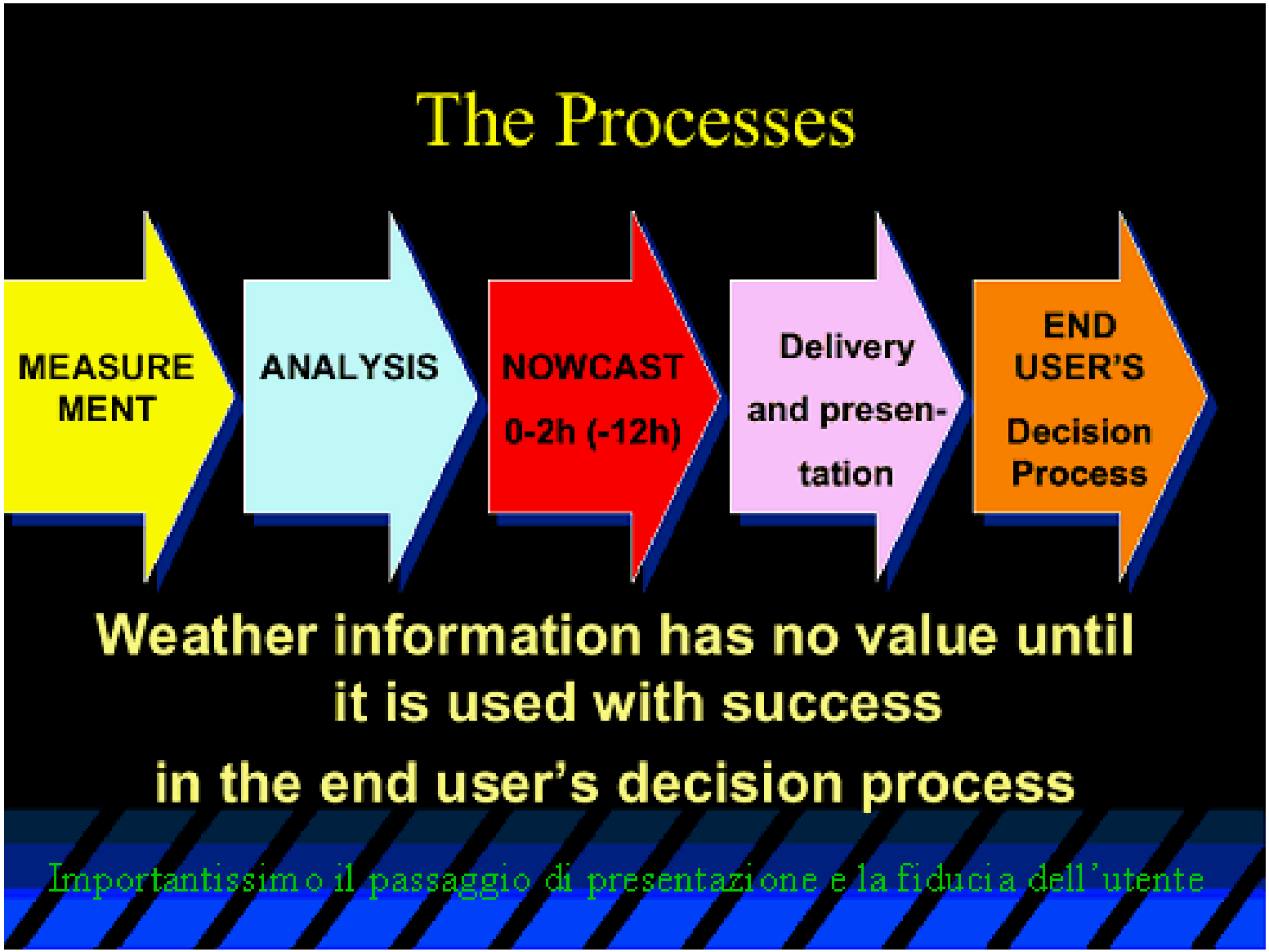
IV Use of probabilities

2. Some complications in the decision process


The Processes
MEASURE MENT
ANALYSIS
NOWCAST 0-2h (-12h)
Delivery and presen-tation
END USER'S Decision Process
Weather information has no value until it is used with success
in the end user's decision process
Importantissimo il passaggio di presentazione e la fiducia dell'utente

IV.2.1 The rationale to deterministically over-forecast weather events

Full probability distribution (no particular bias)

Ob / Prob	R	–
100	10	0
80	8	2
60	6	4
40	4	6
20	2	8
0	0	50

Ob / Fc	R	–
R	28	12
-	2	58

Decision matrix for people with c/L around 40%

This is the same as if they had been given these deterministic forecasts directly

Ob / Fc	R	–
R	28	12
-	2	58

Since most people's cost/loss ratios lie below 40% a certain degree of over forecasting is unavoidable (necessary).

IV.2.2 Demand induced biases in the weather forecasts?

Up to 1896 the U. S. Weather Bureau supplied the New York Times with weather forecasts


The New York Times.

AUSTRIA FORMALLY DECLARES WAR ON SERVIA; RUSSIA THREATENS, ALREADY MOVING TROOPS; PEACE OF EUROPE NOW IN KAISER'S HANDS

The great public baseball favourites in the 1890's were

The New York Giants

In the paper

"TELL ALL THE TRUTH, BUT TELL IT SLANT"

– Testing models of media bias

http://sites.duke.edu/sarahtaylor/files/2014/10/Raymond-and-Taylor-Media-Bias.pdf

Collin Raymond at the University of Oxford and Sarah Taylor at Duke University

show that the weather forecasts to the New Yorkers in the late 1890's were biased according to the home matches of "The New York Giants"

1890 – May 1896

Away	Obs rain	Obs sun	
Fc rain	130	102	232
Fc sun	80	319	399
	210	421	

June 1896-99

Away	Obs rain	Obs sun	
Fc rain	90	74	164
Fc sun	45	157	202
	127	306	

Home	Obs rain	Obs sun	
Fc rain	81	67	148
Fc sun	46	239	285

Home	Obs rain	Obs sun	
Fc rain	42	39	81
Fc sun	36	148	184

Normal, "objective", "scientific" over forecast

Normal, demand driven over forecast (no home ma

	1890-96 US Weather Bureau	
Frequency obs rain	32%	-
Fq fcst rain (team away)	37%	+5%
Fq fcst rain (team at home)	34%	+2%
Total fcst	36%	+4%

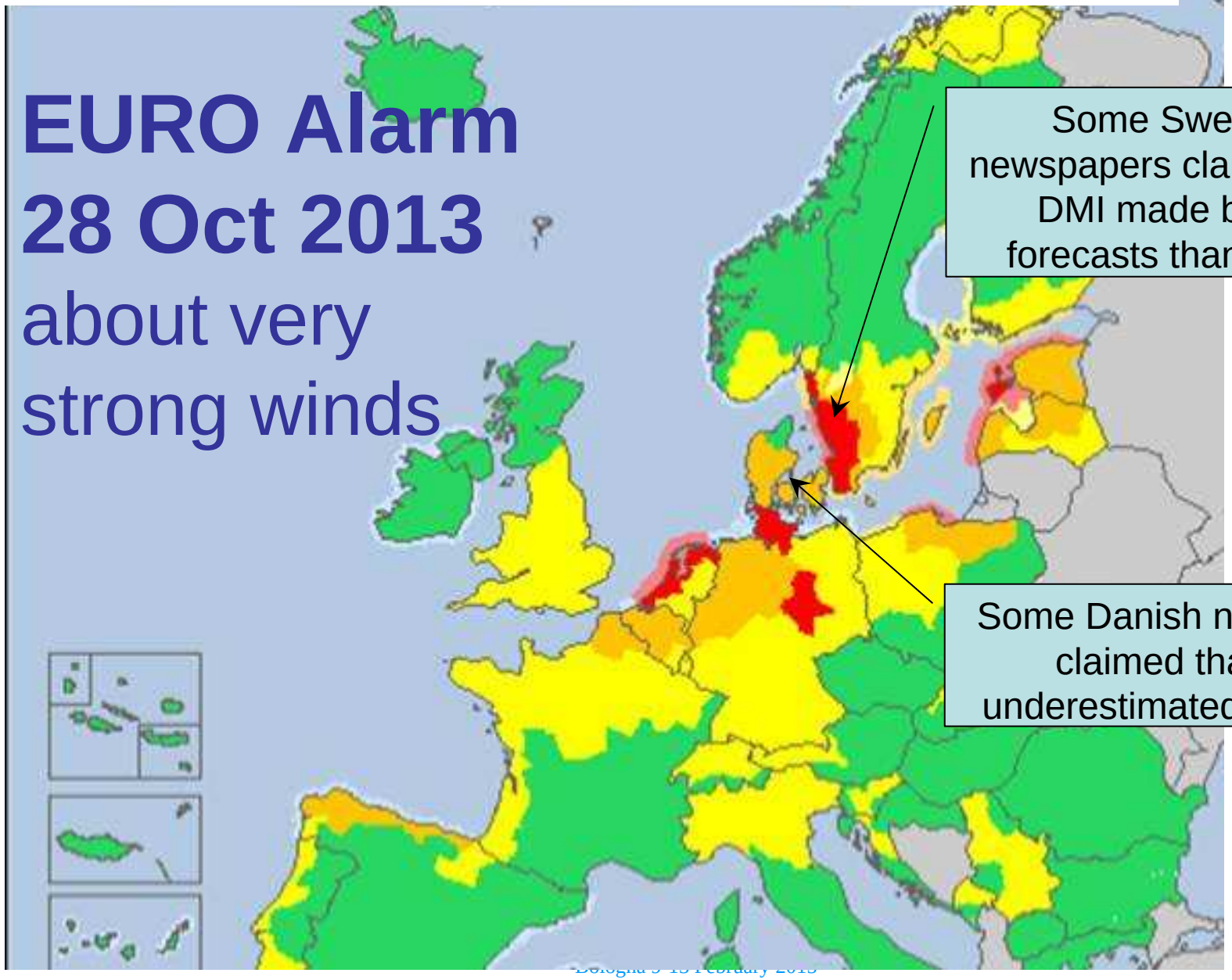
Abnormal, demand driven un forecast (when home matches!)

The bias of under-predicting rain (over-predicting sunshine) was more pronounced when "The New York Giants" had a **good baseball season** and less pronounced when they had a **bad baseball season**.

When supporters were less keen to watch them

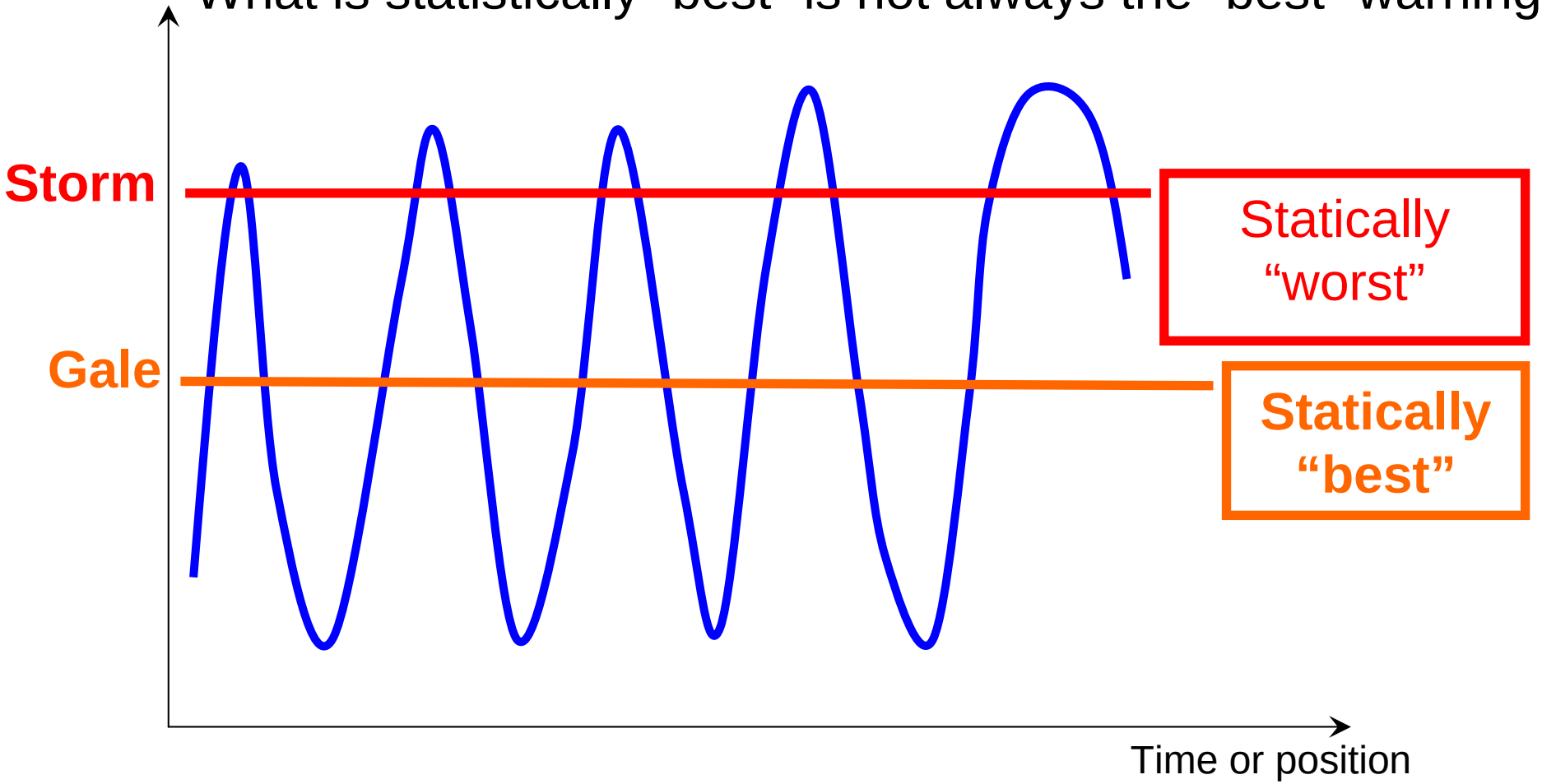
When supporters were more keen to watch them

Were the Danish wind forecasts “best”?



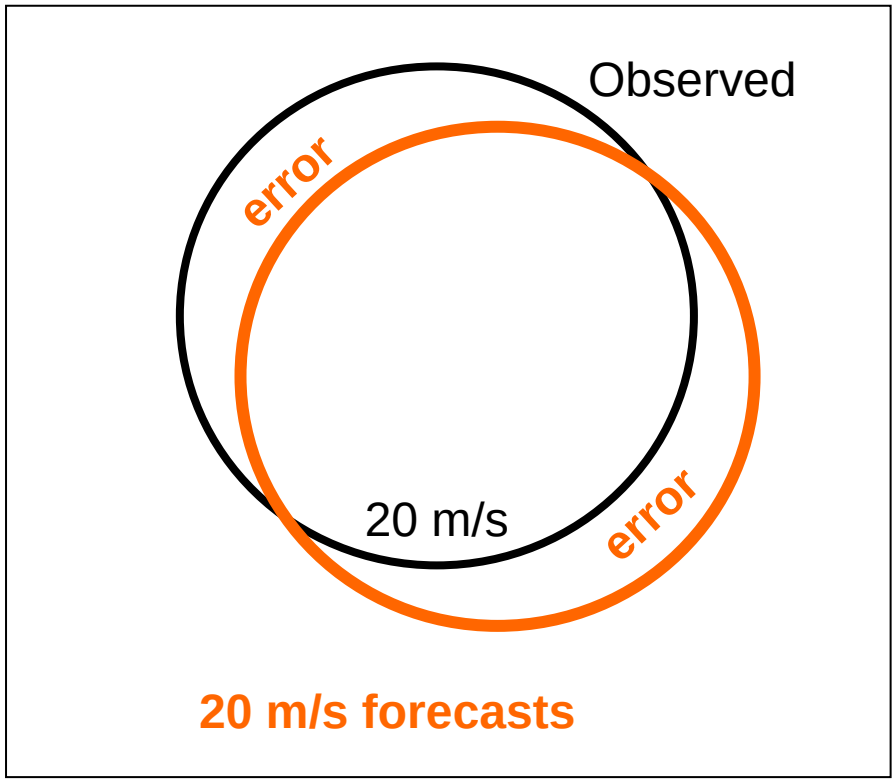
Drawback with deterministic warnings

What is statistically “best” is not always the “best” warning

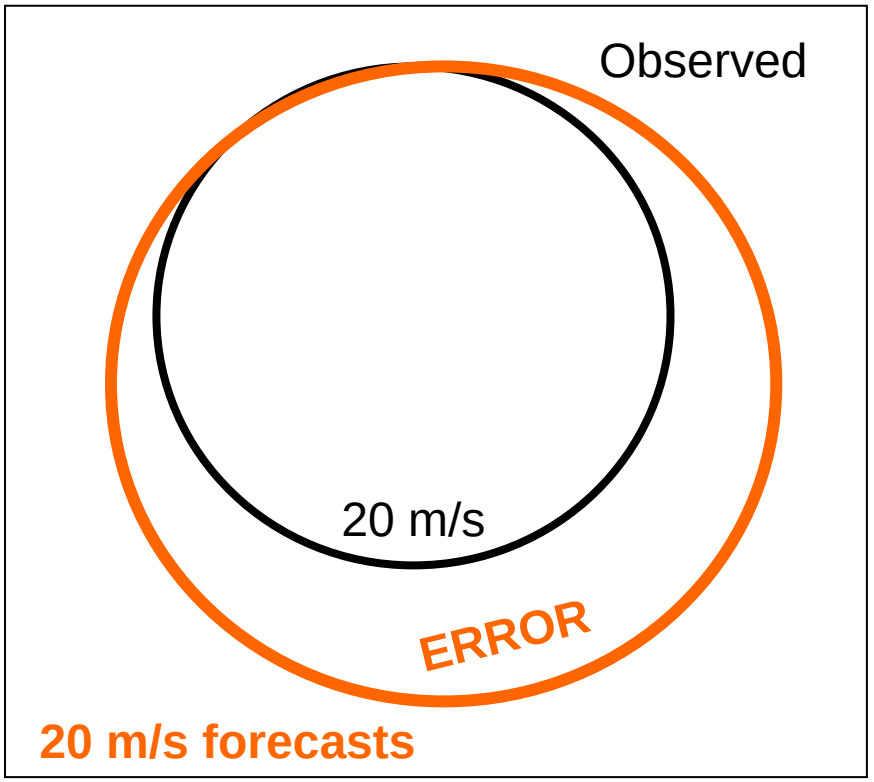


Recommended: 20% risk of storm (in time or location)

Better forecasts?



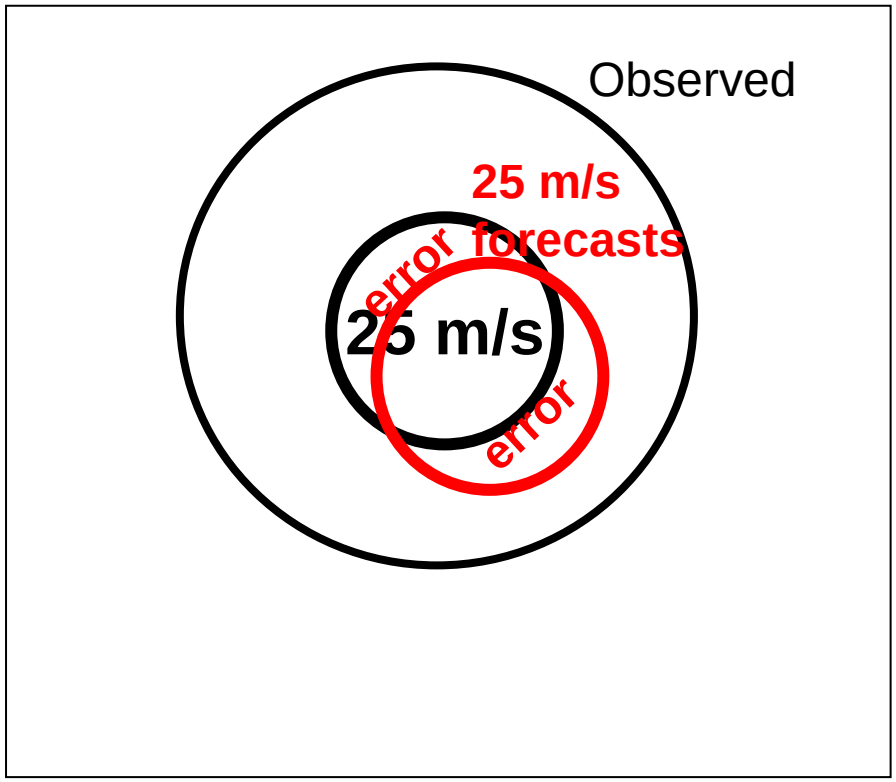
More useful forecasts?



No over-forecasting:
Assumes a missed event is as bad as a false alarm

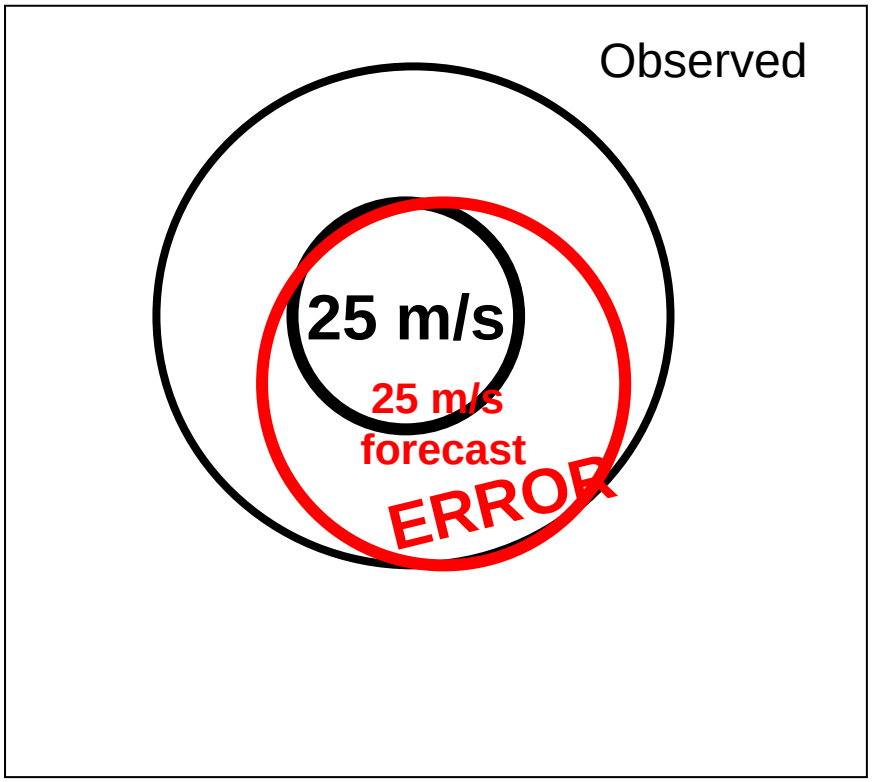
Over-forecasting: Assumes a missed event is much worse than a false alarm

Better forecasts?



No over-forecasting:
Assumes a missed event is as bad as a false alarm

More useful forecasts?



Over-forecasting: Assumes a missed event is much worse than a false alarm

IV.2.3. Do we really obey the cost-loss model?

-What do you prefer?

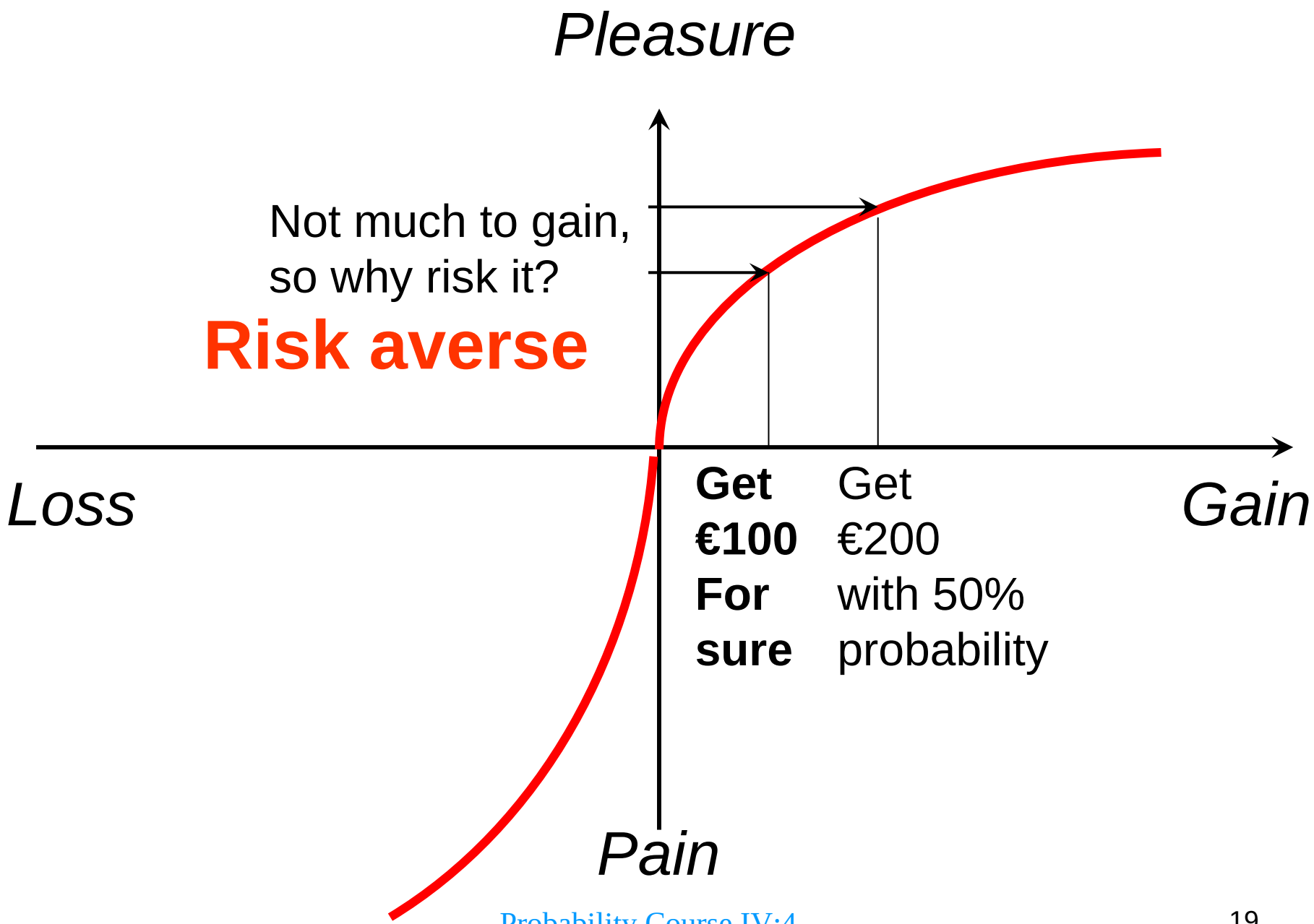
-An 80% chance of winning € 1000

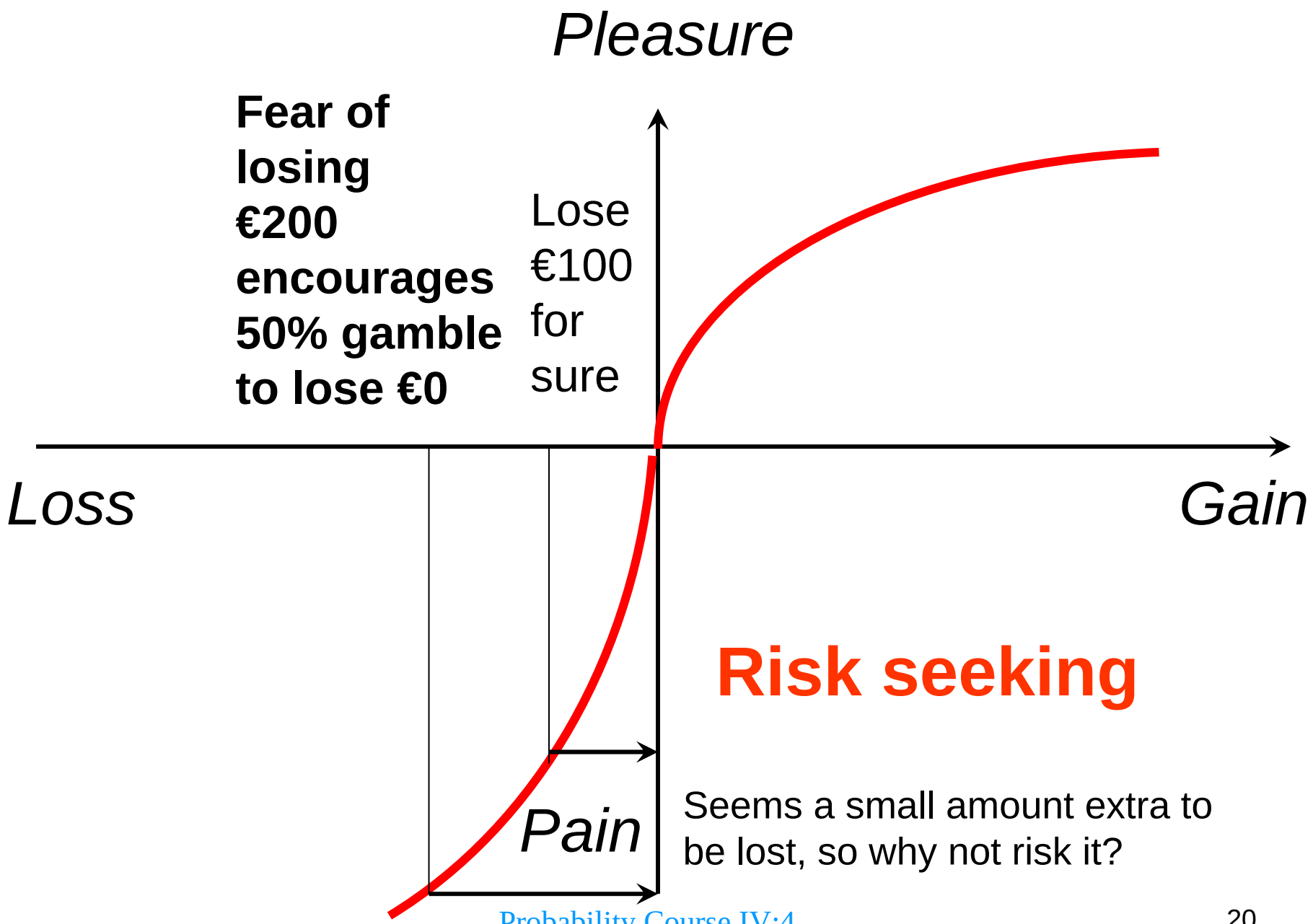
or

-Get € 700 directly in your hand?

According to the cost-loss model, the first alternative is to be preferred (€800 > €700)

However, most people, even professors in mathematical statistics, would take the **€** 700


Pleasure
Not much to gain,
so why risk it?
Risk averse
Loss
Gain
Pain
Get
€100
For
sure
Get
€200
with 50%
probability


Pleasure
Fear of losing €200 encourages 50% gamble to lose €0
Lose €100 for sure
Loss
Gain
Risk seeking
Pain
Seems a small amount extra to be lost, so why not risk it?

Consequences for the cost-loss model with a user with c/L-ratio 0.5

-Lose € 500 *for sure* by protecting or a forecast 50% chance of losing € 1000 or *nothing at all*? People tend to be *risk seeking* and choose the later …which means they tend to neglect weather forecasts!

-Lose € 500 *for sure* by protecting or a forecast 80% chance of losing € 1000 or *nothing at all*? People tend to be *risk avoiding* and choose the former …which means they tend to prefer confident weather forecasts!

IV.2.4 The 2005 Trento dice game

From the 2005 Trento course

1. A separate die is cast to define the probability of rain
2. It can be 16%, 33%, 50%, 67% or 83% (never 0% and 100%)
3. The participants can insure themselves against the weather
4. A die with the corresponding proportion of rain and sun is cast
5. With the **sun** coming up nobody loses, with **rain** those who have not insured

END