



31 January 2006

Oikos International Roundtable

Assessing, managing, and perhaps attempting to prevent risk

(And how you can aid climate modelling at home tonight)

Leonard A. Smith

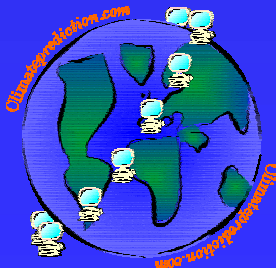
London School of Economics

Pembroke College, Oxford

and about 20,000 members of the public
(any of you?)

www.lsecats.org

www.climateprediction.net





Assessing the risk: a METRO from Feb 2005

Is this an accurate reflection of what is known today?

Is what we know today accurate?

How relevant is this information to the decisions we have to make today?

And for long-term decisions:

How robust is the current information?

Is informed expert opinion likely to change in a years time?

1 Roundtable



And, of course, what
are we talking about?
Climate or Clubbing

A METRO from Feb 2005

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What is generally agreed

The world has warmed up in the last 100 years.

Greenhouse gases tend to warm a planet to first order.

We do not have much high resolution data on century long temperature variations.

Most climate models runs warm up a few degrees when we double CO₂.

Climate models are imperfect.

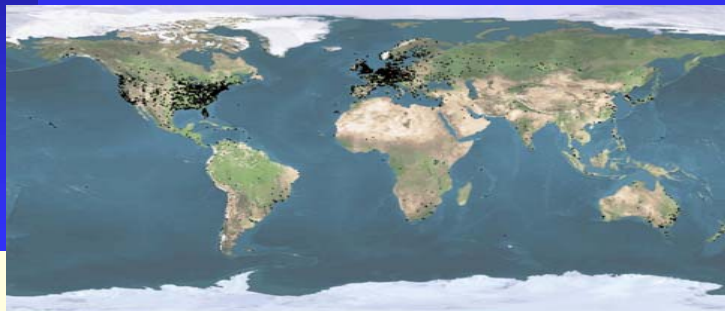
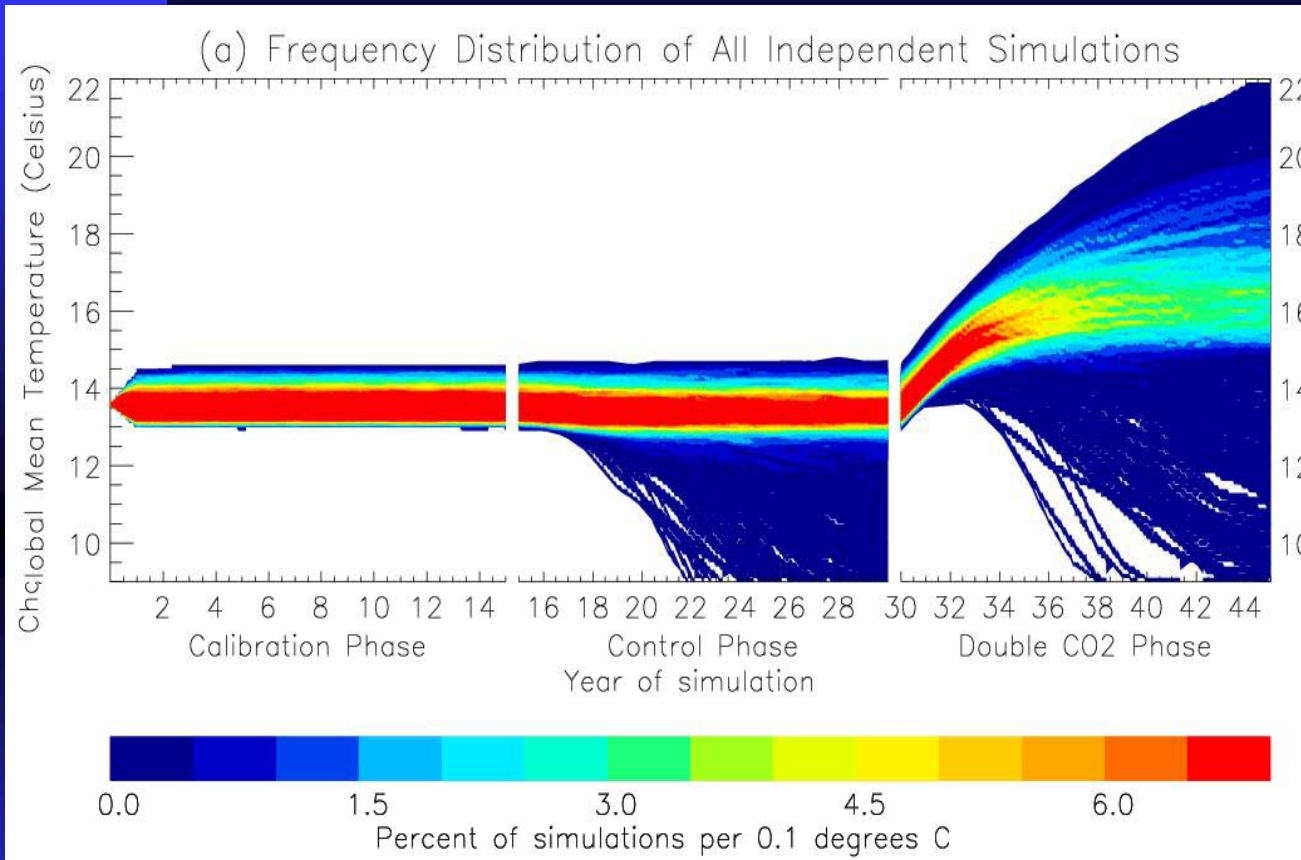
So where did the 11° come from?



This is a global average temperature!

It tells us nothing about summer temperatures in London.

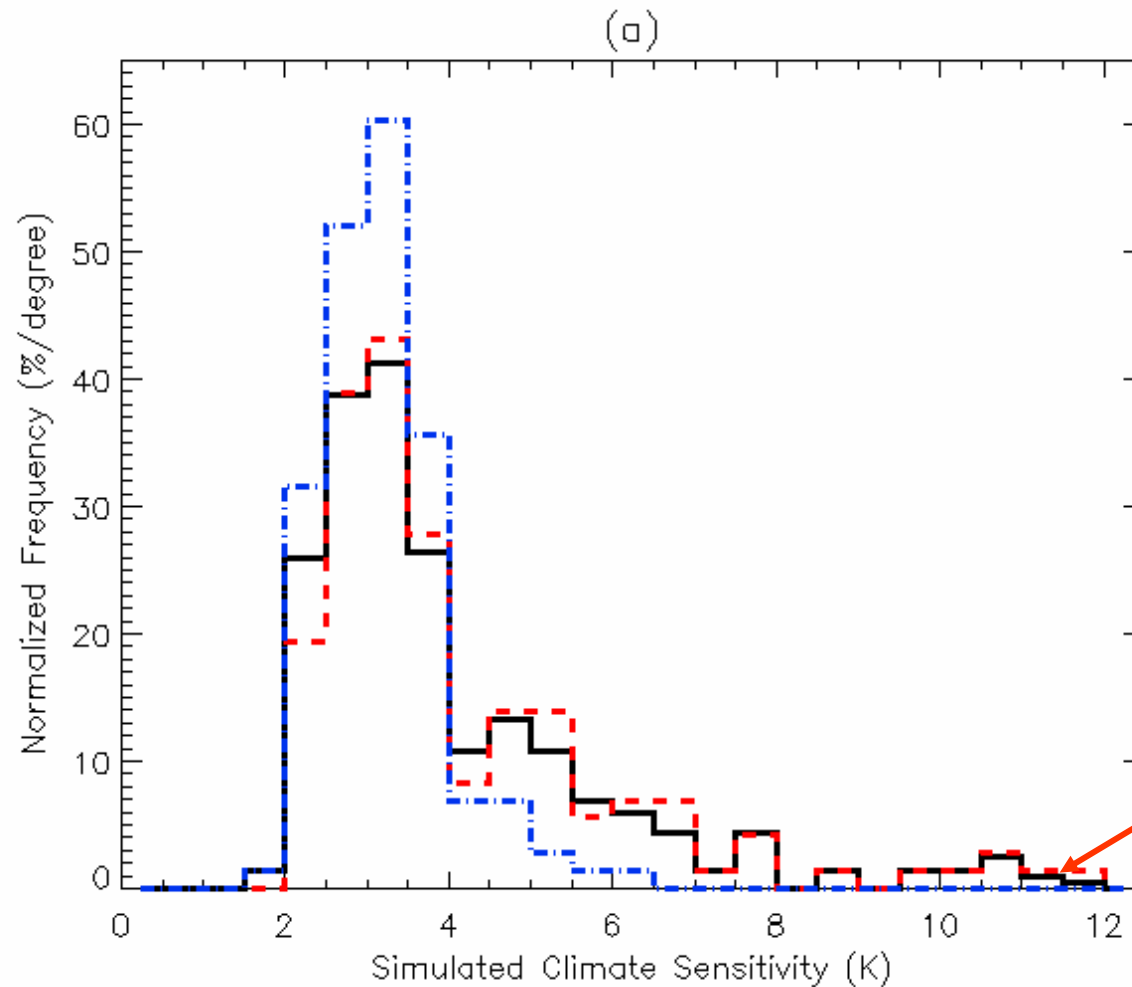
Except through global things like sea level



- > 100,000 participants from 150 countries
- > 70,000 simulations (each 45 years long)
- > 8,000 years of computing time



Frequency Distribution of Climate Sensitivity



% > 8°

Black: 4.2

Red: 4.9

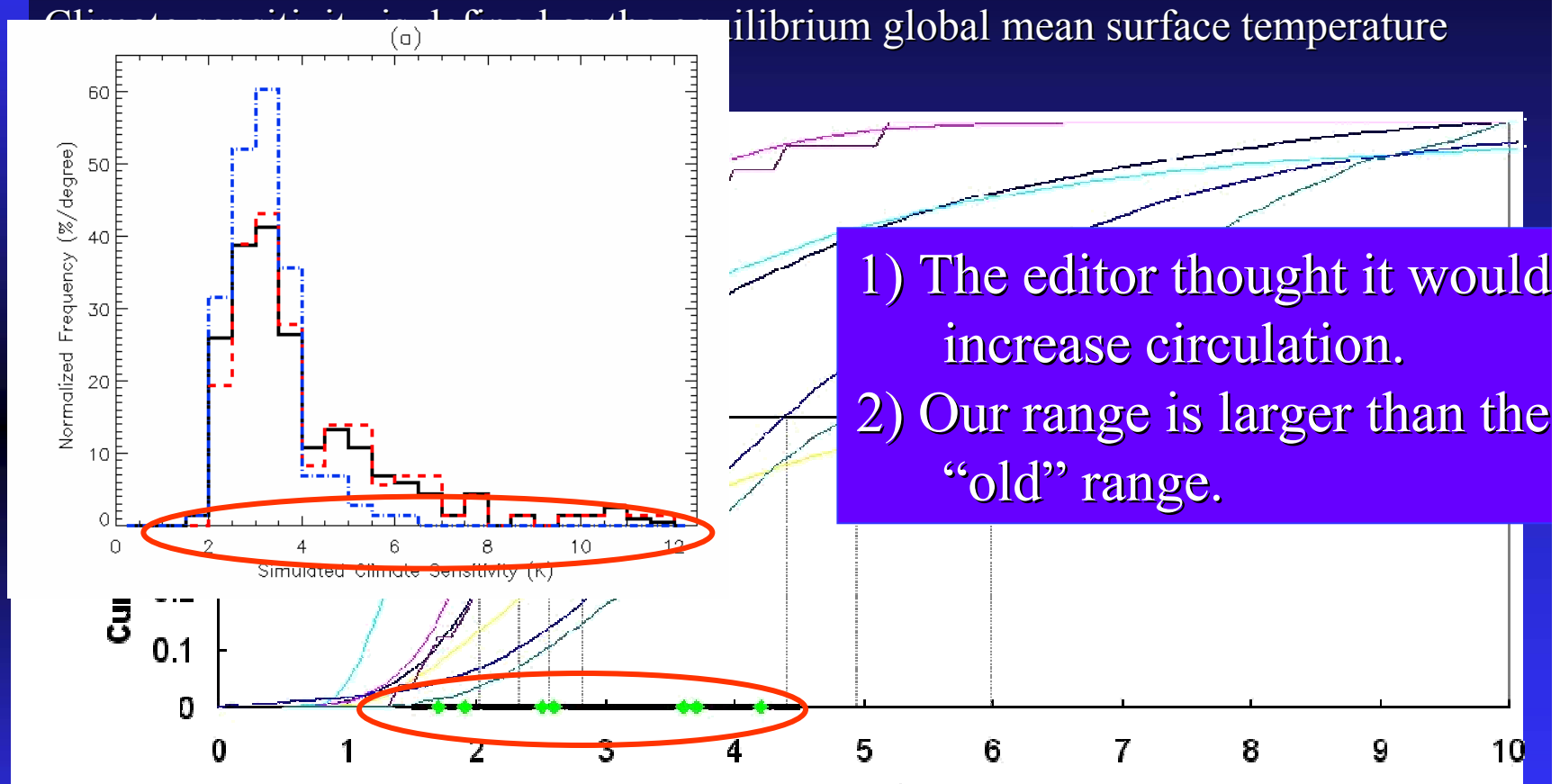
Blue: 0.0



climateprediction.net

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Why did our paper make the cover of the Metro?



We now have 1000 time more model runs.
But the our second order effects are no better.
What are second order effects?

Gregory et al.
CC TAR GCMs
CC range

Suraje Dessai
March 2003

Second order impacts are hard to judge:

Two UL students, a and b, have an exam Friday.

Decision with risk: Go clubbing tonight?

First order effects:

They will physically recover by Thursday.
So no direct effect on the exam Friday.

Second order effect:

Revision tomorrow⁺ will suffer.
Exam performance will suffer.

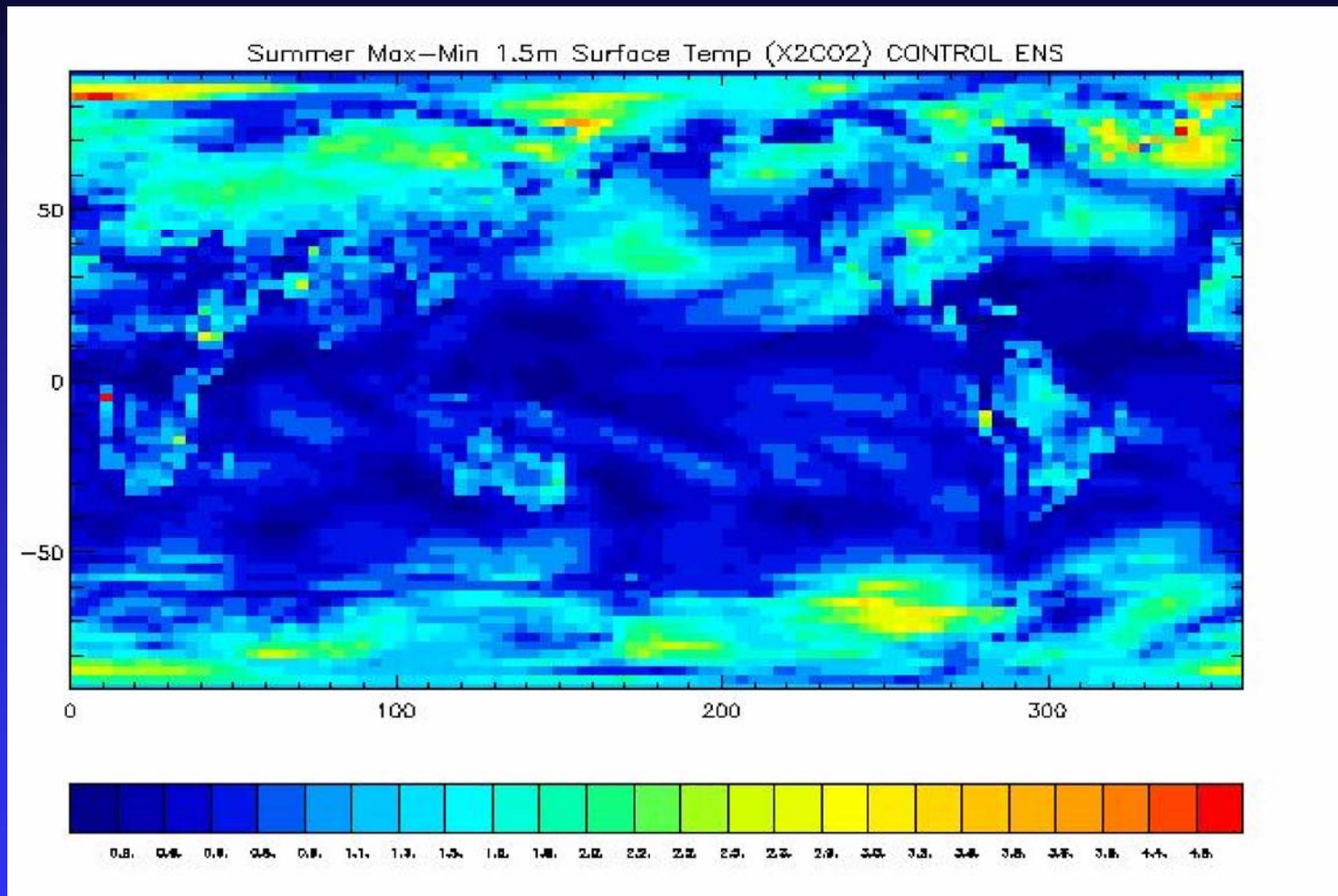
But how much, really?

And what is the cost of not going?



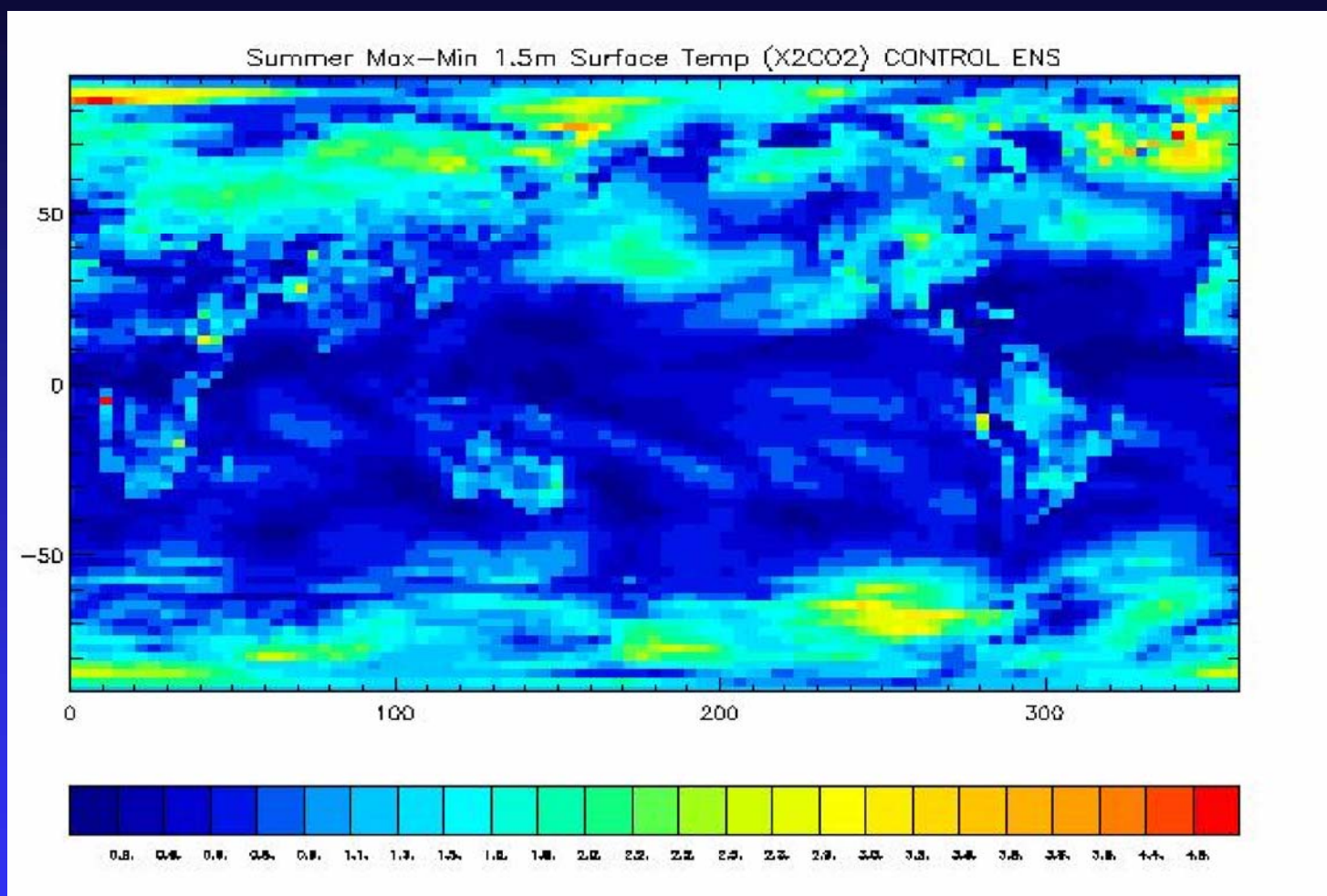
Greenhouse gases warm the planet, which increases clouds, changing rainfall patterns and plants, changing temperatures...

Range of Regional Results of a state-of-the-art model



Take home message: Uncertainties in global average risks are large;
We need to avoid over-interpreting pretty pictures of local impacts.

Regional Results from a state-of-the-art model



And also remember:
Climate change is what we expect.
Weather is still what we get!

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A Question of Risk Management:

You are driving a car on an *urgent* errand in total darkness; you cannot see any trees: should you slow down while you look for the light switch?

This is the climate question; the only rational response is to act before we can see clearly.

So I'll end with 3 quotes to stimulate questions:

Prediction is very difficult, especially about the future.

Niels Bohr

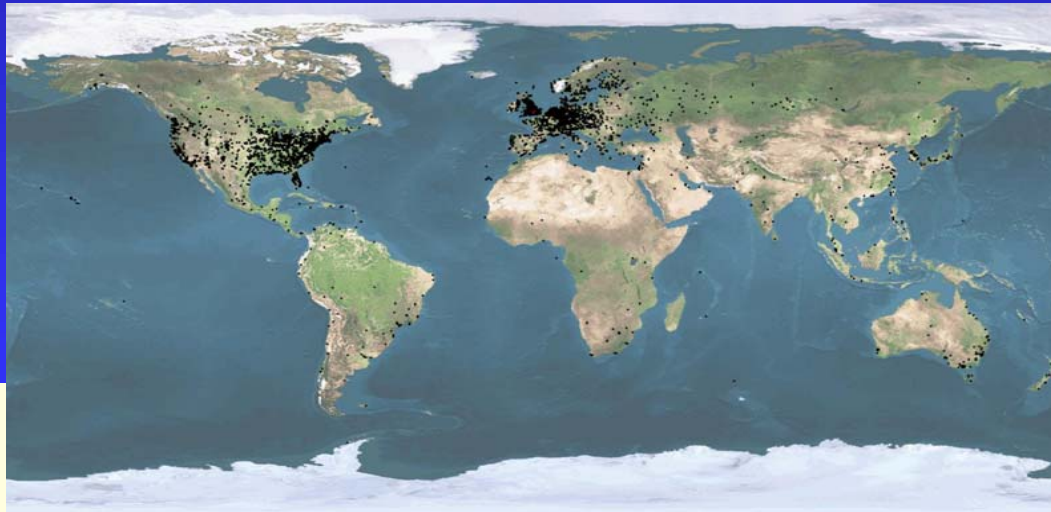


The future will be better tomorrow.

Dan Quayle

*Maybe we oughta help 'em see,
the future ain't what it used ta be.*

Tom Petty



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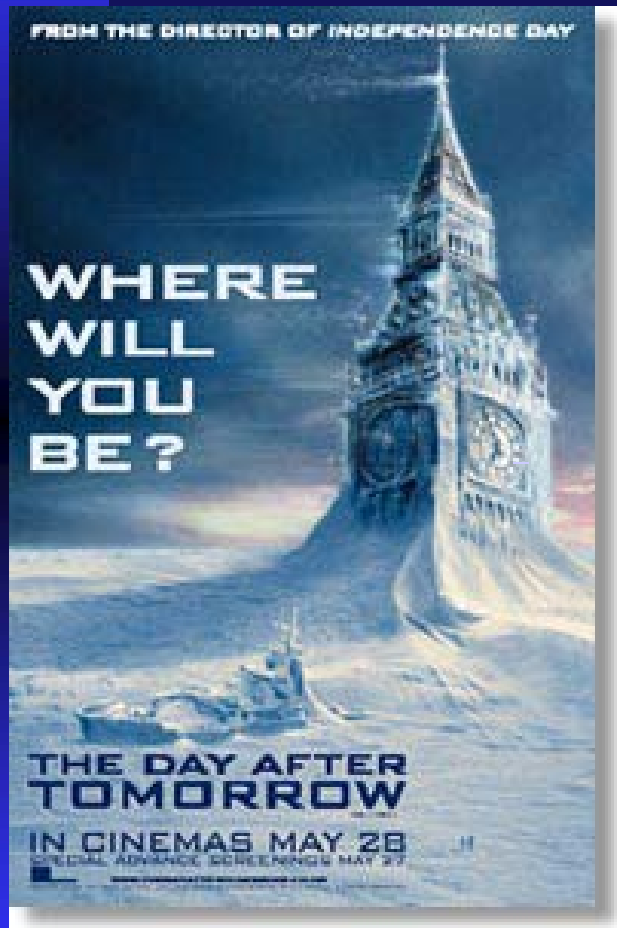
Discuss at www.lsecats.org



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How big is a “low probability” to you?



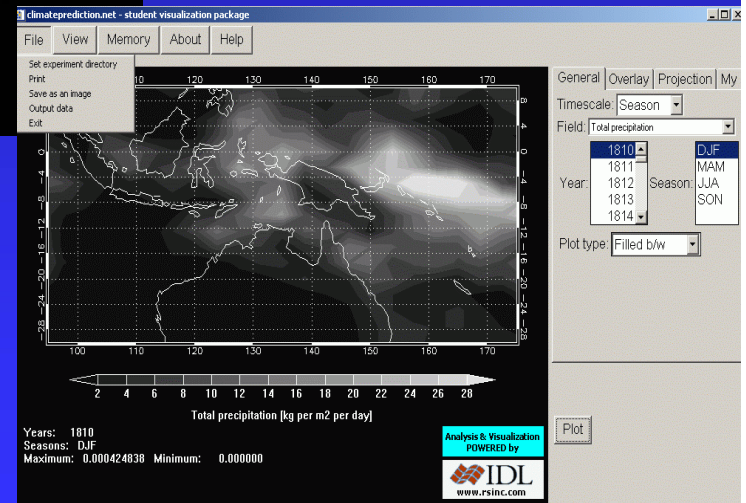
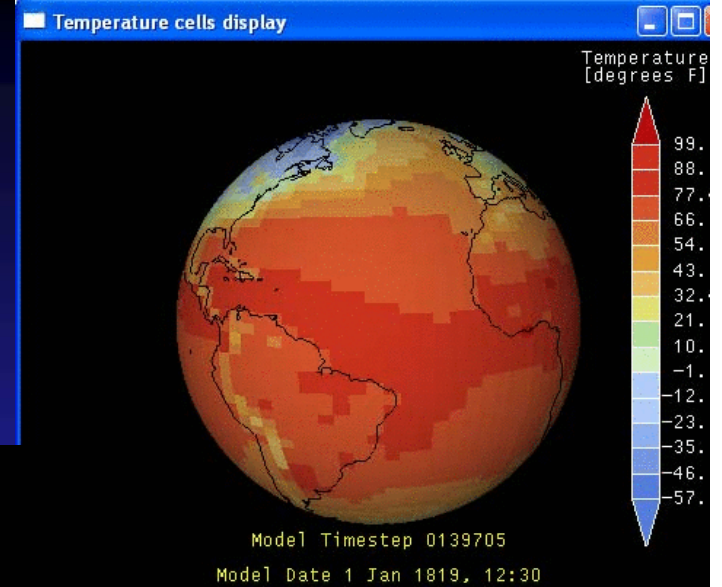
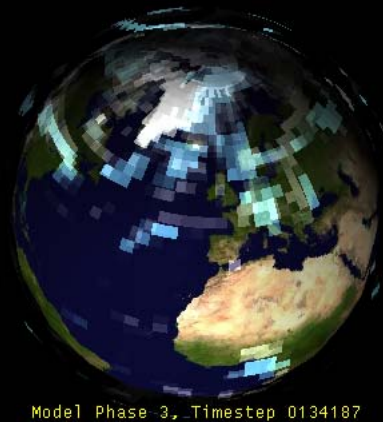
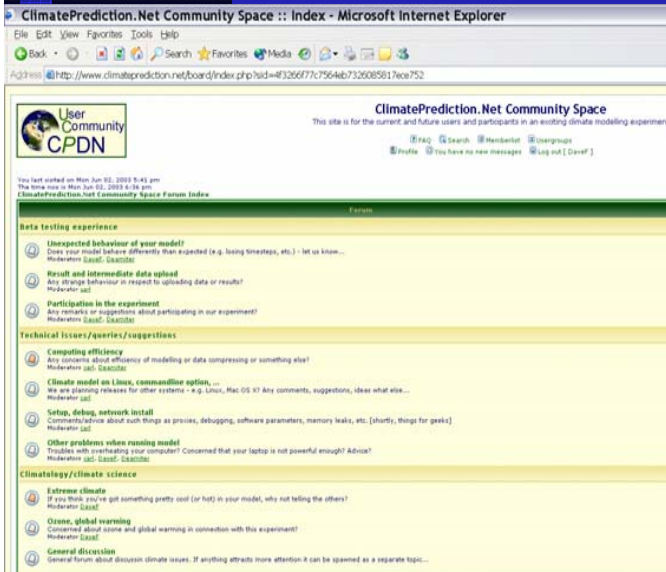
Although we estimate that the chances of a 'Big Chill' in the next hundred years has a *low probability*, we *don't know how low*, and if it happened it would have a very high impact”

UKMO

60%	1
30%-50%	12
10%-25%	8
0%	1



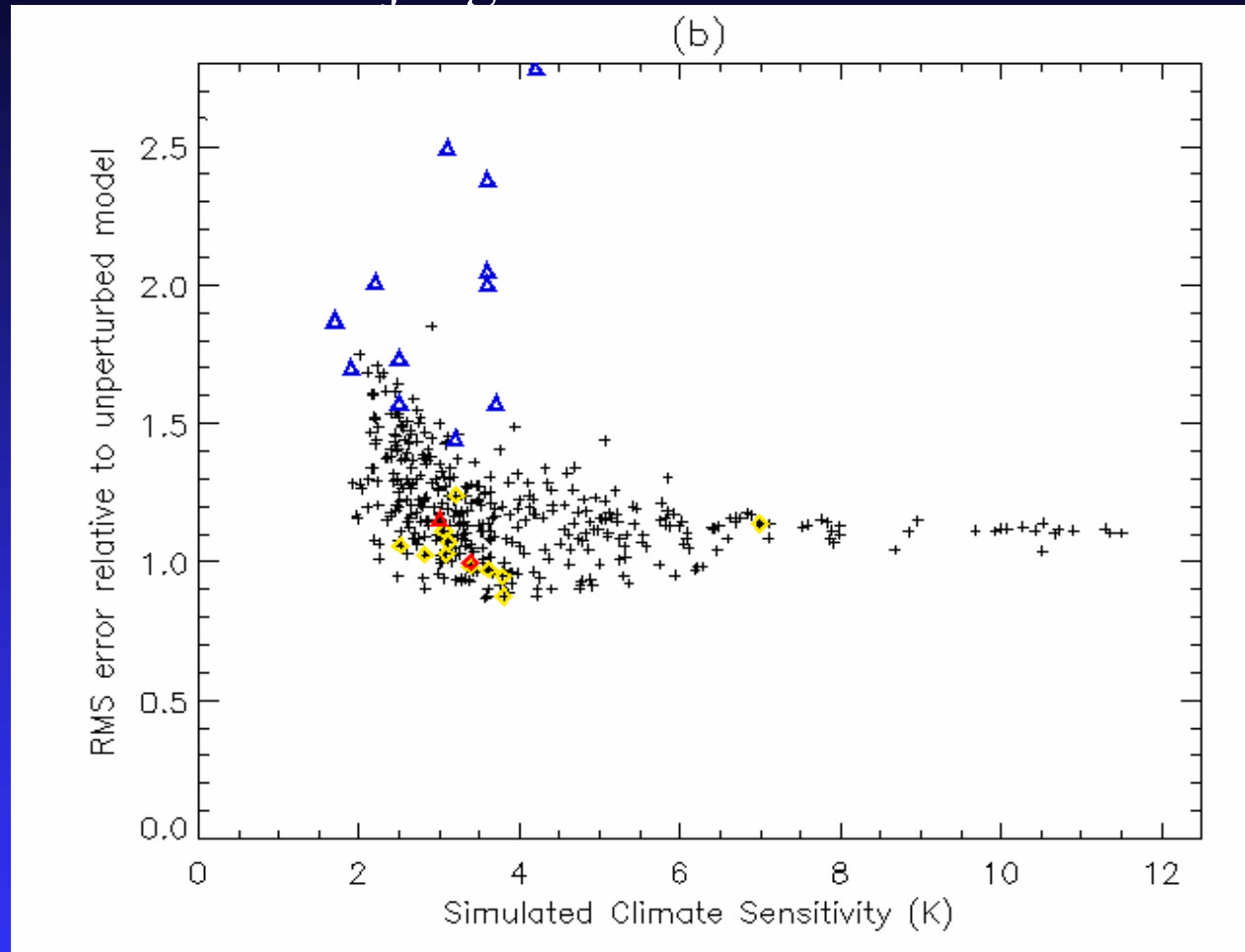
ClimatePrediction.net : What it looks like.



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Is the *climateprediction.net* ensemble “state-of-the-art”?
How should we best judge if a climate model is realistic?



Relative RMS Error relative to unperturbed model.

Yellow Diamond: Single Parameter Perturbation

Black Plus: Multiple Parameter Perturbation

Blue Triangle: CMIP II Model

31 January 2006 **Red Triangle:** HadCM3 (same atmosphere with dynamic ocean)