GLOBAL WARMING AND EXTREME WEATHER EVENTS

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Panic Attack: Our Obsession With Risk
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Are Climate Extremes Increasing?

UK Autumn 2000 Floods
(Loss ~ US $ 750 million)

Hurricane Georges
Strikes Caribbean 1998
(Loss ~ US $ 10 billion)
1. Hurricanes
Trends in Intense Tropical Cyclone Numbers

Northern Hemisphere 1971-2000

Atlantic Basin 1948-2000

Intense TCs = 1-min Sustained Winds > 73 mph
Super Intense TCs = 1-min Sustained Winds > 110 mph
Atlantic Hurricane Predictors

JAS 925mb Wind and SST Anomalies: Active – Inactive Years

Trade Wind Predictor

SST Predictor

Temperature Difference (°C)

Longitude

Latitude

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Temperature Difference (°C)

Longitude

Latitude

2ms⁻¹

-0.80 -0.64 -0.48 -0.32 -0.16 0.00 0.16 0.32 0.48 0.64 0.80
Hurricane Numbers 1950-2001
Tropical Atlantic, Caribbean Sea and Gulf

Perfect Predictors
$R^2 = 0.67$
Future Projections for Tropical Atlantic, Caribbean and Gulf Hurricane Numbers
• The number of Atlantic, US and Caribbean landfalling hurricanes may rise slowly due to global warming.

• However, the change in the mean number over the next 100 years is likely to be small compared to the current range of natural year-to-year variability.

• The large majority of future changes in US and Caribbean hurricane losses will continue to result from natural interannual and decadal variability.
2. Winter Storms
European Winter Storms

- European windstorms caused damages of £1.9 bn per year 1990-1999
- Rank as the 2nd highest cause of global insured losses after US hurricanes

Porthleven, Cornwall: 4 Jan 1998 (Courtesy, Simon Burt)
North Atlantic Oscillation

+ve NAO

-ve NAO

(Figures Courtesy of Martin Visbeck, Columbia University)
NAO Winter Index 1825-2000

(FigureCourtesy of Tim Osborn, University of East Anglia)
NAO Future Projections

(Figure Courtesy of Tim Osborn and Phil Jones, University of East Anglia)
Summary

- The number of European winter windstorms may rise slowly due to global warming but trends (if any) are likely to be small.

- The large majority of European winter storm losses in the foreseeable future will continue to result from natural interannual and multi-decadal variability.
3. Floods
UK Floods of Autumn 2000

(Figure Courtesy of Mike Blackburn, University of Reading)
Czech Floods of Summer 2002

(Figure Courtesy of Ben Lloyd-Hughes, UCL)
England and Wales Winter Rainfall 1900/1-2000/1
Climate change will **slowly** increase rainfall and the number of floods.

There is little direct evidence to link the recent UK (autumn 2000) and European (summer 2002) floods to global warming.

The large majority of floods in the foreseeable future will continue to result from **natural climate variability** and from non-global warming factors.
4. Overall Conclusions
Conclusions

- The large majority of future changes in the incidence of weather extremes will continue to result from natural interannual and decadal climate variability and not global warming.

- The economic impact of global warming - through its affect on extreme weather incidence - is likely to be small over the next 10-20 years.