Winter outlook consultation

Jonathan Hearth and Dr Matt Huddleston

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Contents

The presentation covers the following sections

- Forecasting for the energy industry & markets
- The 2005/2006 winter forecast
- Communicating seasonal & climate risks
- Schedule for the 2006/07 winter forecast

The Dec `05 – Feb `06 winter forecast

WEATHER FORECASTING

Europe braces for its winter of discontent

Clive Cookson on predictions of freezing conditions and unprecedented demands for power made by UK meteorologists this wee

And now for January weather forecast . . .

The Met Office has released a severe weather warning for winter, predicting heavy snowfalls, bitter temperatures to come. How on earth do t know? **Tim Radford** investigates the extreme inexact science of long-range forecasting

The Guardian 20.10.05

DAILY EXPRESS

The World's Greatest Newspaper — THURSDAY NOVEMBER 24, 2005 40p

WE'VE GIVEN THREE AWAY HERE'S ANOTHER ONE — WIN THIS £34,000 CAMPER VAN

- We have dearest gas in the world
- No flu jabs
- Cold will kill 89,000
- Power cuts on the way

WINTER OF DISCONTENT

By **John Ingham** and **Graham Hiscott**

BRITAIN is facing a long hard winter as the big freeze threatens thousands of extra deaths and power cuts.

Major snowfalls are expected to hit the North this morning, spreading steadily south, fanned by strong Arctic winds.

The Met Office reinforced its warnings of one of the worst winters in a decade, dominated by cold blasts from Siberia.

Charities caring for the elderly warned that as many as 89,000 pensioners will die in the cold.

Concerns have been heightened by the Government's flu vaccine "bungle". Tory leader Michael Howard accused the Government of "inefficiency and incompetence" over the shortage.

He said the failure to guarantee enough jabs and energy supplies showed the Government was "on its skids".

Mr Howard's warning came as analysts revealed that the UK's gas is now the most expensive in the world, trading at twice the price for crude oil. This will lead to bigger bills for householders.

Even Tony Blair refused to rule out cuts to domestic gas supplies as he came under fire over escalating prices and fears of fuel shortages this winter.

The Prime Minister conceded that the country faced "difficulties with gas prices", admitting that there was a problem for industry, raising the prospect of lay-offs.

And the Government's problems piled up last night as motoring organisations questioned whether ministers had done enough to make sure Britain's roads remained open during a harsh winter.

FULL STORY: PAGES 4&5

THIEVES TARGET £200M DIAMOND AGAIN

...ts forecasters

...ead of ...ew the ...t not an ...ediction ...nal ...ling US ...ational ...ate and ...University, ...o the UK ...winter ...t Europe ...average of ...cast "Our ...n the fact ...is slowly ...rt, he ...redictive ...ation with ...emperatures ...eterred.

critics in the UK too. The Benfield Hazard Research Centre at University College London agrees that the NAO can be predicted, though it uses a technique based on snow cover and air temperature gradients rather than sea temperatures. Its forecast is for the NAO to be only slightly below normal this winter – not enough to justify the Met Office's warning.

"I would not base economic decisions on NAO forecasts because they are not reliable enough," says Mark Saunders, head of long-range forecasting. "There is a divergence of opinion between forecasters and I think the Met Office should have been a little more cautious."

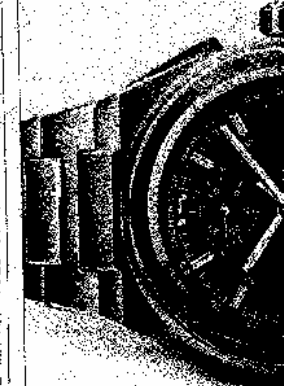
Prof Saunders points out that cold weather in late November, such as the British Isles will experience over the next few days, does not portend an Arctic winter. In fact, the Met Office's four-week forecast suggests that it will become mild during early

...25 2005

Secret briefings as Met Office issues weather warnings

By David Ross

Huskies pull handlers in the Scottish Highlands yesterday



Antimagne... But highly...

The winter headline forecast for Dec-Feb 2005/06

The forecast for Dec-Feb 2005/6 – was first issued in September 2005 and updated monthly

The Met Office continues to predict a two in three chance of a colder-than-average winter for much of Europe, and that if Europe were to experience below-average temperatures, parts of the UK - especially southern regions - would also be affected. There is also an indication for a drier-than-average winter over much of the UK.

The last eight winters have been relatively mild and perhaps have given the impression that these are 'normal'. The balance of probability is for a winter colder than those experienced since 1995/6.

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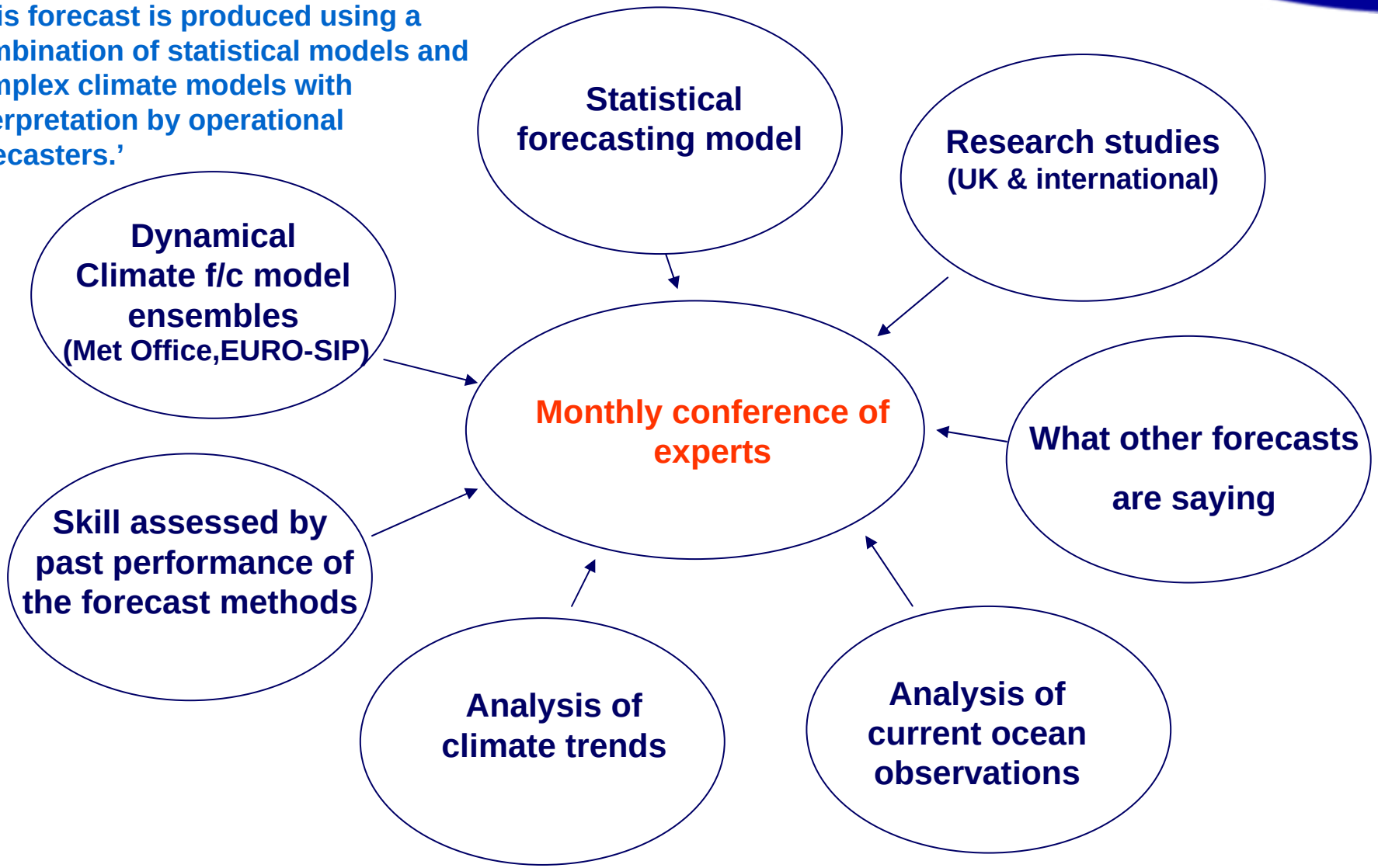
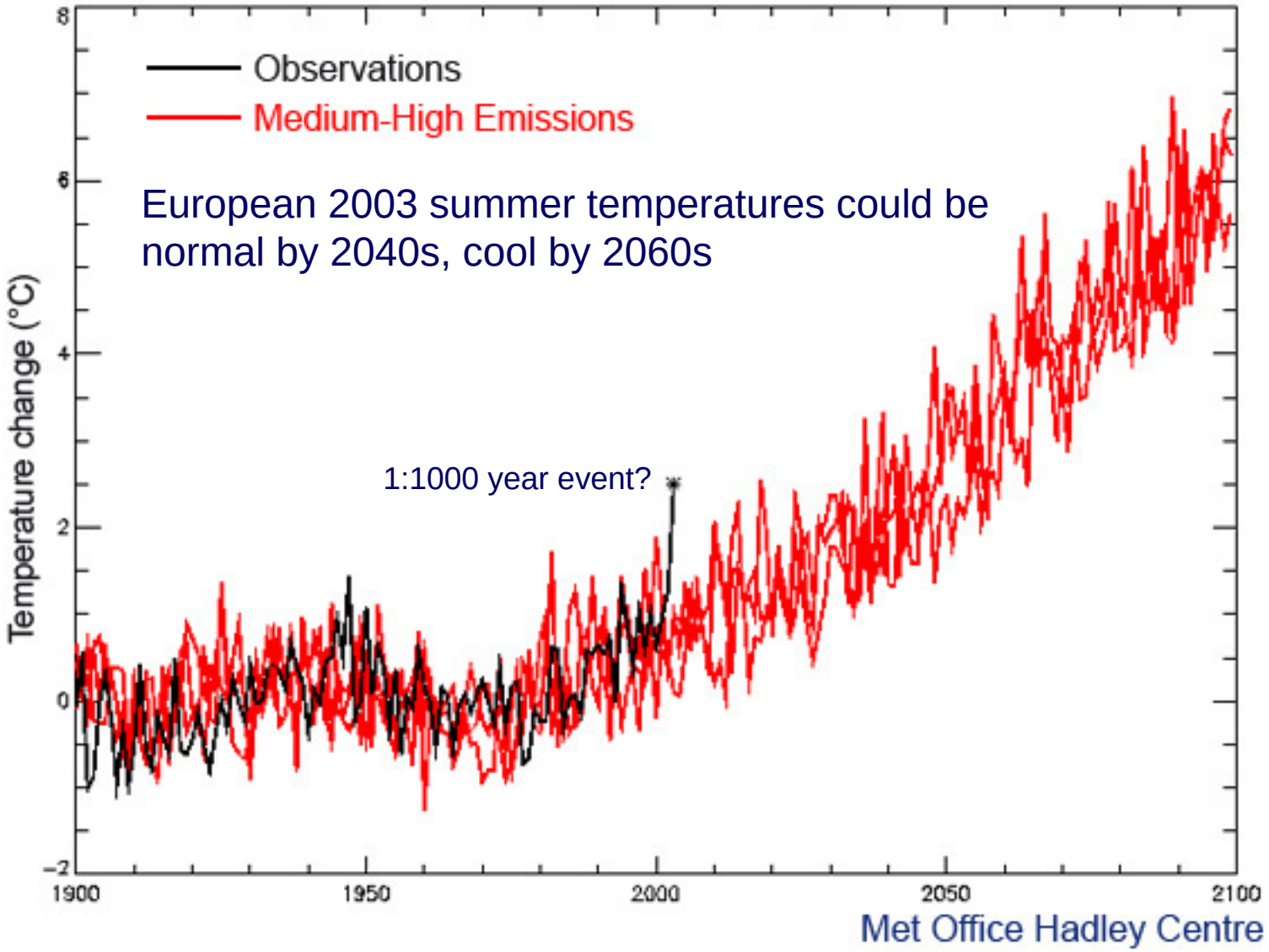
How the seasonal winter forecast is produced

'This forecast is produced using a combination of statistical models and complex climate models with interpretation by operational forecasters.'



Changing return periods due to climate change

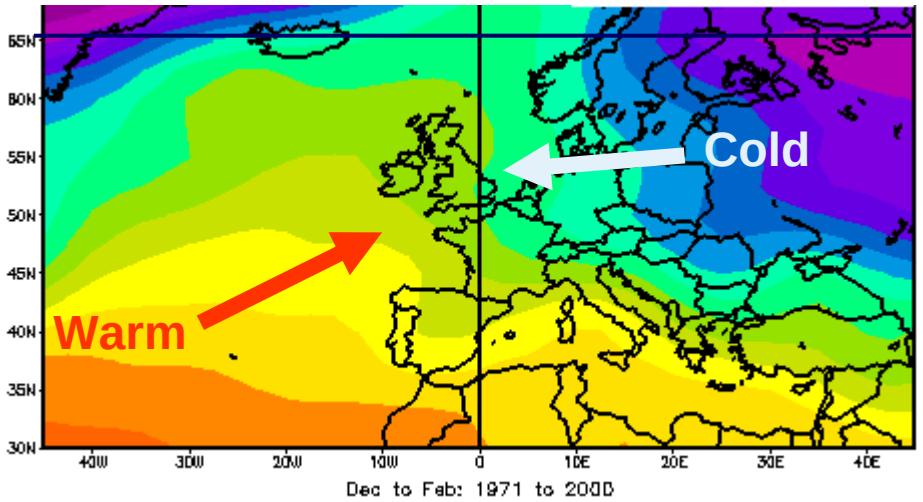


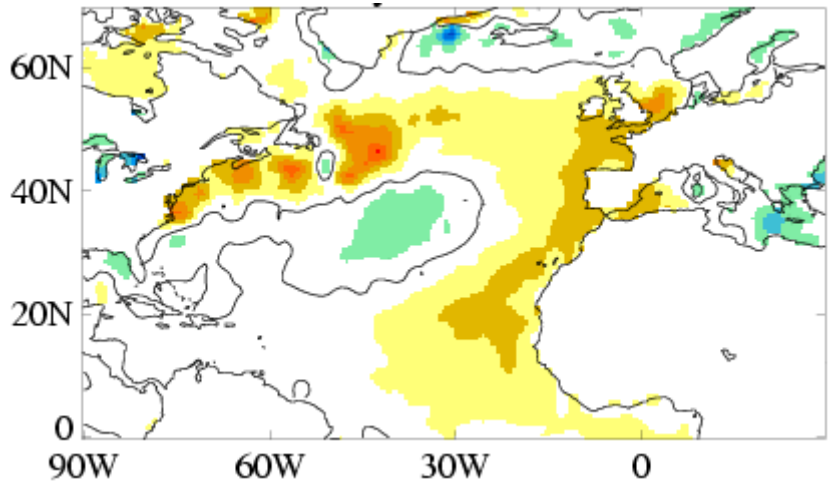
Warm oceans and cold winters?

- Oceans act as the climate memory and influence the atmosphere
- Air is modified by track over the ocean
- The influence of the warm Atlantic ocean temperatures depends on the wind direction

Sea temp November 1995 (opposite) – one month later December 1995 was the coldest December for more than 20 years

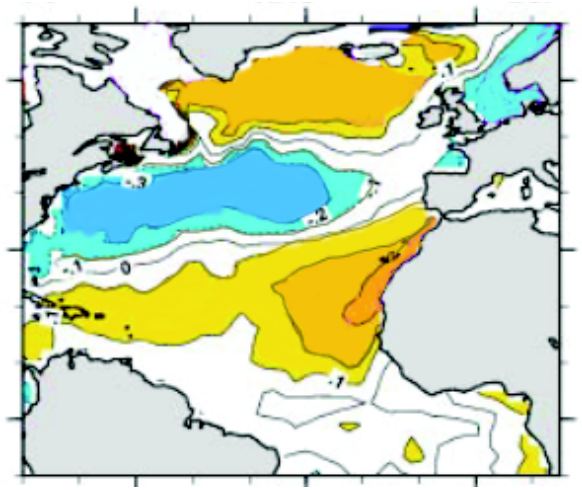
Winter Average Temperature





The North Atlantic Oscillation

Sea-surface temperature (SST) anomalies

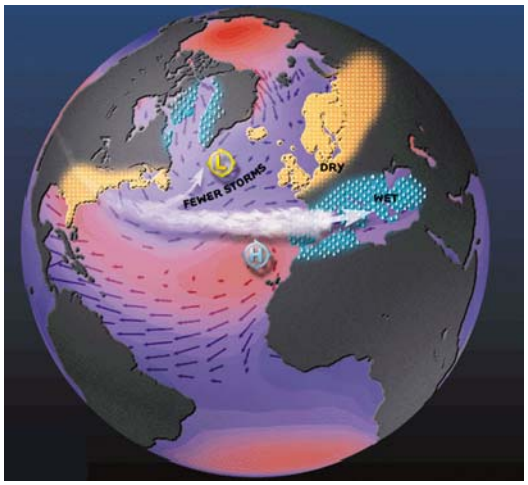


Negative NAO

WINTER

(Schematic)

North Atlantic Oscillation



- In mid-latitudes internal seasonal variability is large. The scientific evidence suggests a weak forcing of the ocean on the atmosphere in winter (and the models underestimate the effect).
- Negative North Atlantic Oscillation (NAO) implies greater frequency of easterly flow.
- The empirical-statistical NAO forecast uses the May sea surface temperatures to predict winter NAO (*Rodwell & Folland, 2002)* and is correct ~ 2:3 times for the sign of the anomaly or change in sign.

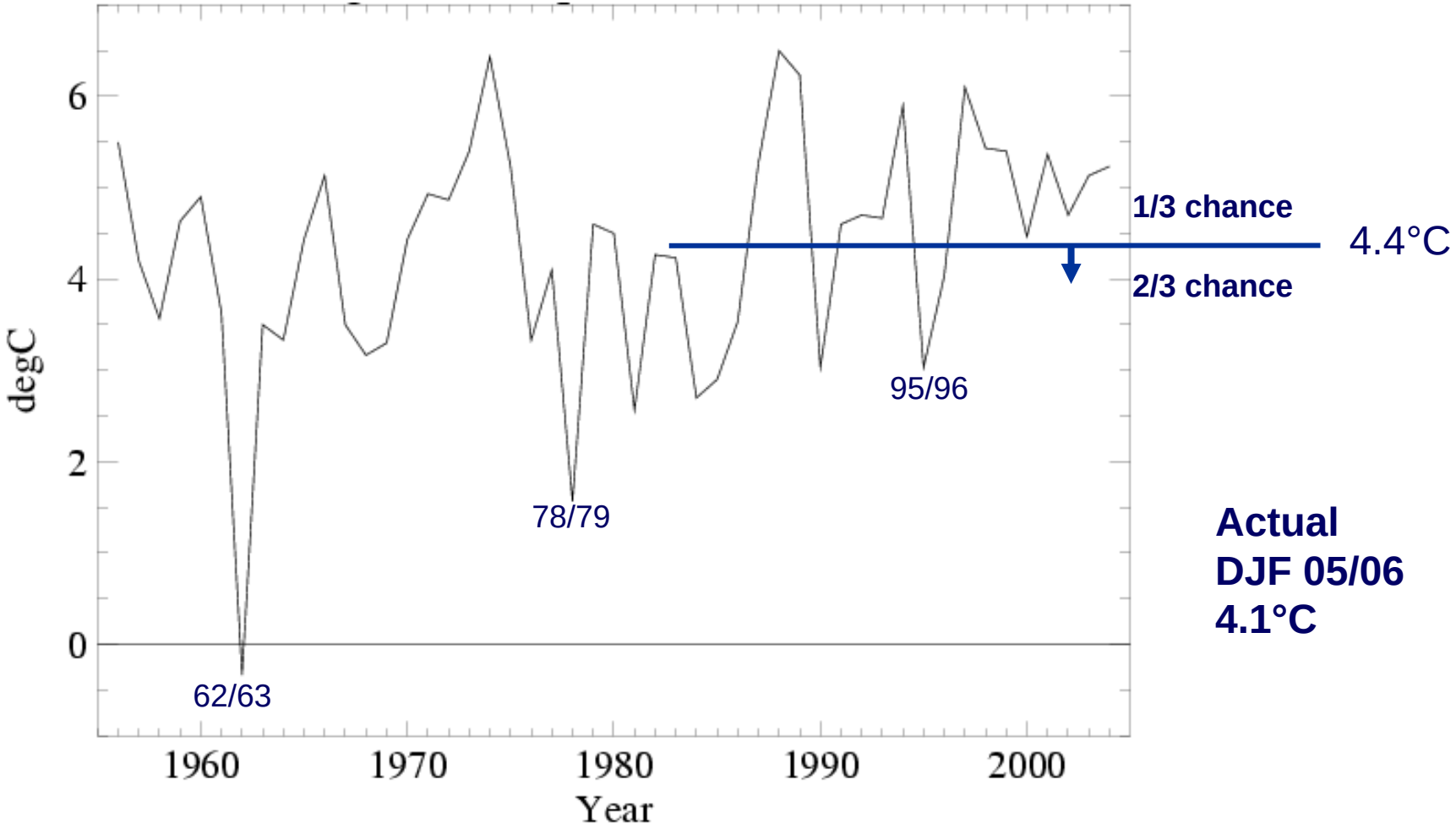
Summary of evidence in 2005/06

- The statistical **NAO** forecast suggested colder than average winter particularly for Europe (it was supported by the experimental decadal forecast system).
- **Seasonal ensemble model** forecasts for September and October suggested cold conditions over Europe. November suggested warm.
- The seasonal system forecast the **sea surface temperature tripole** consistently with a negative NAO situation – but the signal is weak ~ 40% of observed amplitude (as expected).
- Real time analysis of **sub-surface** ocean temperatures supported the re-emergence of tripole SST anomalies in winter. This was closely (weekly) monitored to see if the forecast was 'on track'.
- **Expert interpretation** (by research, forecast & communications staff) was used to draw all this together into the headline forecast and to subsequently decide if the forecast should be revised.

Central England Temperature – How Cold?

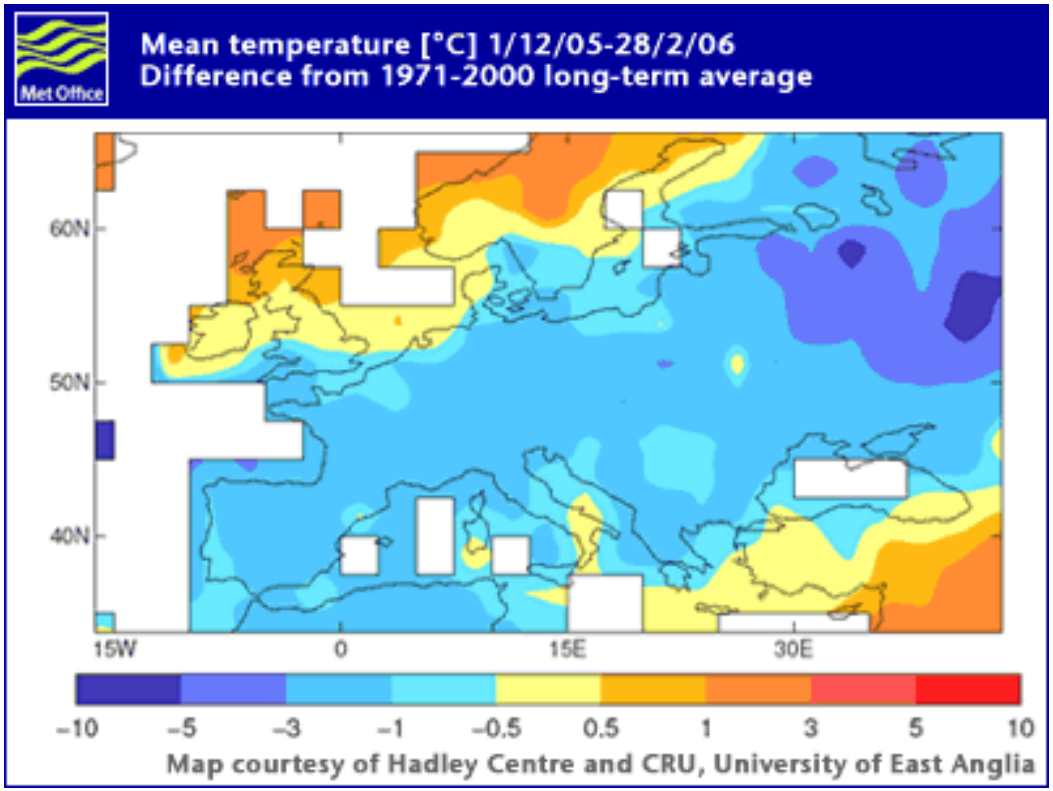
Presented to ~90 users/customers at the Winter Briefing last November

December to February Central England Temperatures



Note: 4.4=median for 1948-1998. 4.48=mean for 1971-2000 as used on web site.

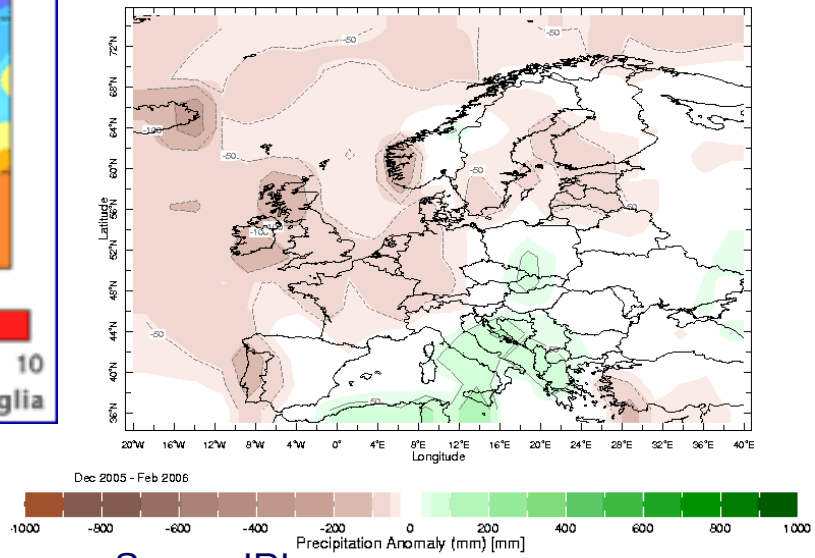
What happened in 2005/06?



It was cold over Europe

Over UK the temperature signal varied with location. It was cold in Southern regions.

It was dry over Europe



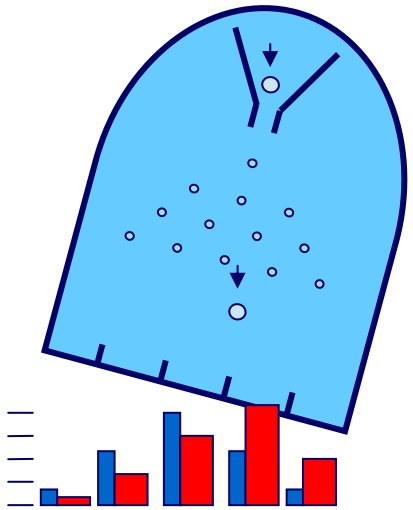
Source:IRI

Note that an individual probability forecast cannot be said to be right or wrong. All we can say is that the most likely forecast category occurred.

Communicating seasonal and climate risks to the energy industry & markets

Communicating risks and probabilities

- Categorical forecasts
  - **2:** Above / Below; **3:** Above / Normal / Below
  - Need defining in terms of a climatology – but which?
  - Few categories due to short observation record and chaotic nature of climate
  - Not always the most useful way to communicate to experts
- Probability distributions
  - More detail is wanted by users
  - Can provide what is scientifically credible



In mid-latitudes internal seasonal variability is much larger than external signals. Even with improved models, seasonal forecasts for these regions will be probabilistic and have lower skill than shorter-range forecasts.

Communicating forecasts

Science/communication in 2006

- How cold is cold? This needs to be quantified for likelihood forecasts
- Putting the component forecasts on the web wasn't helpful
- We had greater confidence in the forecast for Europe than for UK – need to work with the media & industry to communicate this also.

Developing forecast utility

- Communicate forecast in terms that each market sector can use
  - More detail e.g. changes in likelihood of a 1:50 cold winter, a 1:20 peak day, or of cold weeks/months, or forecast in terms of Composite Weather Variable
  - Find & prove levels of skill that are both scientifically valid & useful to customers

- **Workshop to discuss forecast presentation and interpretation**

Please contact us if you would like to be involved.

Communication 2006/07

- Scoping study for the impact of climate change on the energy industry launch **5th June 2006**
  - Contact *fiona.hewer@metoffice.gov.uk*
- First winter seasonal forecast available:

  www.metoffice.gov.uk 1st July 2006
- Winter seasonal forecast updates
  - **1st September 2006**
  - **2nd October 2006**
  - **1st November 2006**
  - **1st December 2006**


Met Office