

# **Climate change: facts and myths**

**Myles Allen, Universität Oxford, Oxford, UK  
Hans von Storch, Institut für Küstenforschung, Geesthacht, DE  
Moderation: Prof. Lars-Erik Cederman, ETH Zürich**

This debate about climate change was held on the "Day of Teaching" under the umbrella of the 150-years ETH celebration. The purpose of the event was to demonstrate the pedagogical value of public debates in academic life. We have chosen to organize a debate on climate change because it is a topic that is not only scientifically contested but also of profound societal relevance.

**ETH Zürich, Switzerland, <http://www.ethz.ch>**

**Tag der Lehre / Day of Teaching  
November 14, 2005**

## **Hans von Storch**

**Institute for Coastal Research  
Geesthacht, DE**

ETH Zürich, Switzerland  
Tag der Lehre / Day of Teaching  
14. November 2005

## My view ...



- Climate is the statistics of weather.
- Anthropogenic climate change is real.
- We observe now changes of climate, which can be reasonably explained only through human agency.
- These changes take place mostly in global distributions of temperature.
- Claims that Global Warming is presently causing abnormally extreme rare events are mostly false.

## My view ...



- In the public, anthropogenic climate change is used as an explanation for rare events – which should be explained by the random character of weather. However, the reference to anthropogenic climate change is a culturally more consistent explanation.
- Examples: Extratropical storms in the 1990s; hurricanes in the 2000s.
- Scientists only suggest a causal relationship; in the media these suggestions become assertions. The scientific community objects only inefficiently.

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### Countdown to global catastrophe

**Climate change: report warns point of no return may be reached in 10 years, leading to droughts, agricultural failure and water shortages**

By Michael McCarthy, Environment Editor  
24 January 2005

The global warming danger threshold for the world is clearly marked for the first time in an international report to be published tomorrow - and the bad news is, the world has nearly reached it already.

The countdown to climate-change catastrophe is spelled out by a task force of senior politicians, business leaders and academics from around the world - and it is remarkably brief. In as little as 10 years, or even less, their report indicates, the point of no return with global warming may have been reached.

The report, *Meeting The Climate Challenge*, is aimed at policymakers in every country, from national leaders down. It has been timed to coincide with Tony Blair's promised efforts to advance climate change policy in 2005 as chairman of both the G8 group of rich countries and the European Union.

And it breaks new ground by putting a figure - for the first time in such a high-level document - on the danger point of global warming, that is, the temperature rise beyond which the world would be irretrievably committed to disastrous changes. These could include widespread agricultural failure, water shortages and major droughts, increased disease, sea-level rise and the death of forests - with the added possibility of abrupt catastrophic events such as "runaway" global warming, the melting of the Greenland ice sheet, or the switching-off of the Gulf Stream.

The report says this point will be two degrees centigrade above the average world temperature prevailing in 1750 before the industrial revolution, when human activities - mainly the production of waste gases such as carbon dioxide (CO2), which retain the sun's heat in the atmosphere - first started to affect the climate. But it points out that global average temperature has already risen by 0.8 degrees since then, with more rises already in the pipeline - so the world has little more than a single degree of temperature latitude before the crucial point is reached.

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SPIEGEL ONLINE - August 30, 2005, 03:39 PM

URL: <http://www.spiegel.de/international/0,1518,372179,00.html>

German Papers

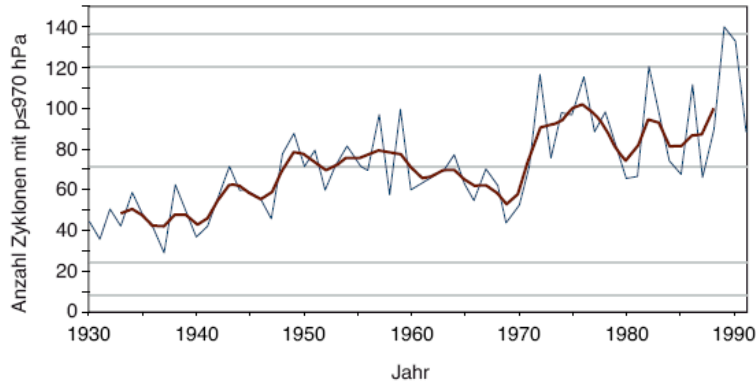
## Katrina Should be A Lesson To US on Global Warming

**Seems like everything is President Bush's fault. One day after Katrina hammered the Gulf Coast, German commentators are laying into the US for its stubborn attitude to global warming and Kyoto.**



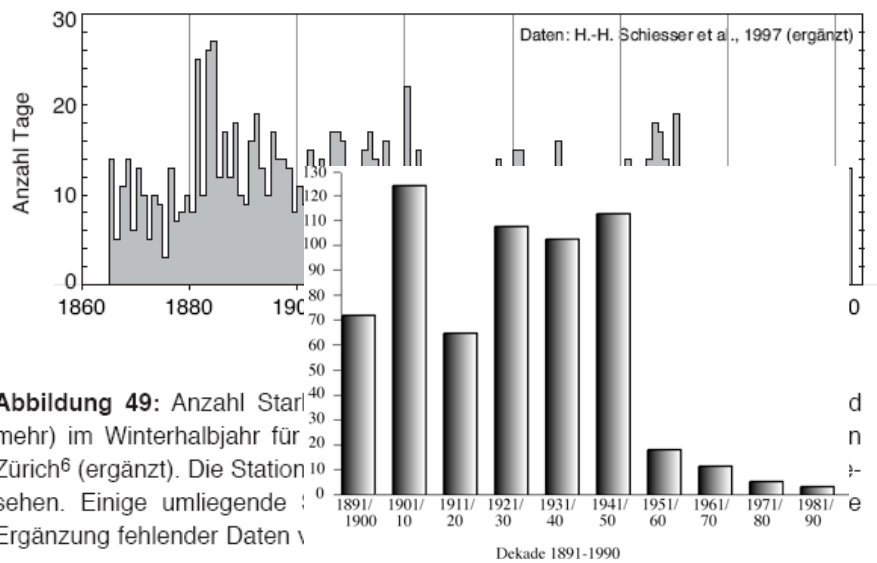
Hurricane Katrina is big news for German commentators, whatever their ilk. For some, the powerful storm which slammed the Gulf Coast on Monday, is a symbol of the sort of environmental terrors awaiting the world thanks to global warming and proof positive that America needs to quickly reverse its policy of playing down climate change. For the more conservative, it is simply another regrettable natural catastrophe.

**Extratropical storms in Europe  
Discussion in the early 1990s.**



**Abbildung 48:** Zeitreihe der jährlichen Anzahl starker Tiefdruckgebiete im Nordatlantik und in Europa von 1930–1990. Ein Tiefdruckgebiet gilt als stark, wenn der minimale Luftdruck kleiner als 970 hPa ist.<sup>5</sup> Die Abbildung zeigt eine deutliche Zunahme der Häufigkeit dieser starken Tiefdruckgebiete in der betrachteten Zeitperiode.

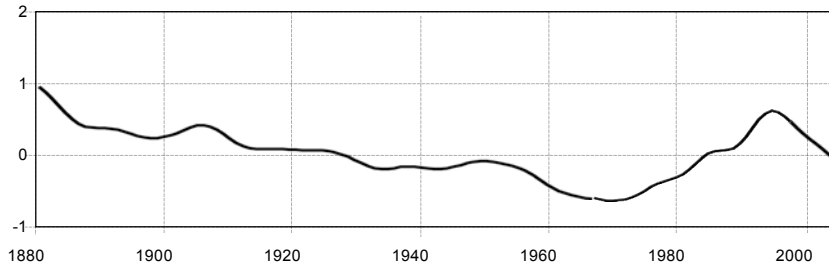
**Extratropical storms in Europe  
Discussion in the early 1990s.**



**Abbildung 49:** Anzahl Sturmtage (mehr) im Winterhalbjahr für Zürich<sup>6</sup> (ergänzt). Die Station Zürich zeigt eine deutliche Zunahme der Anzahl Sturmtage im Winterhalbjahr. Einige umliegende Stationen zeigen ebenfalls eine Zunahme. Ergänzung fehlender Daten v

**Extratropical storms in Europe  
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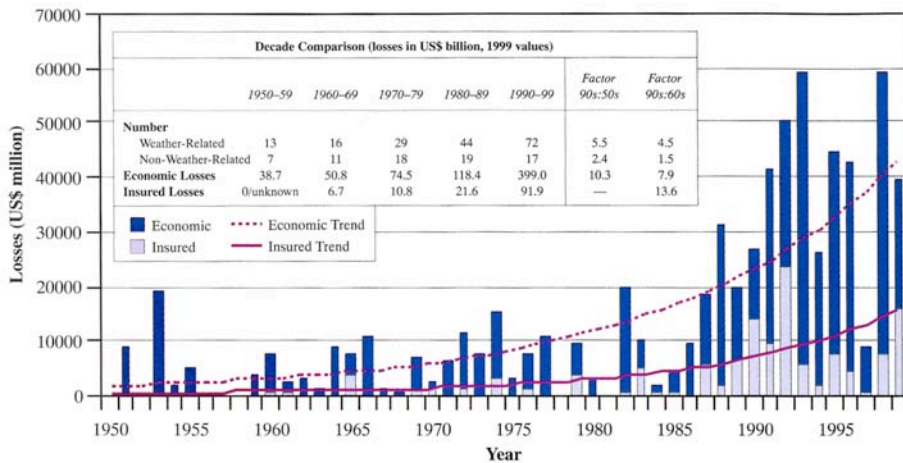
**North Sea: storm intensities**



Date derived from air pressure readings at fixed stations

Alexandersson, SMHI, 2003

**The case of hurricanes  
More violent storms, caused by Global Warming?**

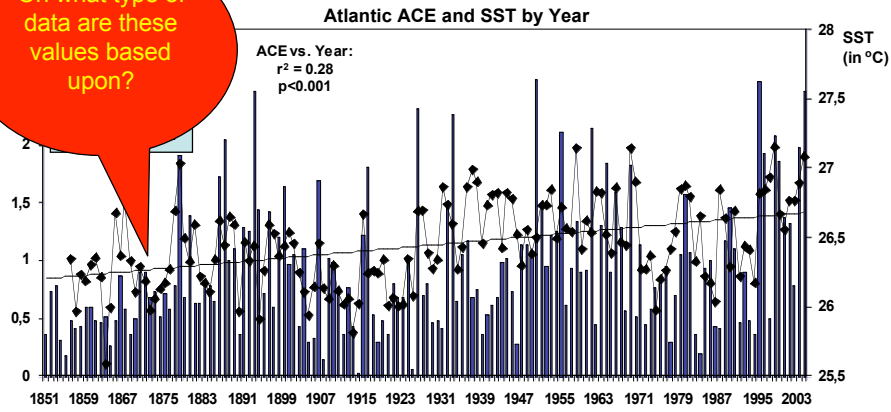


**Figure TS-5:** The costs of catastrophic weather events have exhibited a rapid upward trend in recent decades. Yearly economic losses from large events increased 10.3-fold from US\$4 billion yr<sup>-1</sup> in the 1950s to US\$40 billion yr<sup>-1</sup> in the 1990s (all in 1999 US\$). The insured portion of these losses rose from a negligible level to US\$9.2 billion annually during the same period, and the ratio of premiums to catastrophe losses fell by two-thirds. Notably, costs are larger by a factor of 2 when losses from ordinary, noncatastrophic weather-related events are included. The numbers generally include "captive" self-insurers but not the less-formal types of self-insurance.

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More violent storms, caused by Global Warming?**

**Annual Atlantic ACE and SST Data**

On what type of data are these values based upon?



Note: ACE is sum of squares of wind speed in knots for every 6 hour increment during which storm is at least a tropical storm (and hence is included in HURDAT dataset). ACE is shown here in raw units (in M) and not standardized  
 Note: ACE data from National Hurricane Center's North Atlantic hurricane database (HURDAT)  
 Note: SST data for 1870-2004 on a 1° grid for 6-18N, 20-60W, from Hadley Centre Sea Ice and SST data set (HadISST). SST data for 1856-1869 on a 5° grid for 5-20N, 20-60W from Physical Oceanography Distributed Active Archive Center (PO.DAAC) at the NASA Jet Propulsion Laboratory's GOSTAPLUS data set  
 Note: p-value is on simple linear regression

Trenberth, 2005, pers. comm

**The case of hurricanes  
More violent storms, caused by Global Warming?**

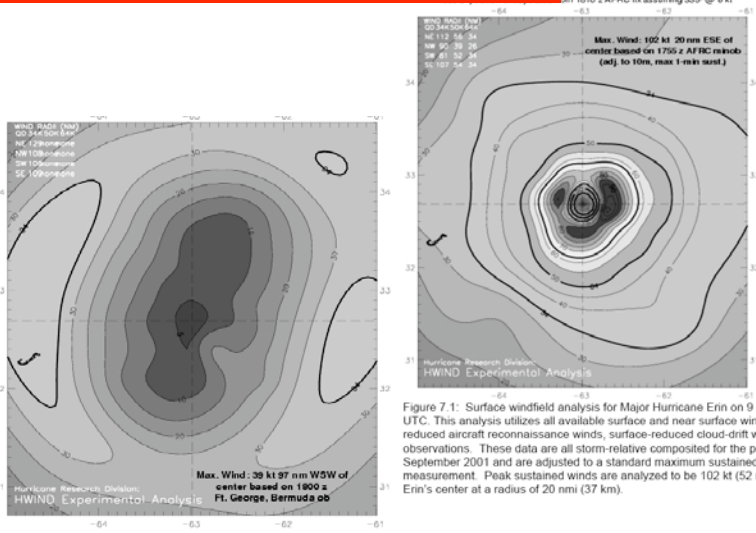
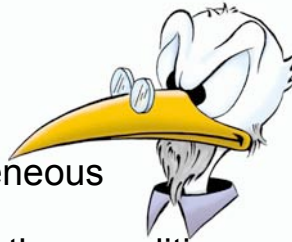


Figure 7.1: Surface windfield analysis for Major Hurricane Erin on 9 September 2001 at 1930 UTC. This analysis utilizes all available surface and near surface wind data including surface-reduced aircraft reconnaissance winds, surface-reduced cloud-drift winds, and ship and buoy observations. These data are all storm-relative composited for the period of 1500 to 1900 UTC, 9 September 2001 and are adjusted to a standard maximum sustained surface (1 min, 10 m) measurement. Peak sustained winds are analyzed to be 102 kt ( $52 \text{ m s}^{-1}$ ) to the east-southeast of Erin's center at a radius of 20 nmi (37 km).

Figure 7.2 Same as Figure 3, but without the benefit of surface-reduced aircraft reconnaissance flight-level winds. In this case, highest analyzed surface winds were only 39 kt ( $20 \text{ m s}^{-1}$ ) based upon observations from Bermuda about 100 nmi (160 km) from Erin's center. Such an analysis is typical of data available before the advent of aircraft reconnaissance data in the mid-1940s and is illustrative of the underestimation bias that occurred for many tropical cyclones during the era of the late 19<sup>th</sup> and early 20<sup>th</sup> Centuries being re-analyzed.

## Conclusion



- History of overselling “inhomogeneous data”
- Typically, better analyses of weather conditions lead to the description of stronger extreme events – which goes along with the detection of trends towards more intense events. This may be true, but can not be separated from the better analyses.
- Multi-year and even multi-decennial trends may be entirely natural of origin. The “detection” of anthropogenic effects requires special statistical “detection”-algorithms.

## Climate Research ...



- is a social process.
- serves social needs of providing explanations for otherwise unexplainable phenomena (in particular: disasters).
- The understanding of “the public needs to be alarmed” leads to unsustainable practice of science, which undermines the role and functioning of science.
- Normative arguments are seeping into public appearance of science, so that science may be perceived as just another form of normatively guided knowledge claim.