

UNIVERSITÄT LEIPZIG

Climate Dynamics (Summer Semester 2019)  
J. Mülmenstädt

Today's Lecture (Lecture 15): The interface between science and society

[Reference](#)

Various, linked from course web page

## 5.5 – The importance of the 2°C warming goal

# Consequences of 4°C warming

World Bank report on 4°C warming:

- ▶ Heat, drought, flood
- ▶ Change relative to variability especially large in the tropics
- ▶ Food insecurity due to drought and ocean acidification

*A 4°C world is so different from the current one that it comes with high uncertainty and new risks that threaten our ability to anticipate and plan for future adaptation needs.*

## Committed climate change

- ▶ Equilibration of the system is slow, so even if CO<sub>2</sub> emissions ceased entirely, warming would continue; equilibrium temperature change for a given CO<sub>2</sub> emissions total is called the “committed warming”
- ▶ Especially large effect for committed sea-level rise

# Origin of the 2°C warming goal

## Why 2°C?

United Nations Framework Convention on Climate Change: stabilize atmospheric composition at a level avoiding “dangerous anthropogenic interference” with climate.

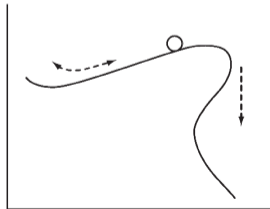
Originated (Nordhaus, 1975) as historical-temperature argument:

*As a first approximation, it seems reasonable to argue that the climatic effects of carbon dioxide should be kept within the normal range of long-term climatic variation. According to most sources the range of variation between distinct climatic regimes is in the order of  $\pm 5^{\circ}\text{C}$ , and at the present time the global climate is at the high end of this range. If there were global temperatures more than 2 or 3°C above the current average temperature, this would take the climate outside of the range of observations which have been made over the last several hundred thousand years.”*

Three views on the 2°C goal (Jaeger and Jaeger, 2011):

1. Catastrophe view sees it as the threshold separating a domain of safety from a domain of catastrophe

Contrary view: more than 1.5°C is already dangerous (Hansen et al., 2007) based on sea-level rise < 2 m



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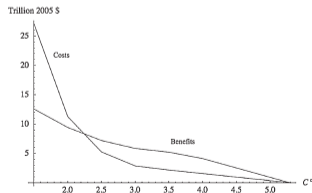
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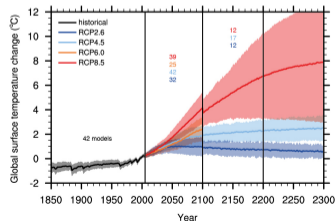
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1. Catastrophe view sees it as the threshold separating a domain of safety from a domain of catastrophe
2. Cost-benefit view sees it as a strategy to optimize the relation between the costs and benefits of climate policy
3. Focal point view sees it as a solution to a complex coordination problem.

Contrary view: more than 1.5°C is already dangerous (Hansen et al., 2007) based on sea-level rise < 2 m



## Can we do what needs to be done?

- ▶ At some point, the committed climate change becomes too great to achieve the 2°C goal
- ▶ What this point is, measured in accumulated emissions, is uncertain (due to uncertainty on the feedback parameter) – we could be “lucky” or “unlucky”
- ▶ As previous “deadlines” for emissions reductions have passed without climate action, the deadline has moved (2015→2020→2030), but the assumptions (sharp emissions dropoff, negative emissions through biofuels with CCS) become less realistic
- ▶ Cynical view: for policy makers, it is more important to be seen attacking problems than actually solving them
- ▶ “Evidence-based policy making ” → “policy-based evidence making”?



## “Unburnable carbon” and stranded assets

*No more than one-third of proven reserves of fossil fuels can be consumed prior to 2050 if the world is to achieve the 2° C goal, unless carbon capture and storage (CCS) technology is widely deployed.*

This means leaving money in the ground. . .

# Research or advocacy – a false dichotomy?

## The myth of the dispassionate scientist

In this world view, the scientists deliver the scientific evidence to society; it is then the job of the policy makers to make cost–benefit tradeoffs and respond to the threat

## If you see something, say something

But what happens if the policy makers do not do their job?

- ▶ If you are a government scientist, can you campaign against your government?
- ▶ Can you get arrested at protests?
- ▶ What is legal?
- ▶ What is ethical?

## 5.6 – “Skepticism” and how to respond to it

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What does *skepticism* mean? Actual meaning is not believing claims that are not substantiated by a convincing argument; in this sense, scientists are the biggest skeptics, in the pursuit of the scientific method: attempting to falsify hypotheses. The result of this form of skepticism is overwhelmingly consistent with the global-warming consensus (and forms the basis of the global-warming consensus).

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### What is “*skepticism*”?

“*Skepticism*” means deliberately creating the impression of uncertainty where none exists. People who call themselves “skeptics” do not seek to find scientific truth, but rather to sow doubt to impede action on climate change.

- ▶ What is “skepticism” meant to accomplish?
- ▶ How is “skepticism” propagated?
- ▶ Why does it work?

# Brief history of climate change denial – what motivates the deniers?

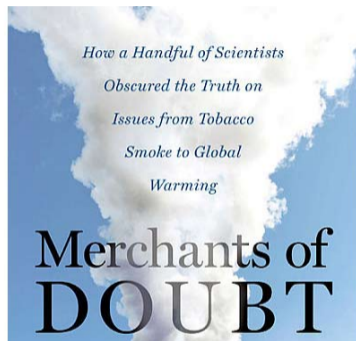
## What do these issues have in common?

- ▶ Ozone hole
- ▶ Cancer from smoking and from secondhand smoke
- ▶ Acid rain
- ▶ Global warming

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- ▶ Global warming
- ▶ **Communism!**



## The three tiers of denialism

1. Claim there is no warming
2. Claim it's not anthropogenic
3. Claim the cost to do anything is prohibitive

The same denier can make multiple of these claims, even in the same conversation.

**Remember: the end goal is not to come up with scientific truth, but to sow doubt**



## Some methods of deniers – how is “skepticism” propagated?

- ▶ deliberate misinterpretation of “uncertainty” (somewhat related: deliberate misinterpretation of the role of climate models)
- ▶ straw-man arguments
- ▶ made-up numbers
- ▶ intimidation, criminal activity
- ▶ cherrypicking
- ▶ projecting (scientists are corrupt and lie for money)

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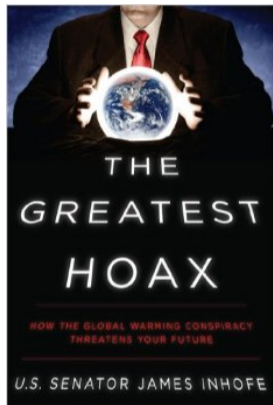
# Why does denialism work?

Psychology:

- ▶ distrust of scientific authority
- ▶ anecdotal over statistical
- ▶ emotional versus rational
- ▶ confrontation with conflicting evidence only deepens mistaken belief

Press is complicit because of journalistic concept of “balance” (and because of the quality of science journalism)

## Expert consensus, policy makers and the public – three sad examples

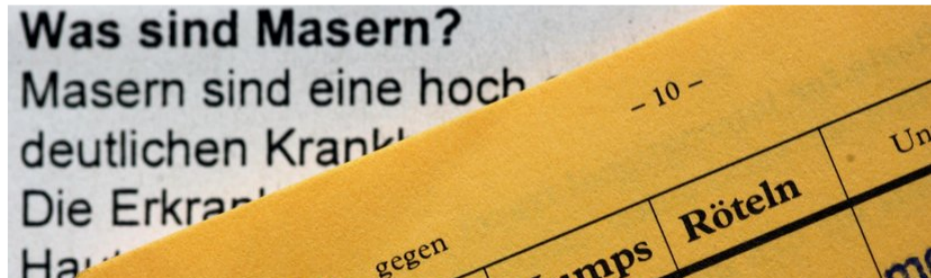




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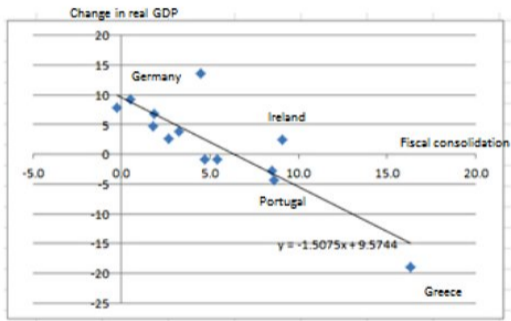
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## Berlin bekommt die Masernwelle nicht in den Griff



# Expert consensus, policy makers and the public – three sad examples

Austerity in the euro area, 2009-2013



The New York Times | <http://nyti.ms/1CMW85d>

The Opinion Pages | OP-ED CONTRIBUTOR

## Wolfgang Schäuble on German Priorities and Eurozone Myths

By WOLFGANG SCHÄUBLE | APRIL 15, 2015

BERLIN — The annual spring meetings of the International Monetary Fund and the World Bank begin on Friday in Washington. I'm looking forward to them, even if the discussion in recent years has seemed, to some commentators, a bit too well-rehearsed to provoke much discussion or thought outside of the usual comfort zones.

The fact that the immediate sting of the global financial crisis has faded in much of the world has probably contributed to this complacency. Unfortunately, however, the world economy is not yet out of the woods. It still faces very concrete challenges. We are as badly as ever in need of a common understanding of what needs to be done.

The financial crisis broke out seven years ago and led many countries into an economic and debt crisis. A pervasive set of myths — that the European response to the crisis has been ineffective at best, or even counterproductive — is simply not accurate. There is strong evidence that Europe is indeed on the right track in addressing the impact, and, most importantly, the causes of the crisis. Let me run through some of these myths.

First, it has often been said that German insistence on fiscal austerity meant that Germany, the largest economy in the European Union, has “punched below its weight” — and thereby pushed the eurozone more deeply into crisis — by not stimulating more demand. This misses the point. As in medicine, to prescribe the right treatment it is

## So what can we do?

- ▶ Persuade the persuadables – <https://skepticalscience.com>
- ▶ Make climate change a moral issue
- ▶ Democracy...