Met Office winter forecast 2006/7

Dr Matt Huddleston, Principal Consultant Climate Change

Met Office Consulting

Presentation to Ofgem - 28 March 2007

Content

- Climate change context
- The 2006/07 winter forecast & verification
- Outlook for spring/summer
- Making the most of the weather and climate

Climate change: a global problem

"By 2050, we will have 3 times the global economy. Can we generate the energy needed to provide that using current systems?"

James Smith
Chairman of Shell UK, 8 Nov 2008.
- *in response to the Stern Report on Economics of Climate change*

Intergovernmental Panel On Climate Change
4th Assessment Report

- Man-made global warming is unequivocal
  - Very likely we have experienced it already
  - Best estimate for 2100 warming is 1.8˚C to 4.0˚C

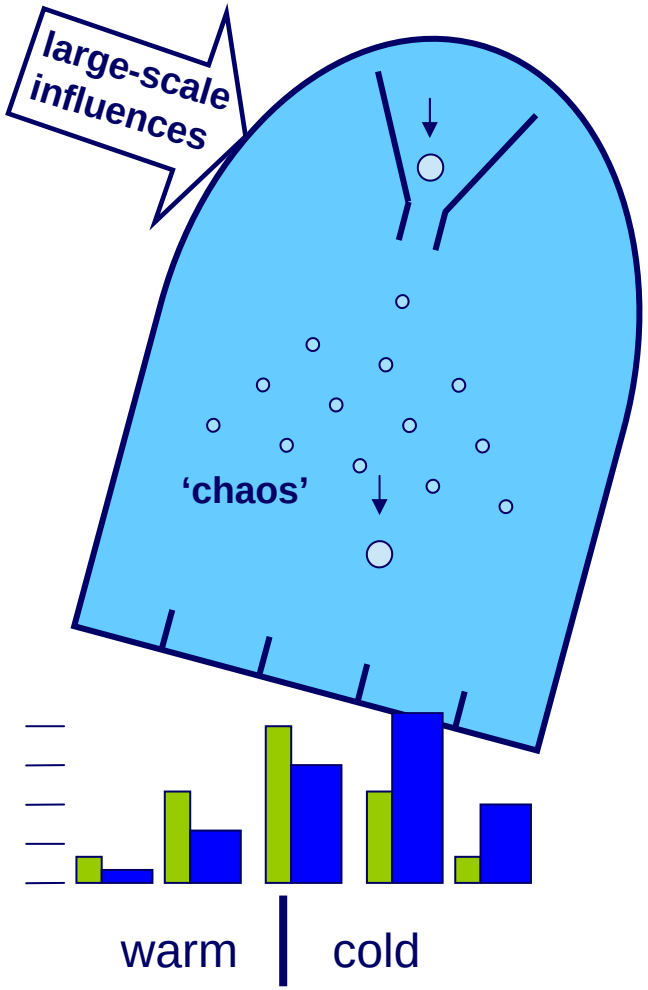
- Significant changes in the **nature**, **scale** and **location** of hazards are expected.
  - Risks associated with European storms, extreme precipitation events, tropical cyclones, permafrost melting and heat-stress are changing
  - Uncertainty still remains in key areas including sea level rise

Times of change

- How vulnerable is my business to Climate Change?
- How will the Climate Change Bill affect the future of the UK's Energy industry?
- How will Climate Change affect operational decisions made day to day through to strategic planning?
- How can I embrace Climate Change and use it to achieve differentiation through sustainable competitive advantage?

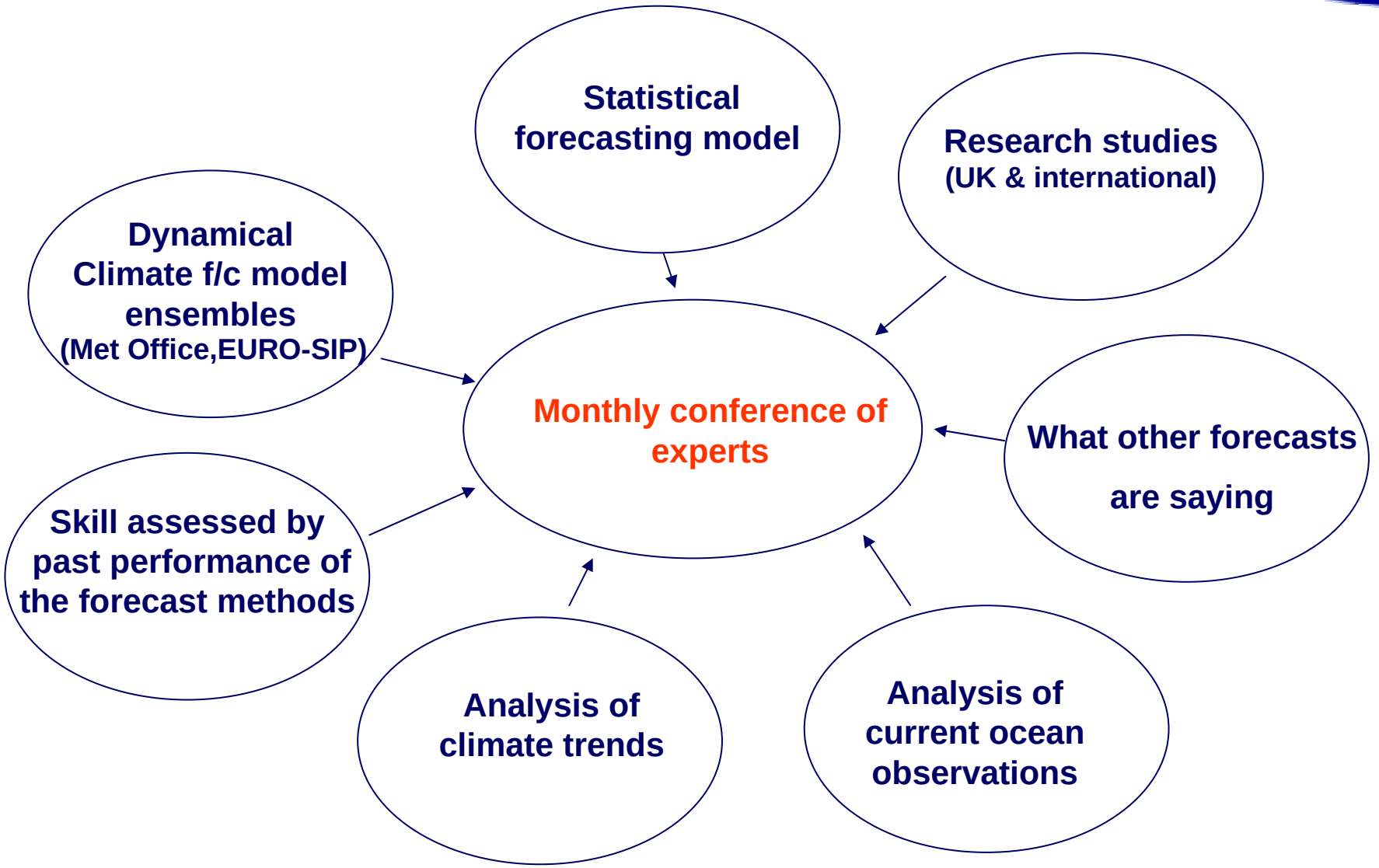
Winter 2006/7 as forecast

Schematic interpretation: this 2005 vs 2006 year



- In 2005 we predicted a 'cold' tilt on the pin table, 67% chance cold: 33% chance warm
  - the ball fell on the side consistent with the tilt.
- It is also useful to know when there is no net tilt on the pin table
- A user who decides to take action when the forecast for cold exceeds 60% would have acted in 2005 year, but not in 2006.

The Met Office seasonal winter forecast



Early forecast indication – 10th July 2006

Early indications for Winter 2006/7 (December, January and February)
Temperature

The signal from the statistical method is for **near- or above-normal temperatures across Europe this winter**. This signal is not particularly strong, but statistically the method offers good advice on two out of three occasions in predicting whether the seasonal average temperature will be above or below the long-term average. **This implies that southern areas of the UK (where last year it was coldest relative to the long-term average), are likely to experience a milder season than last winter**, although of course this does not rule out occasional cold snaps and snow. For northern Britain, a mild winter is signalled.

Precipitation

Last winter saw much drier-than-average conditions across nearly all parts of the UK - much as last autumn's forecast had suggested. In the south-east this was the continuation of a long period of dry weather starting in November 2004. Early indications are that this coming winter is **likely to be wetter over the UK than last year**.

Temperature forecast

- Probabilities weakly favour temperatures warmer than 1971-2000 averages over much of western and central Europe.

- Over northern Europe the influence of El Niño may encourage cold outbreaks during mid to late winter; at times such outbreaks can be expected to affect parts of the UK.

- For the UK, near average or warmer-than-average temperatures are the more likely outcomes for the winter period as a whole with the potential for lower temperatures (relative to average) in mid to late winter.

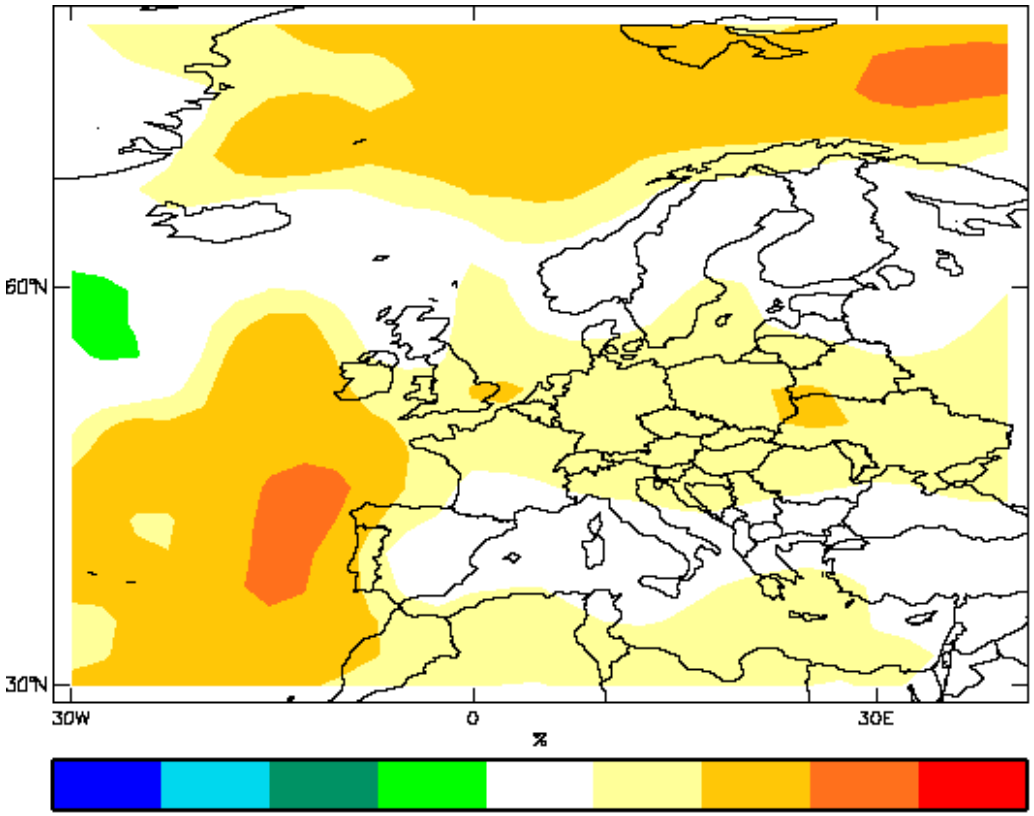
Precipitation forecast

- Signals for precipitation from our forecasting methods are mixed over Europe, and in most regions there is no clear indication for either above or below normal

- For the UK, best-estimates slightly favour average or above-average precipitation for the winter as a whole

Winter forecast update, issued 5th Dec 06:
probability of temperature above/below 1971-2000 averages

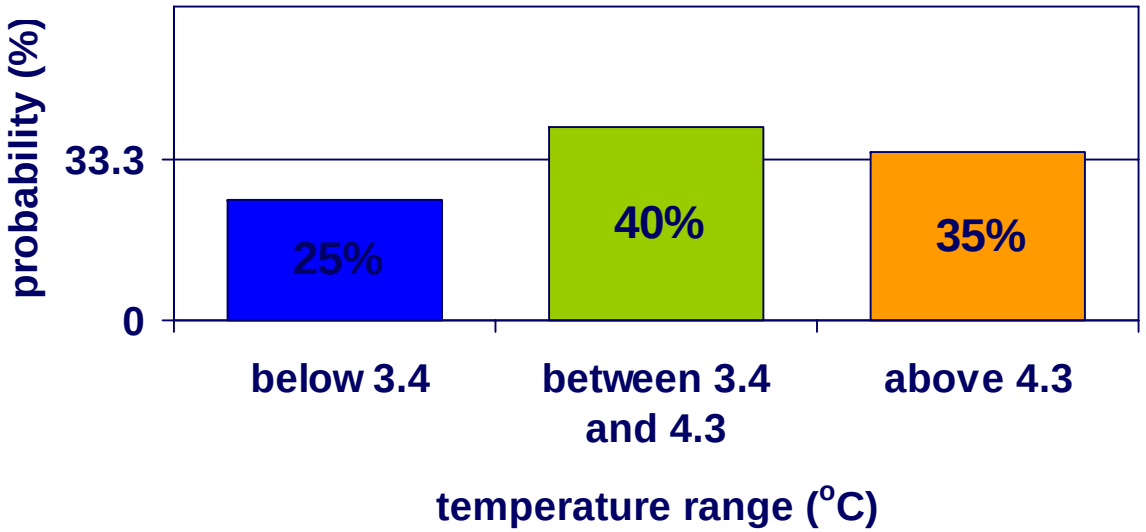
Probability of winter-mean temperature above/below average



Winter forecast update, issued 5th Dec 06:
UK temperature and precipitation probability

Temperature

Probability of UK winter-mean temperature: 2006/7

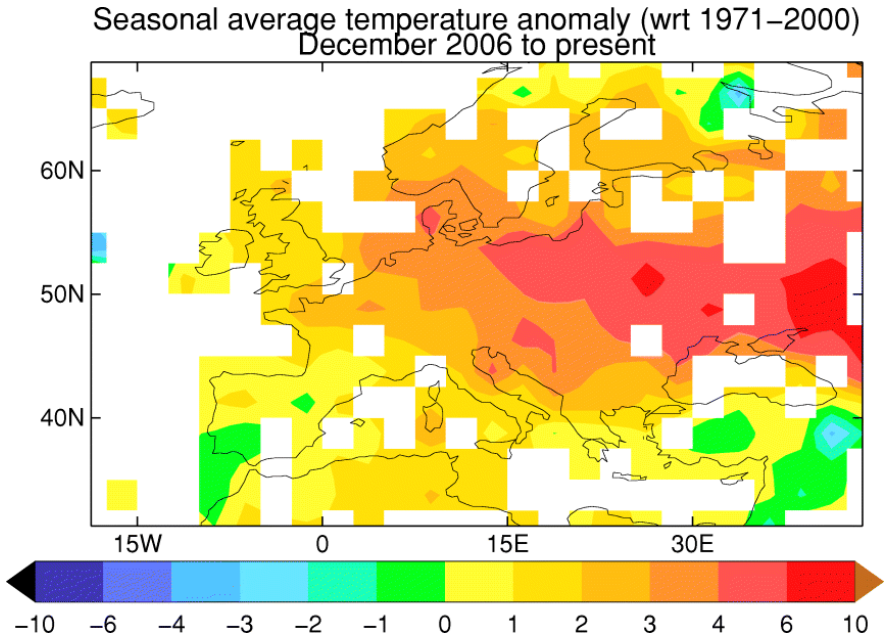


Winter 2006/7, as observed

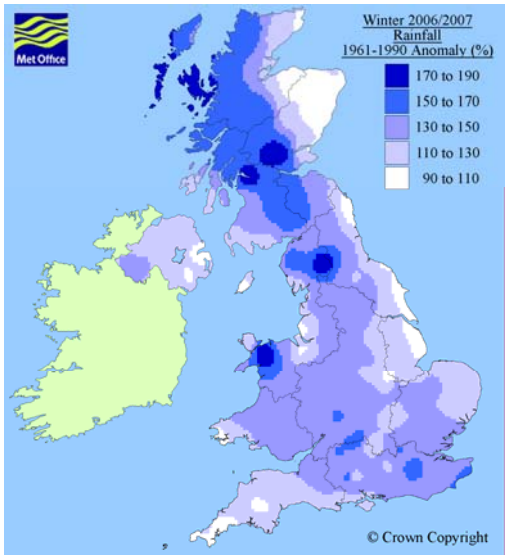
Met Office winter forecast 2006/7

The outcome, Dec – Feb 2006/7

Observed Europe temperature anomalies relative to 1971-2000



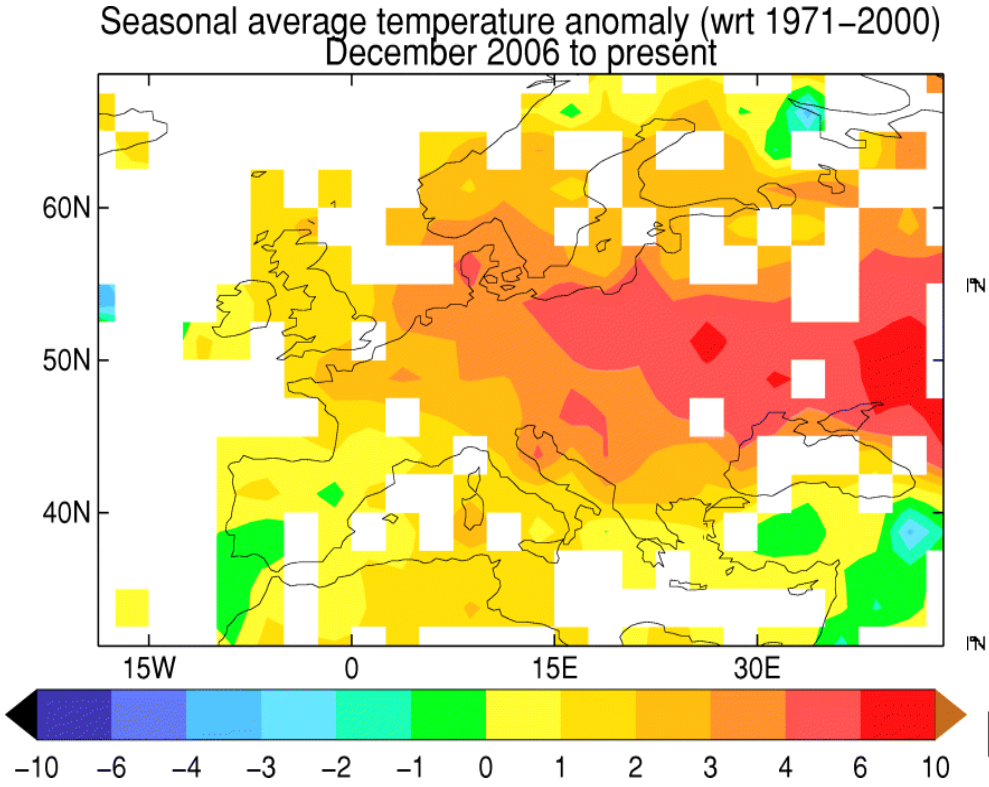
Observed UK rainfall anomalies



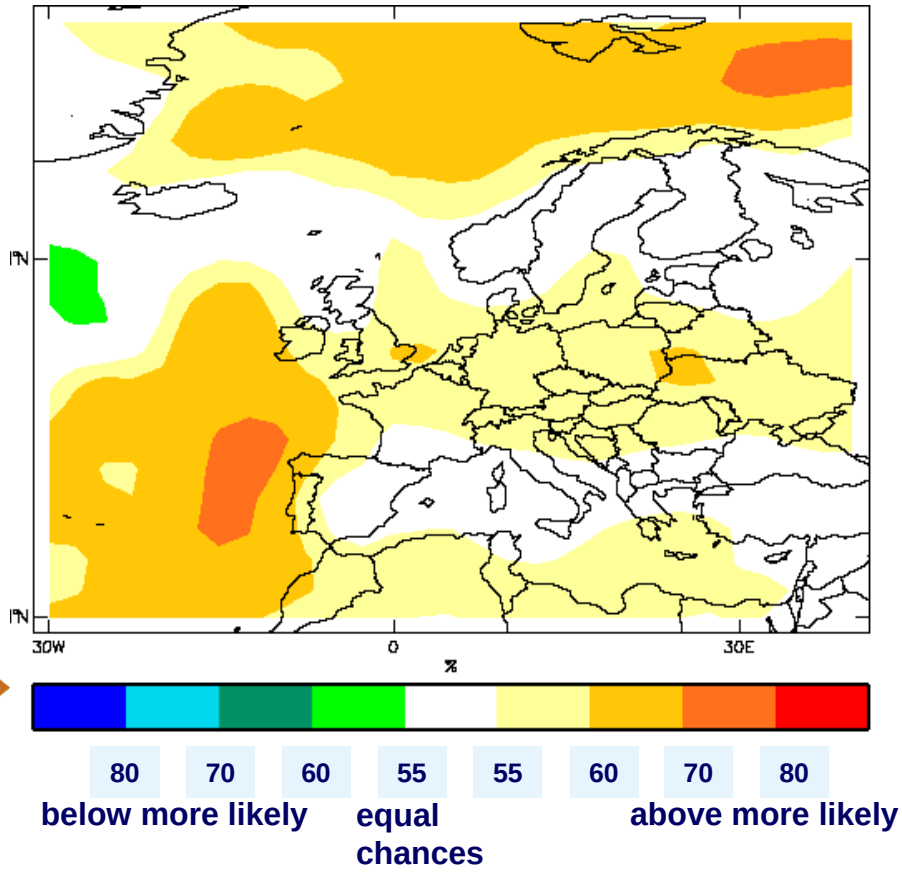
Winter verification so far

Observed Winter temperature

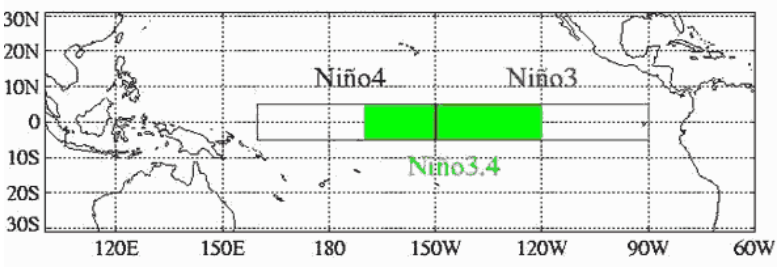
Dec – Feb

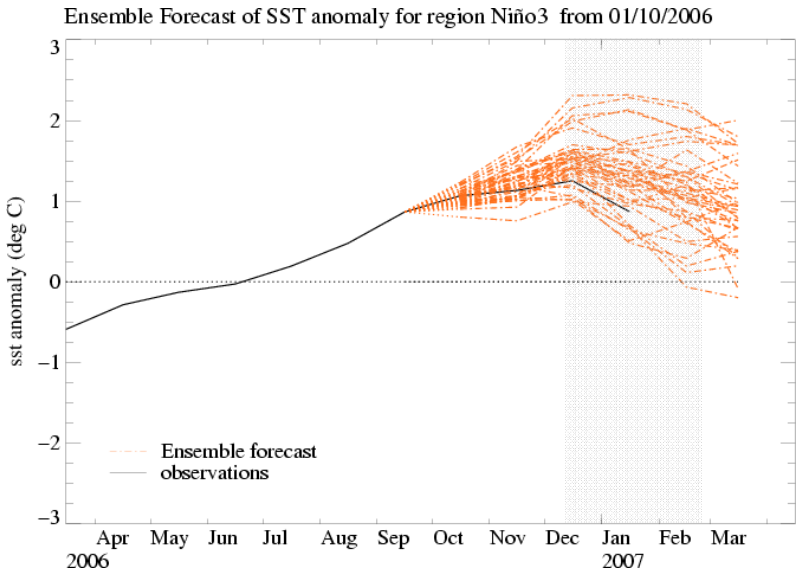


Forecast probability of winter-mean temperature above/below average



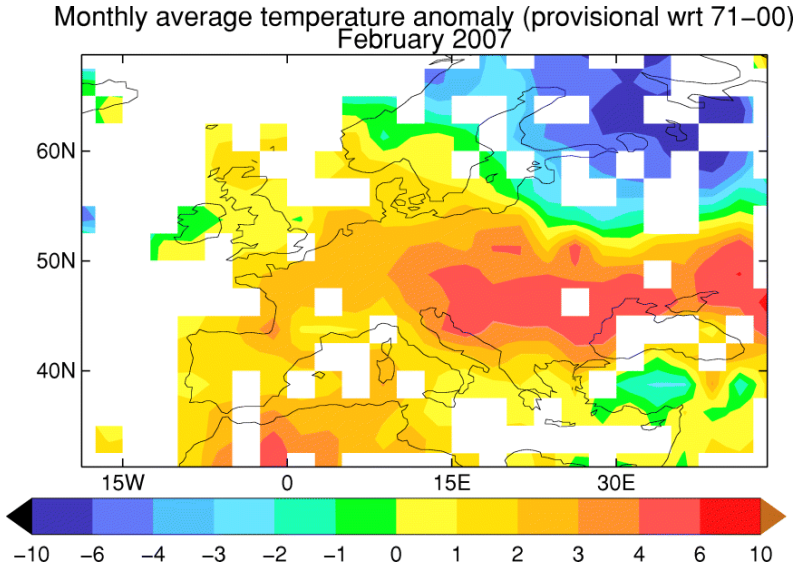
Moderate strength El Niño: favours late winter cold in northern Europe





Observed (black) and predicted (red) tropical Pacific ocean surface temperature

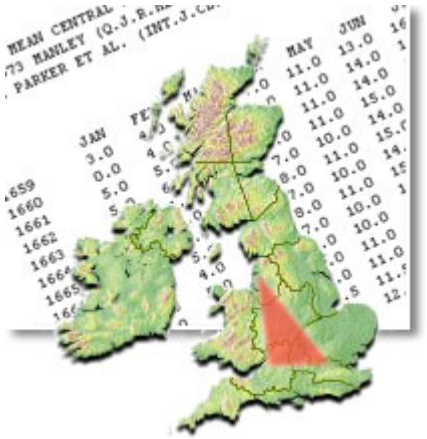
February anomalies



Forecast Uncertainties 5.12.06

“ El Nino … colder-than-normal winter spells in northern Europe, particularly in the Scandinavian region. ”

For the UK record books…



Central England Temperatures (CET), from 1659

- 2006: warmest ever January – December

- March 06 to Feb 07: warmest ever 12 month period
  - Sept-Oct-Nov: warmest in record
  - October joint 3rd warmest
  - January 07 5th warmest
  - Dec - Feb joint 3rd warmest

Spring & summer 2007

Forecast for spring 2007…

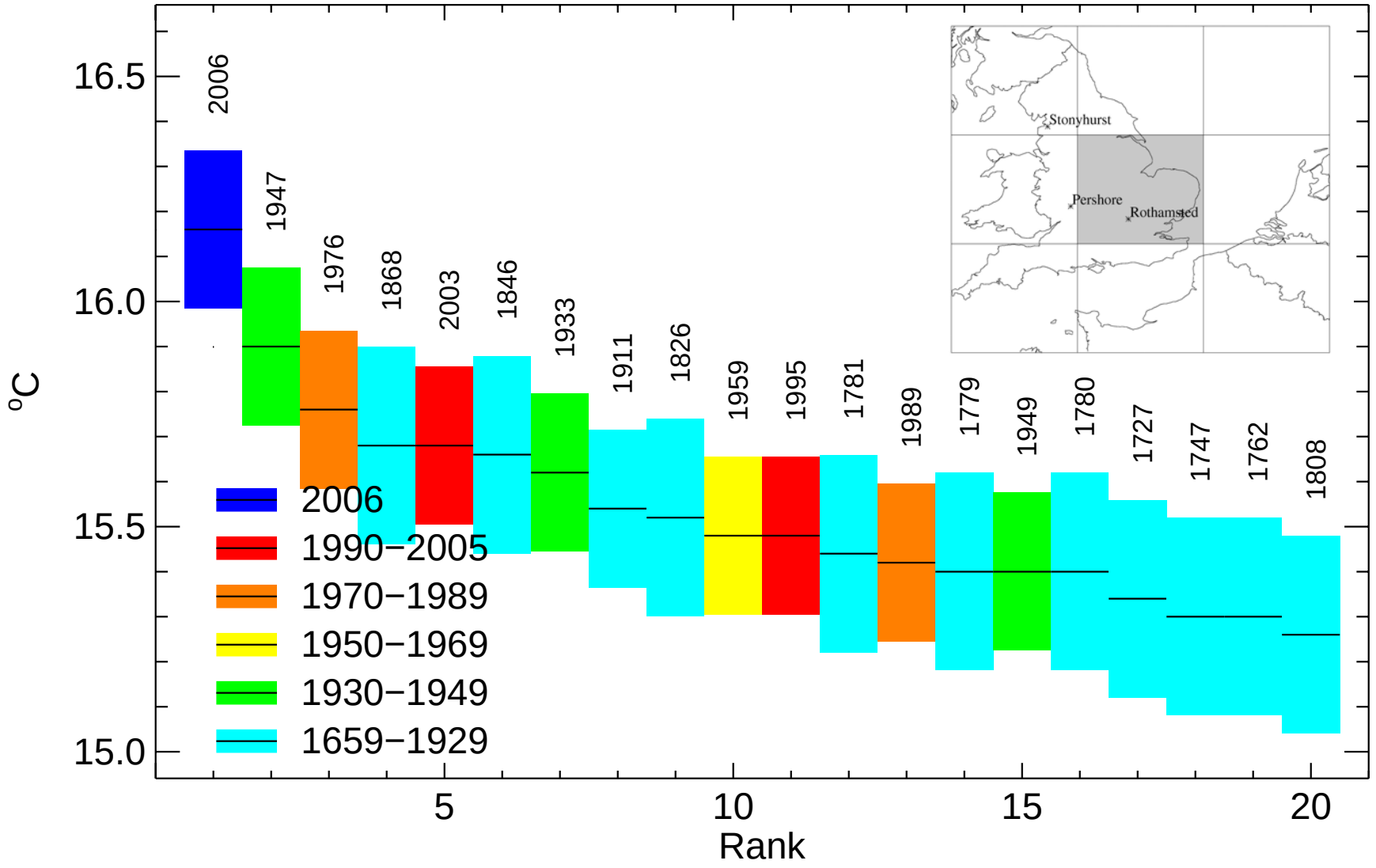
Temperature

- There is a 70% probability that the mean spring season **temperatures will be above the 1971-2000 long-term average** over most of western Europe, including the UK. These conditions would follow a 12-month period that has been the warmest on record.

Precipitation

- Signals for precipitation are mixed over Europe, and in most regions there is no clear indication for either above or below normal. For the UK, best estimates **slightly favour average or a continuation of above-average rainfall** for the spring season as a whole.

20 warmest extended summers (May to September) in Central England



…. outlook to summer 2007

- A preliminary assessment … favours a summer **warmer than the 1971-2000 mean**. This would continue recent trends, with the last summer below the 1971-2000 mean now nearly 10 years ago in 1998.

- At this time, it is too early to assess the likelihood of very-warm mean summer conditions such as those experienced in 2003 or 2006.

- Full forecast will be issued 10am, 11th April

Our changing climate

Your opportunities and risks

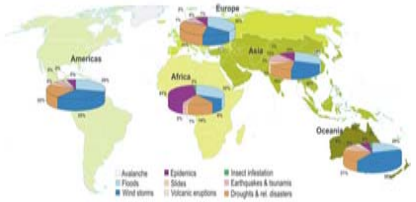
- Making the most of the weather and climate -

Met Office consulting:
Enabling decision making & reducing risk exposure:

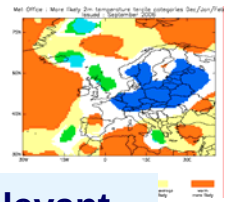
"Time to see necessity as opportunity"

Sir Nic Stern
8 Nov 2006

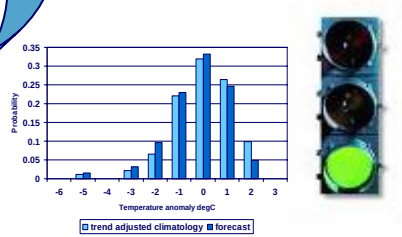
Business Exposure to environmental risks



Dialogue, analysis and understanding – Met Office Consulting



User-relevant forecasts and, science and climate predictions



Business impact forecasts And decision models

Application of seasonal forecasts example

Tailored forecast of UK drought risk 2006/07
By Met Office Consulting

Unique seasonal climate forecast systems and historical data tailored within 3 days following urgent request.

Specific risk assessment of exceedance of critical thresholds assessed

Risk assessment informed in multi-billion pound decision, potentially saving company huge losses.

Risk-based climate analysis –
Protecting investments

Customer feedback - Cabinet Office
What about the energy industry?

As we have now officially finished the winter season, I would just like to take this opportunity to congratulate Richard Graham and his team, and all of you we pressurise so regularly for long range weather forecasts, for an excellent winter forecast. It was given a long time ago and I think was extremely accurate.

“Many departments found it extremely useful and as I have said before its importance in short - term planning is making it a must-have item”.

Questions we field more regularly now are focussing on when the next season's predictions will be released!

The range of departments using it has increased, Defra and the water resources department were particularly interested how the weather this winter would be, and for obvious reasons the fact you got it right was a great relief to them. So well done to all involved, would you please convey my, and the Cabinet Office's, thanks for an excellent job.

March 2007

Essential forecasts for everyone, every day

- What can the Met Office do to help?
  - The Met Office is the world leader on Climate Change and is uniquely positioned to advise businesses of the effects of weather and climate impacts on strategy and planning assumptions.

- Through future proofing business strategy & operations the energy industry can look to develop a sustainable competitive advantage.

- By working together we can ensure that you successfully plan for uncertainty through world leading business decision support tools.

What keeps you awake at night?

Questions & Answers