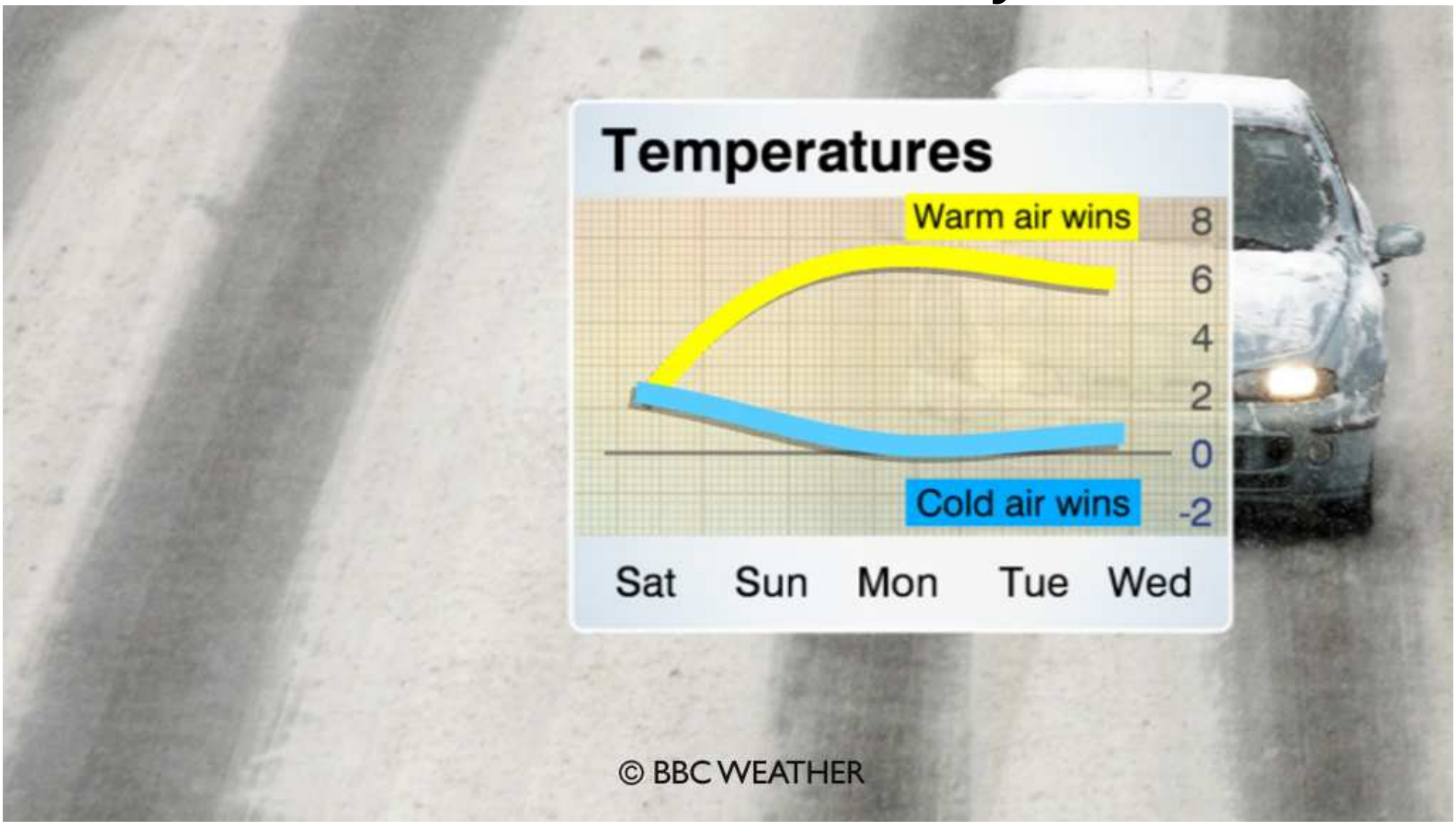
The way the Met Office and BBC forecasters handled the weather situation was **“very well received by senior managers in the BBC and the Met Office….and had been praised by the section of government which is responsible for the Met Office. “**

No direct surveys of public opinion were made, **“but informal feedback has been positive.”**

The Met Office repeated the approach 1 ½ month later

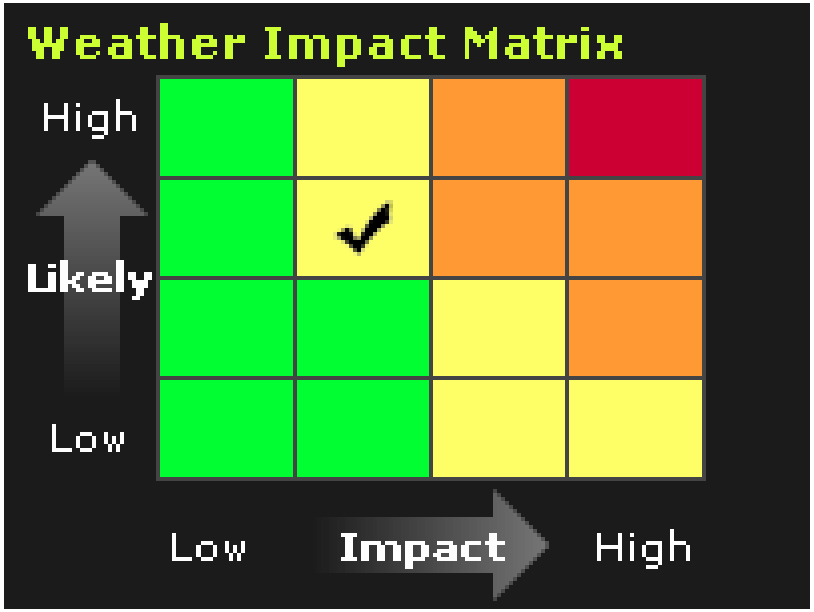


The Met Office and the BBC honestly showed their uncertainty



5. Impact matrices

Issued Thursday valid Saturday



The Met Office warning system

6. Numerical non- or quasi-probabilistic

"The temperature will be 25-29℃"

(Alternatively 27℃ ± 2℃)

"It will rain 10-20 mm today"

(Alternatively 15 mm ± 5 mm)

"The wind will be NW 6-12 m/s"

(Alternatively 9 m/s ± 3m/s)

which all imply a tacit 70% probability

The importance of the base rate

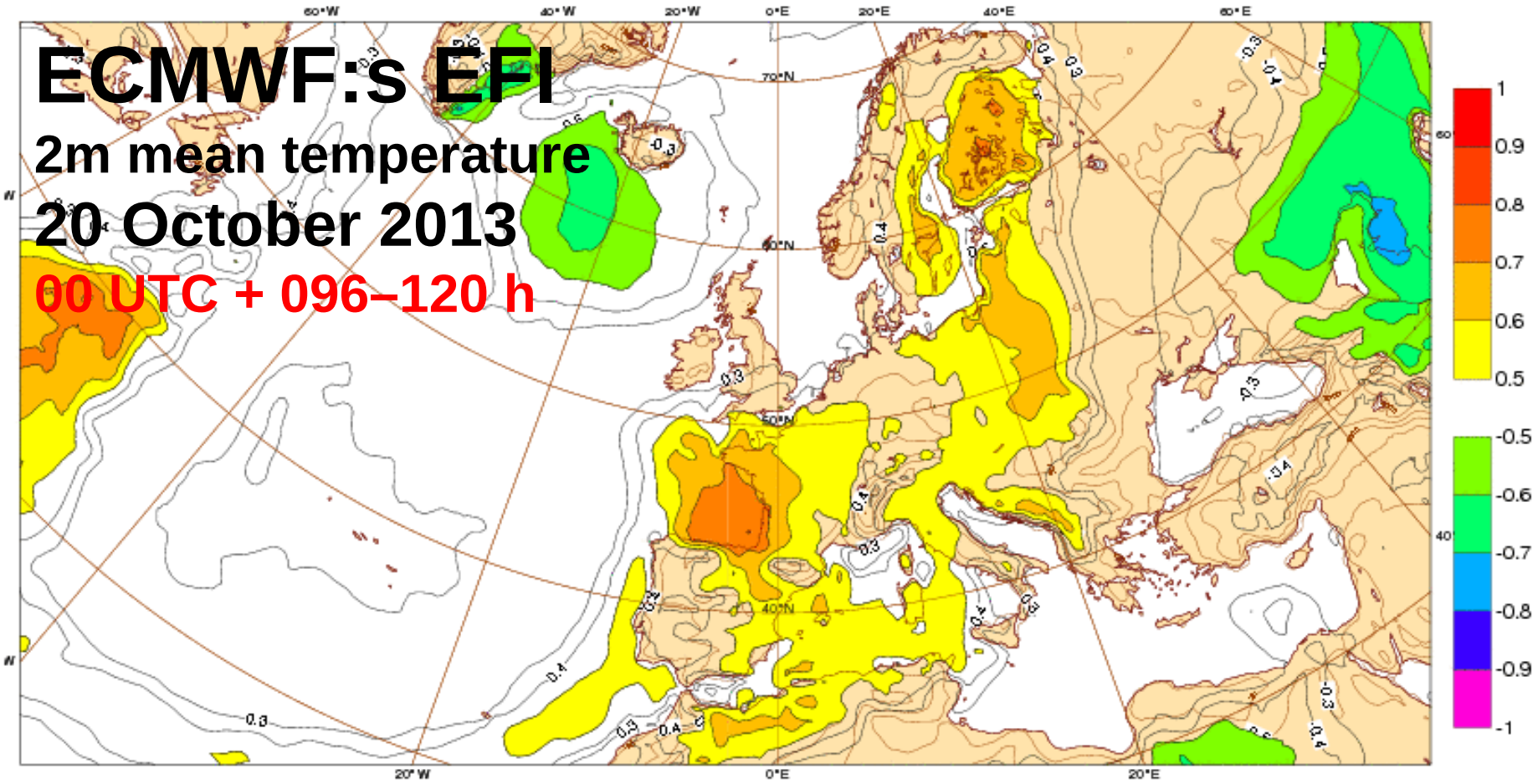
People often forget to consider the base rate
(if you hear people speak Portuguese in e.g. London, they are most likely from Brazil!)

Probability statements can be better understood by reference to the base rate

The base rate in meteorology is the climatology

The ECMWF:s Extreme Forecast Index (EFI) relates the probabilities to the climatology

The EFI does not tell how **likely** something is, only its degree of **extremity**



The EFI does not tell how **likely** something is, only its degree of **extremity**

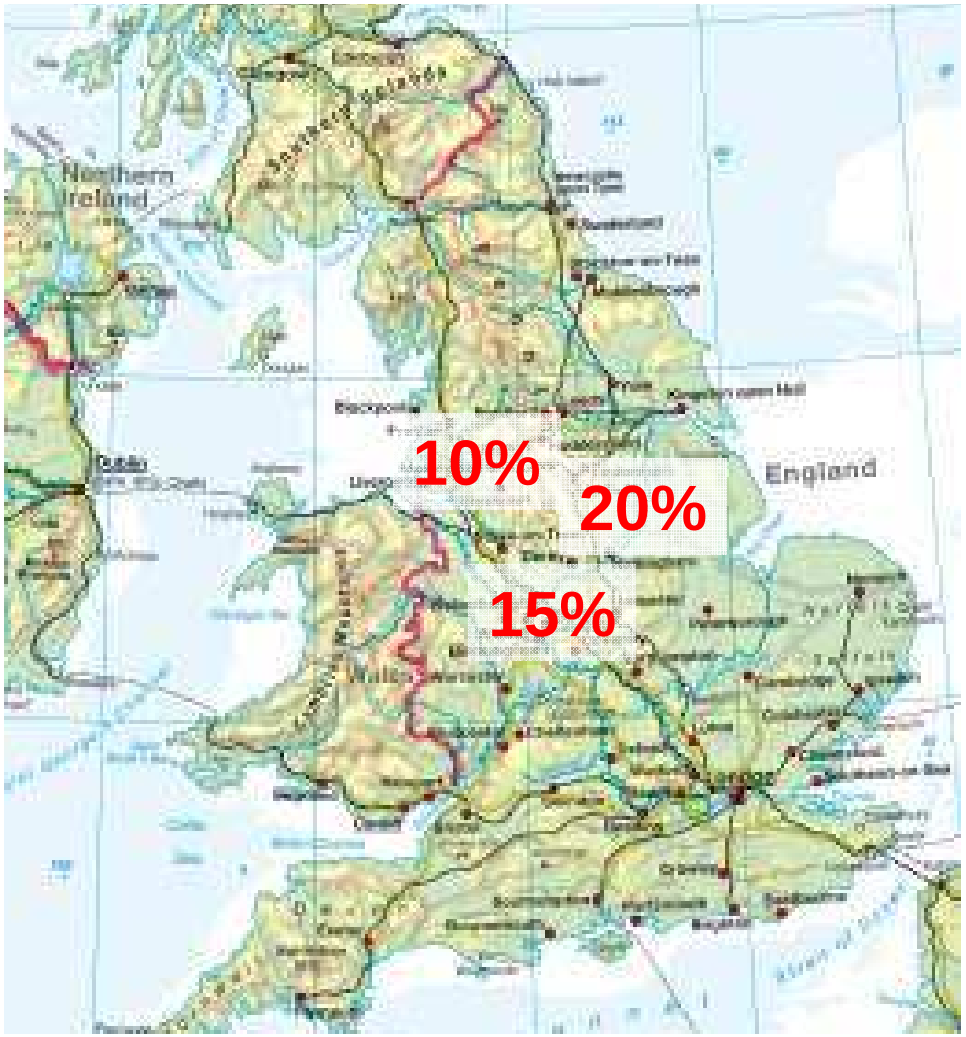
7. 100% probabilistic

But is it just a matter of handing out percentage values??

55% **15%** **40%** **75%** **25%** **30%**

More advanced framing effects:

The authorities did not react appropriately to a probability forecast for severe thunderstorms of 10-20% for individual locations



More advanced framing effects:

The authorities reacted appropriately to a probability forecast of 60% for the whole region.

The use of base rate again

50% probability means different things

1. Tossing a coin:**“50-50? I do not know”** **50%**
2. Snowfall in Alicante:**“50% very high risk!”** **2%**
3. Sunshine in Alicante:**“50% is a low risk!”** **80%**

It all depends on the “base rate”

Summary:

1. As long as we do not have perfect forecasts **we must be able to tell in advance how likely they are**
2. We can do it in terms of probabilities, intervals, approximate values or just verbally **– the importance lies in the communication of the forecast uncertainty**
3. This will also, cleverly done, provide opportunities for the professional forecasters to **display their knowledge and experience**.

So this is not the end of the story, not even the end of the beginning

END