

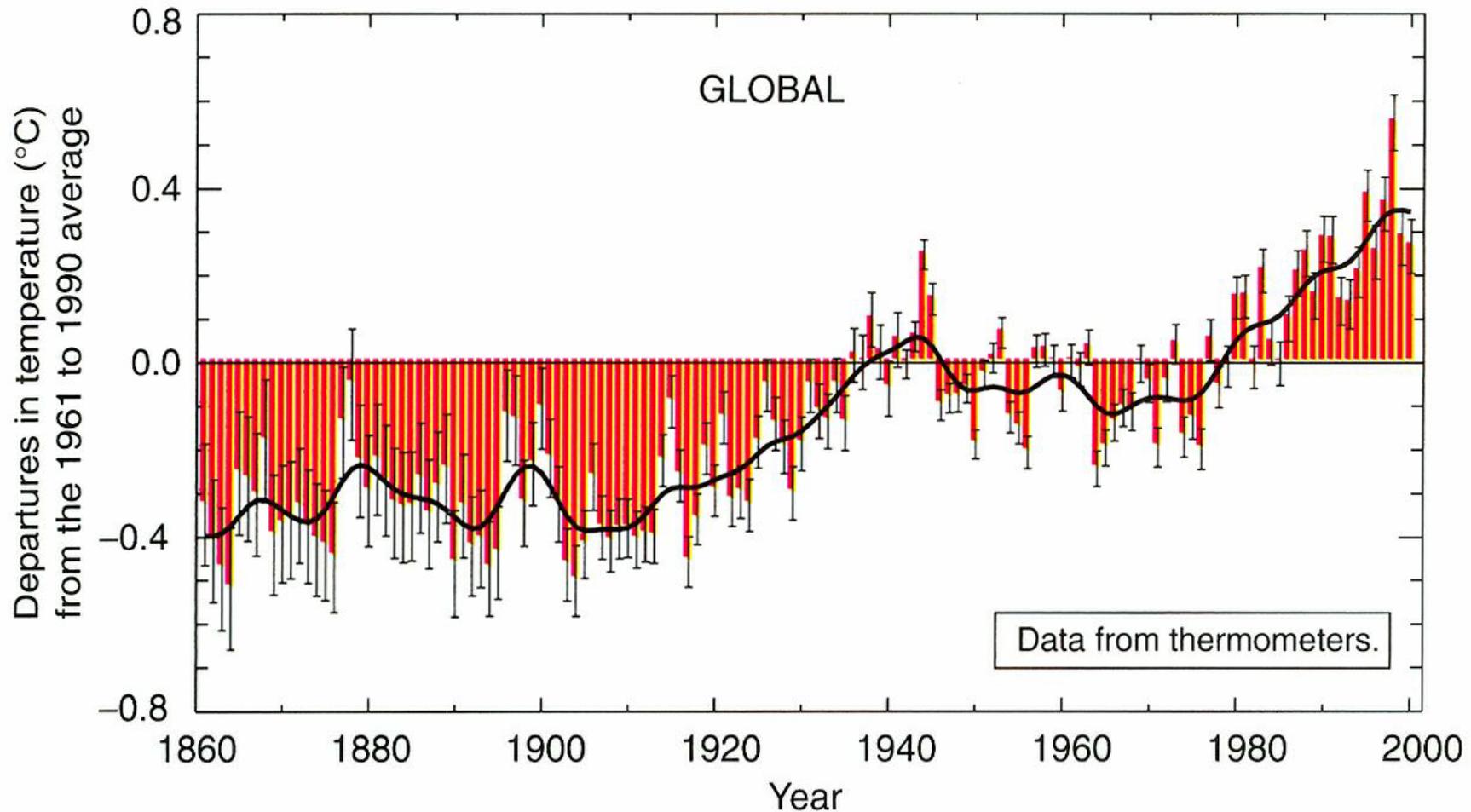
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# Regional climate service in a postnormal context

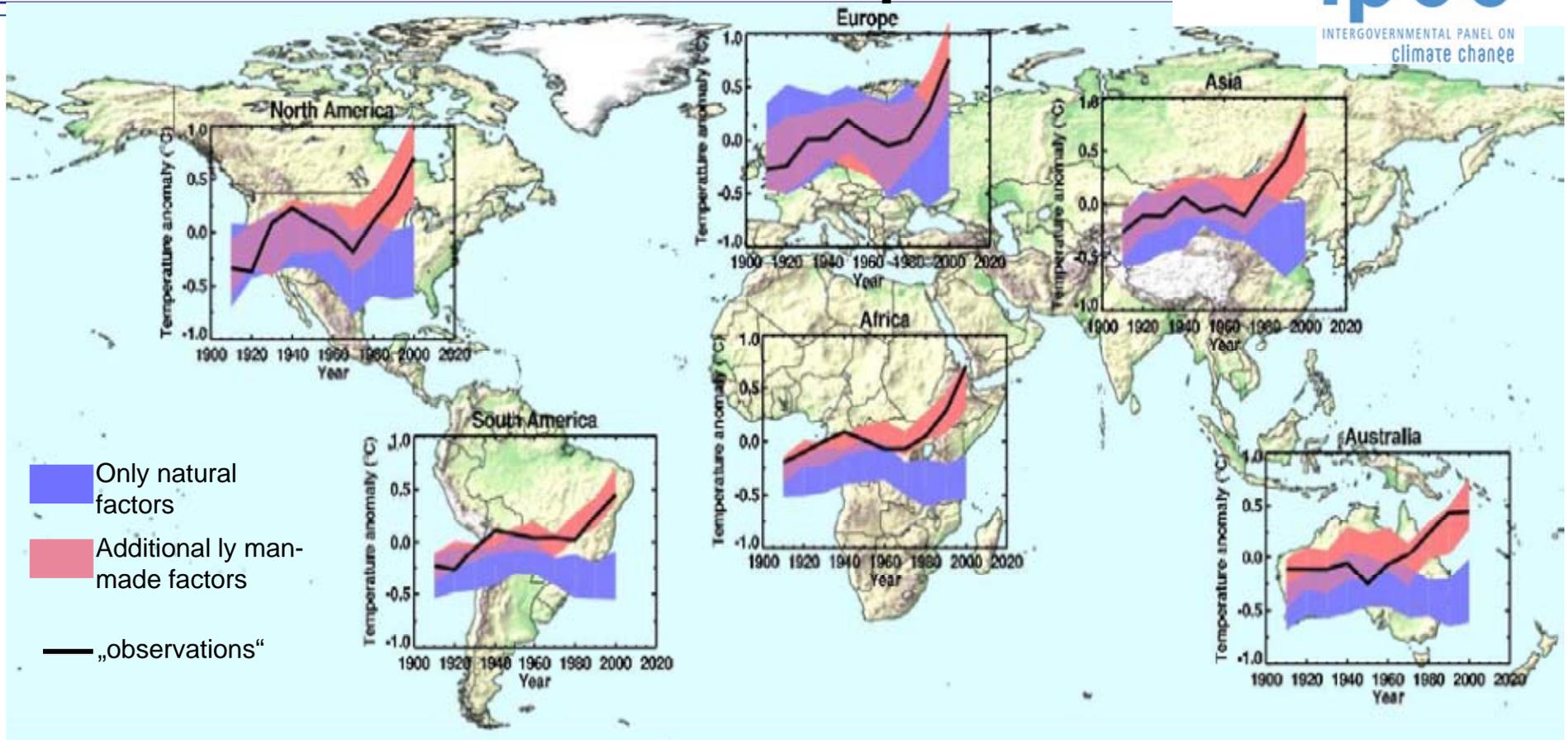
**Hans von Storch**

*Institute of Coastal Research, Helmholtz Zentrum Geesthacht,  
KlimaCampus, University of Hamburg, Hamburg, Germany*

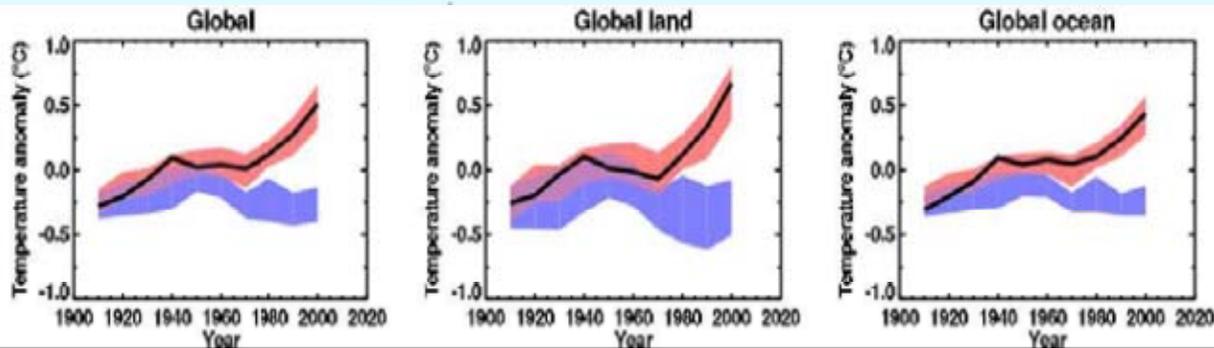
# Global temperature derived from thermometer data (CRU)



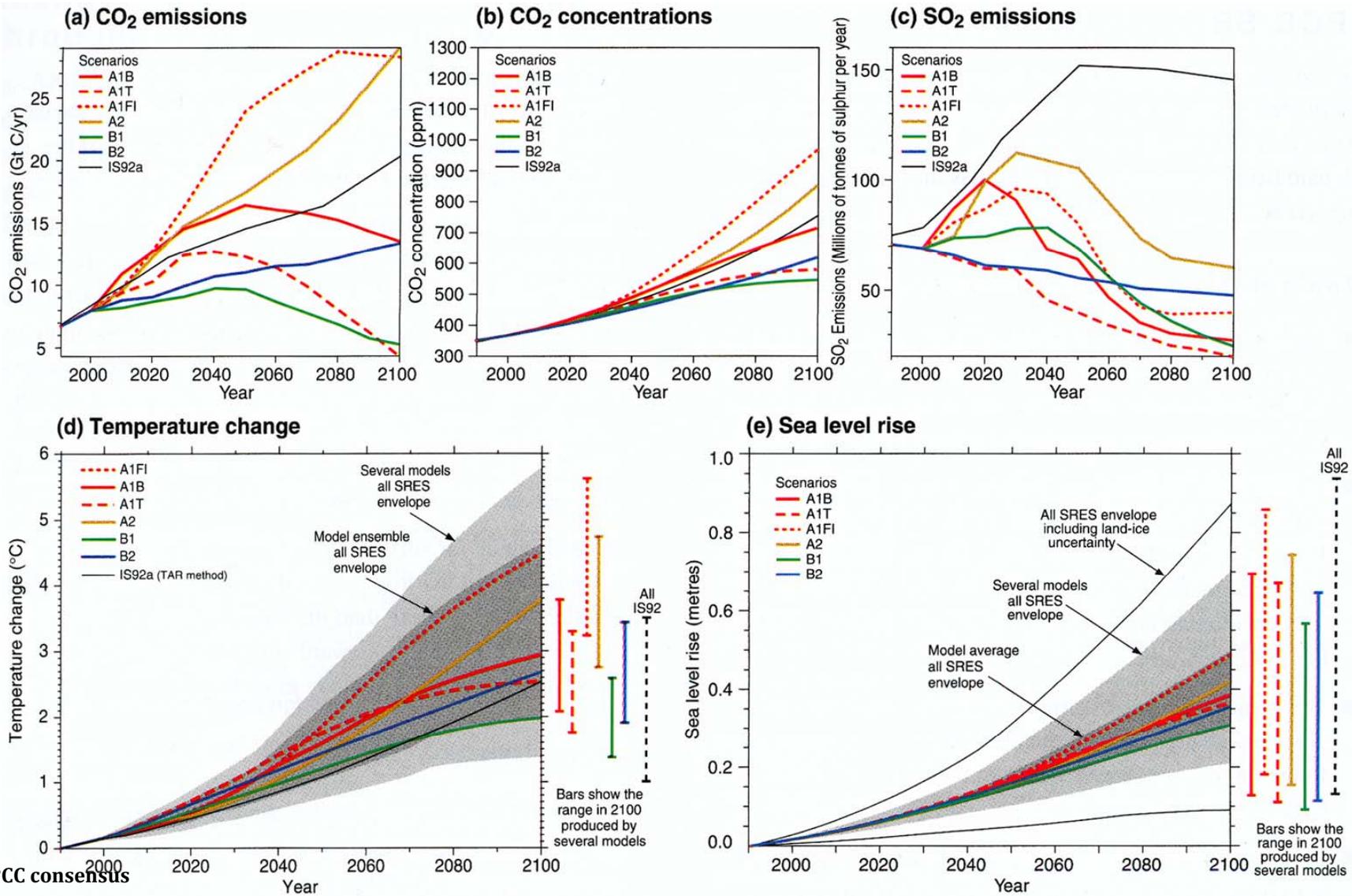
# Explaining global mean surface air temperature



■ Only natural factors  
■ Additionally man-made factors  
— „observations“



# Scenarios, not predictions



The IPCC consensus

- is needed as an impartial institution to provide relevant knowledge for decision makers.
- has documented strong consensual evidence that both the human emissions of greenhouse gases (GHG) as well as the air temperature in the past and foreseeable future has and will continue to increase.
- most of this warming can not be explained without the increase in GHG concentrations – with the present knowledge.

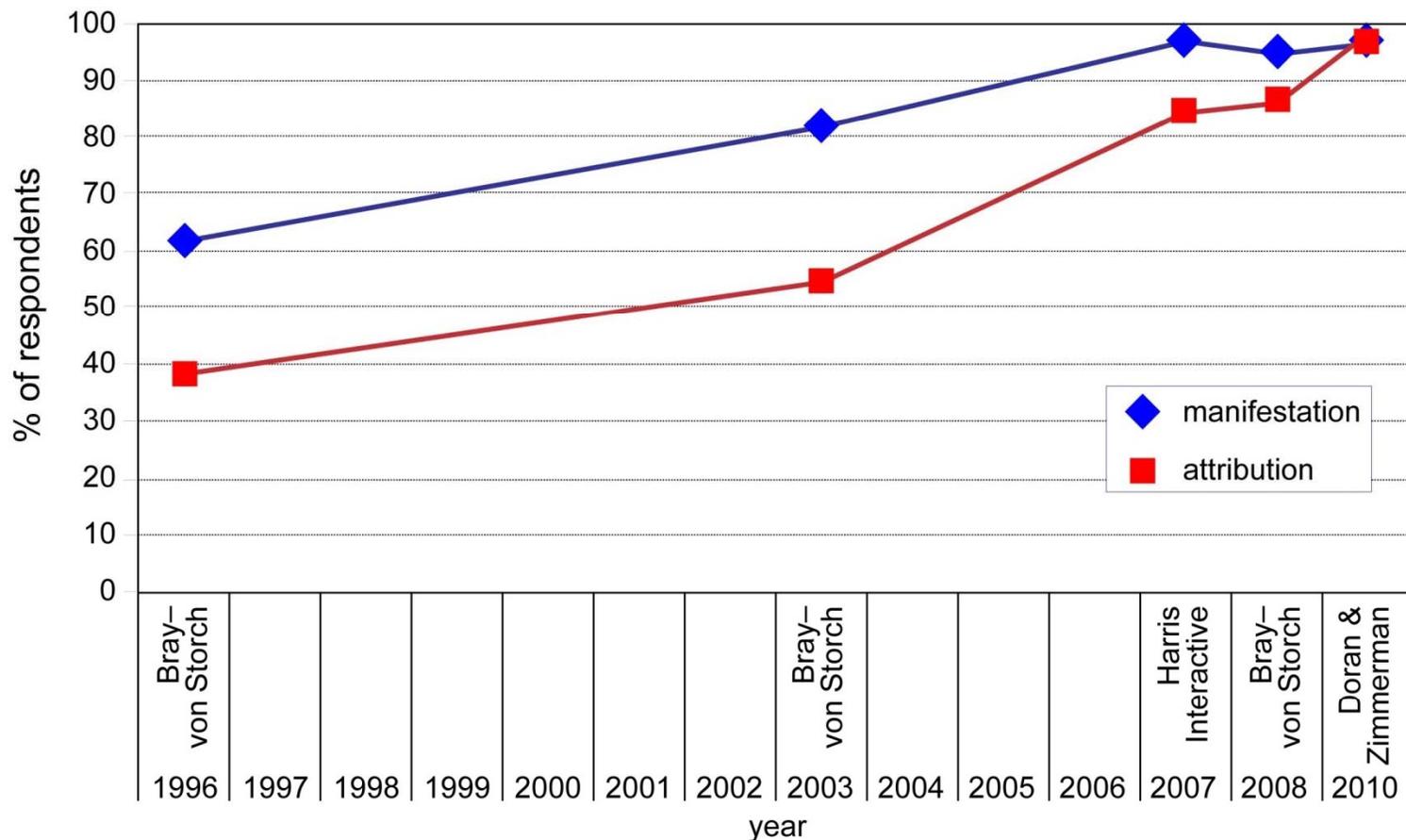
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This does not mean  
that „the“ science is settled  
but merely that „some“ science is settled.

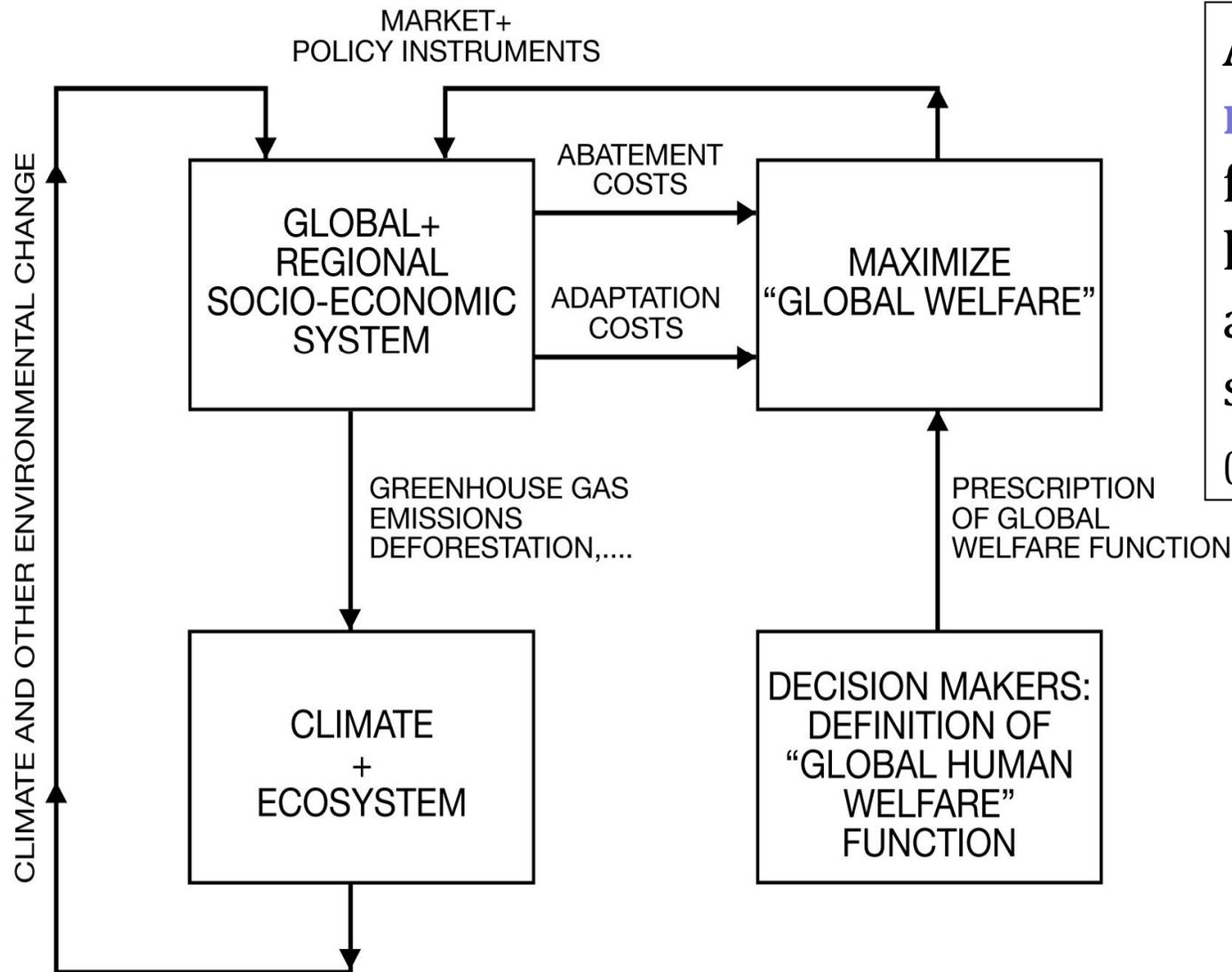
Issues like

- changing statistics of tropical storms
  - rise of sea level
  - fate of ice bears
  - frequency of kidney stones, and
  - frequency of depressions among humans
- are not “settled”.

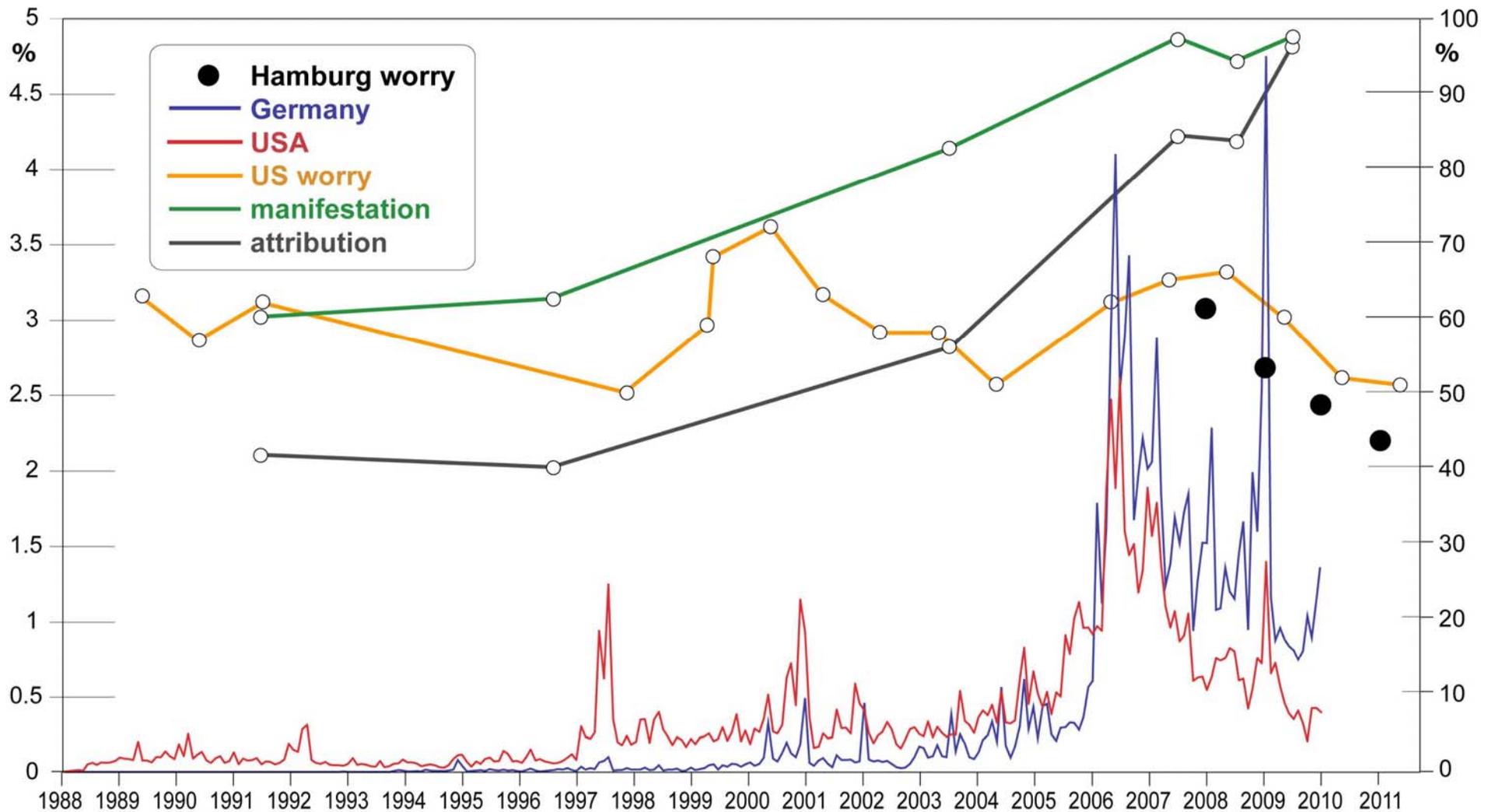
Increasing level of consensus among scientists that climate change is underway (manifestation) and that it is likely a result of anthropogenic influences (attribution)



Bray, 2010



A „**linear model**“-  
framework of  
how to think  
about response  
strategies  
(Hasselmann, 1990)



Increasing level of consensus among scientists that climate change is underway (manifestation) and that it is likely a result of anthropogenic influences (attribution), but increased scepticism among lay people (not only in the US)

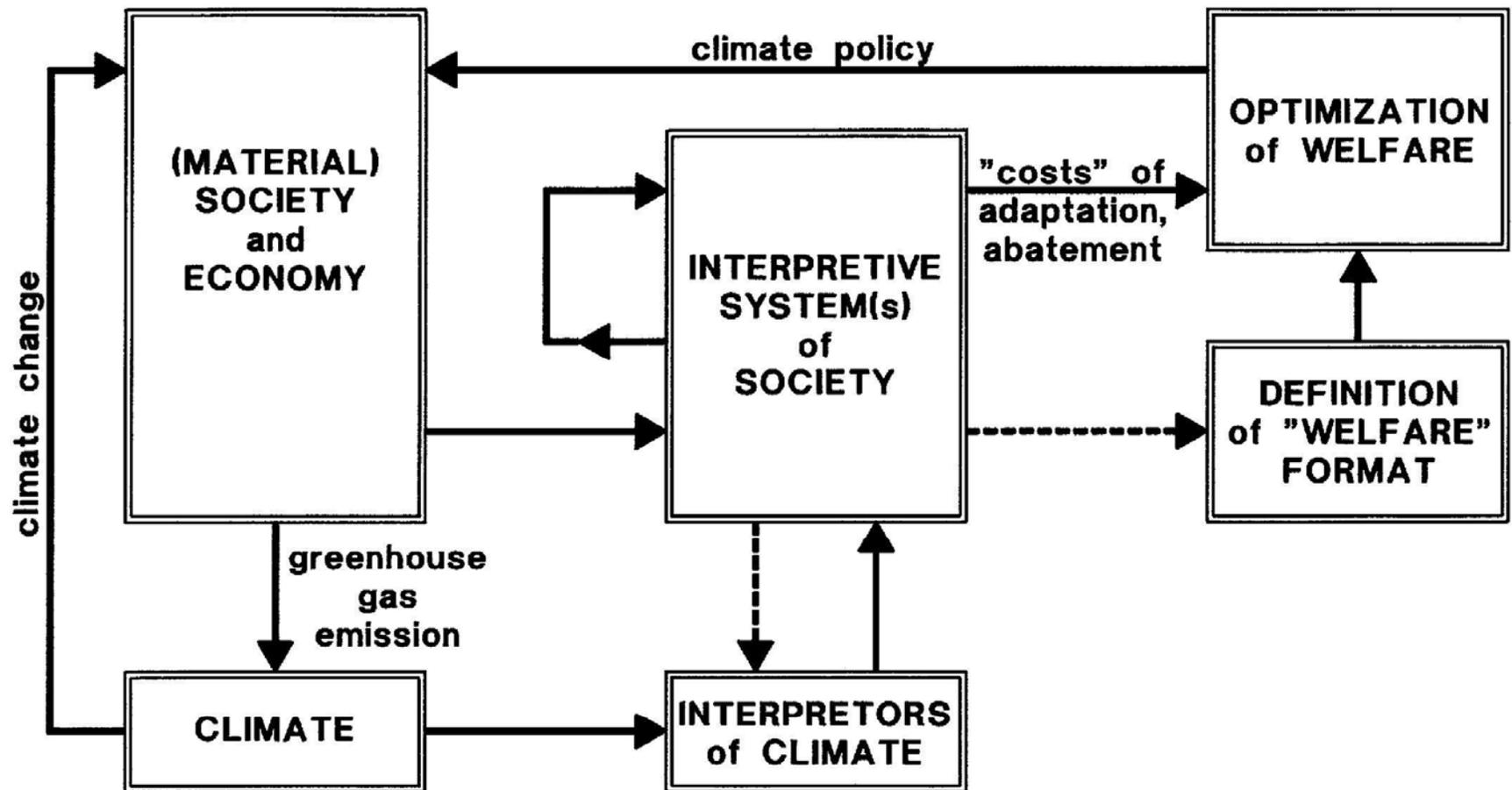
- Climate *change* is a „constructed“ issue. People hardly experience „climate change“.
- One construction is scientific, i.e. an „objective“ analysis of observations and interpretation by theories.
- The other construction is cultural, in particular maintained and transformed by the public media.
- Climate science is in a post-normal phase (where interest-led utility is a significant driver, and less so “normal” curiosity)

Jerry Ravetz, Silvio Funtovicz, 1986 and earlier

State of science, when *facts uncertain, values in dispute, stakes high and decisions urgent.*

**In this state, science is not done for reasons for curiosity but is asked for as support for preconceived value-based agendas.**

# Is scientific knowledge driving the policy process?

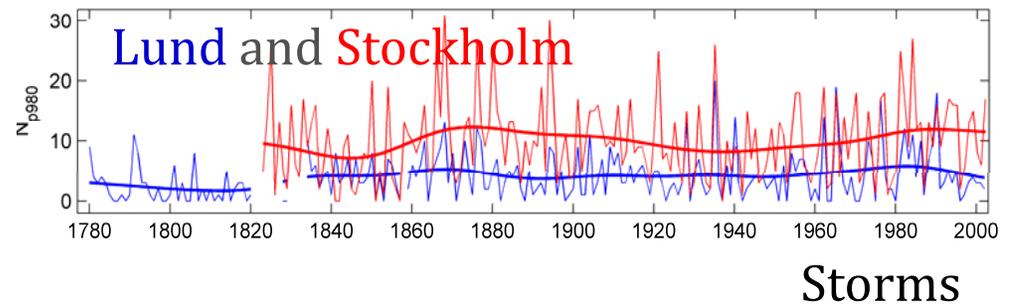
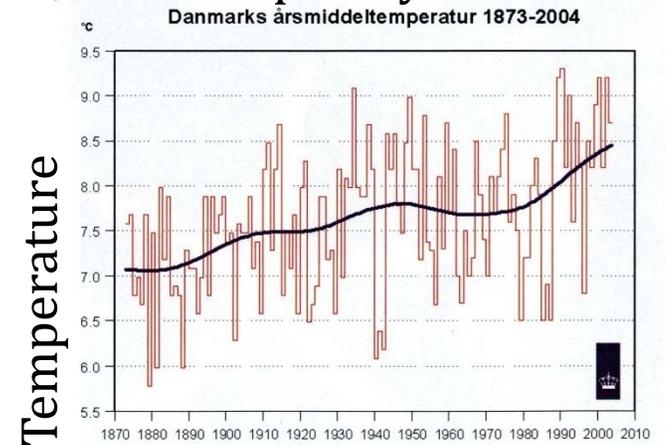


# Two different construction of „climate change“ – scientific and cultural – which is more powerful?



Cultural: „Klimakatastrophe“

Scientific: man-made change is real, can be mitigated to some extent but not completely avoided





Ovädret lamslår stora områden i Europa. I Prag evakueras 50 000 människor i de centrala delarna av staden. I Sverige pratar folk om den "onormalt varma sommaren". Samtidigt sprider sig oron för att det dramatiska vädret beror på växthuseffekten.

# Naturen slår tillbaka våldsamt

**DE HÄFTIGA REGNEN** och de förödande översvämningarna i dess spår stämmer precis med vad den förstärkta växthuseffekten ska resultera i. Den sköna värmen denna och flera andra somrar de senaste tio åren passar också som hand i hand i forskarnas modeller för en pågående klimatförändring. Men detta är ändå inga säkra bevis på att växthuseffekten orsakat sommarens katastrofer. Regnen på vårt klot har alltid varit mer eller mindre våldsamma. Revolutionsåret 1789 fick till exempel Östlandet i

Norge ta emot häftiga regn som saknar sitt motstycke i modern tid. En del av oss minns somrar på 1950-talet som känns helt i klass med årets. Men extremt väder har väl ändå blivit vanligare? –Det finns ingen statistik som visar att häftiga regn, stormar och andra extrema vädersituationer blivit vanligare, svarar man på SMHI. Det är alltså inte i vad vi själva ser och minns vi kan finna stöd för att dagens våldsamma väder är en följd av klimatförändringen. Men det finns, inte

**Analys/Lars-Ingmar Karlsson**



**"De ökande utsläppen av koldioxid och andra växthusgaser lägger sig kring jorden som ett våtvarmt omslag."**

minst i rapporterna från IPCC, den forskarspäckade klimatpanelen i FN:s regi: • Snötäcket på norra halvklotet har minskat med tio procent sedan slutet av 1960-talet. • Havsytan kring Arktis längst i norr krymper liksom världens mindre glaciärer. • Havsytan har stigit med en till två decimeter under 1900-talet. **FÖR ETT PAR VECKOR** sedan kom en färsk brittisk forskarrapport om att det första halvåret i år varit det varmaste sedan mitten av 1800-talet på norra halvklotet. –Det finns inget som talar

emot att klimatet håller på att förändras, säger Markku Rummuainen, chef för det svenska klimatprojektet Sweclim. Det är så långt som forskarna vill gå när det gäller "bevisen" om att deras modeller om växthuseffekten stämmer. Men i praktiken är de flesta klimatforskare tämligen säkra på att de ökande utsläppen av koldioxid och andra växthusgaser lägger sig kring jorden som ett våtvarmt omslag. Och att de här gaserna förstärker våldsamma regn, stormar, torkar och andra mer ex-

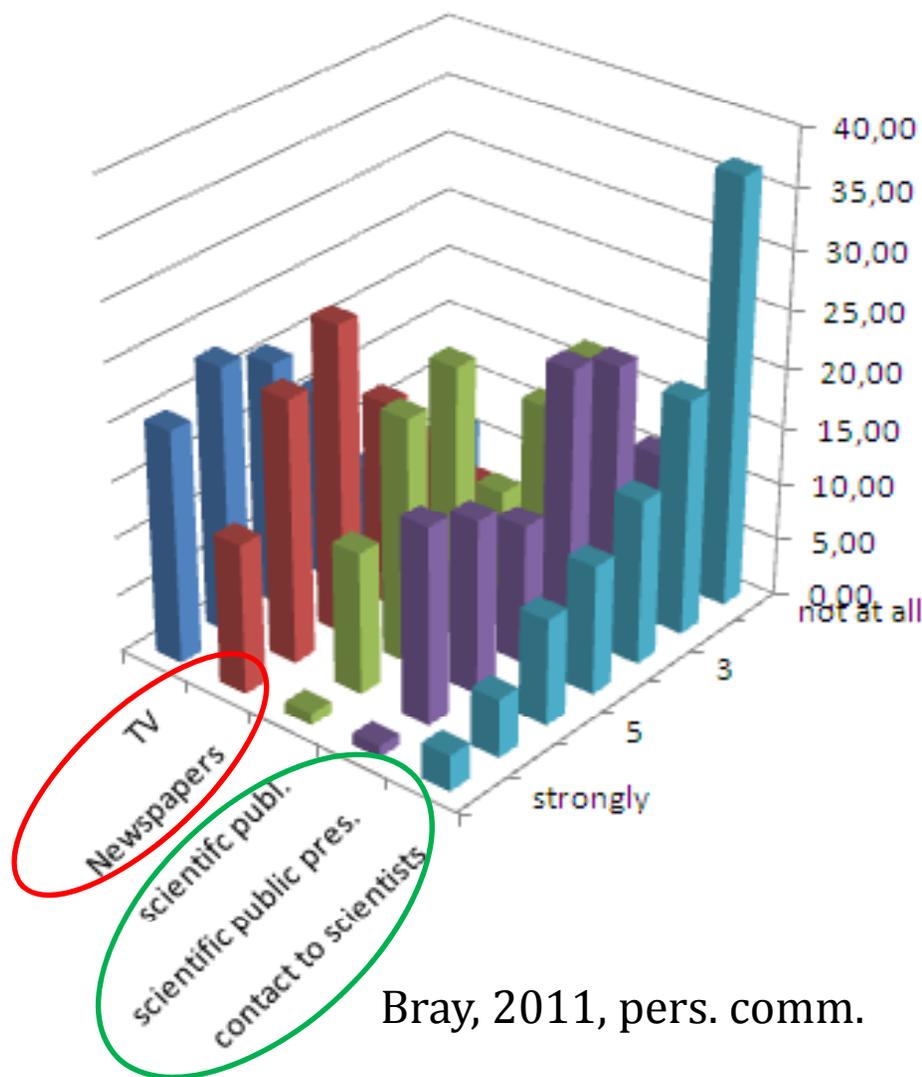
trema vädersituationer med katastrofala följder för dem som drabbas. Forskarnas modeller har accepterats av allt fler. Inte ens den amerikanske presidenten George W Bush lägger ner någon stor energi på att ifrågasätta klimatförändringen. **TROTS ATT TECKNEN** hopar sig på att vi själva och vårt sätt att leva är orsak till klimatförändringen och dess förödande följder – där Tjeckien kan vara ett exempel – är problemen långt ifrån lösta.

Alla länder utom USA har nu mer eller mindre frivilligt gått med på att begränsa sina utsläpp enligt klimatavtalet från Kyoto 1997. Att minska koldioxidutsläppen upplevs alltid av något land som alltför stora uppoffringar. I den tyska valrörelsen har både inrikesministern Otto Schily och miljöministern Jürgen Trittin påpekat behovet av skydda miljön. Så konkret brukar sällan klimatförändringen behandlas i ett val.   
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How strongly do you employ the following sources of information, for deciding about issues related to climate adaptation?

Regional administrators in German Baltic Sea coastal regions.



Bray, 2011, pers. comm.

- The science-policy/public interaction is not an issue of the linear model of „knowledge speaks to power“.
- The problem is not that the public is stupid or uneducated.
- Science has failed to respond to legitimate public questions and has instead requested. “Trust us, we are scientists”.
- The problem is that the scientific knowledge is confronted on the „explanation market“ with other forms of knowledge. Scientific knowledge does not necessarily “win” this competition.
- Non-sustainable claims-making by climate change (stealth) advocates to the public has lead to fatigue.
- Overselling goes with loss of “capital” of science, namely public trust.

# Regional Climate service comprises ...

1. Analysis of *cultural construct*, including common exaggeration in the media.
  - Determination of *response options* on the local and regional scale: mainly adaptation but also regional and local mitigation.
  - *Dialogue* of stakeholders and climate knowledge brokers in „Klimabureaus“.
2. Analysis of *consensus* and *dissensus* on relevant issues (climate consensus reports).
3. Description of *recent and present changes*.
  - Projection of *possible future* changes, which are dynamically consistent and possible („scenarios“)



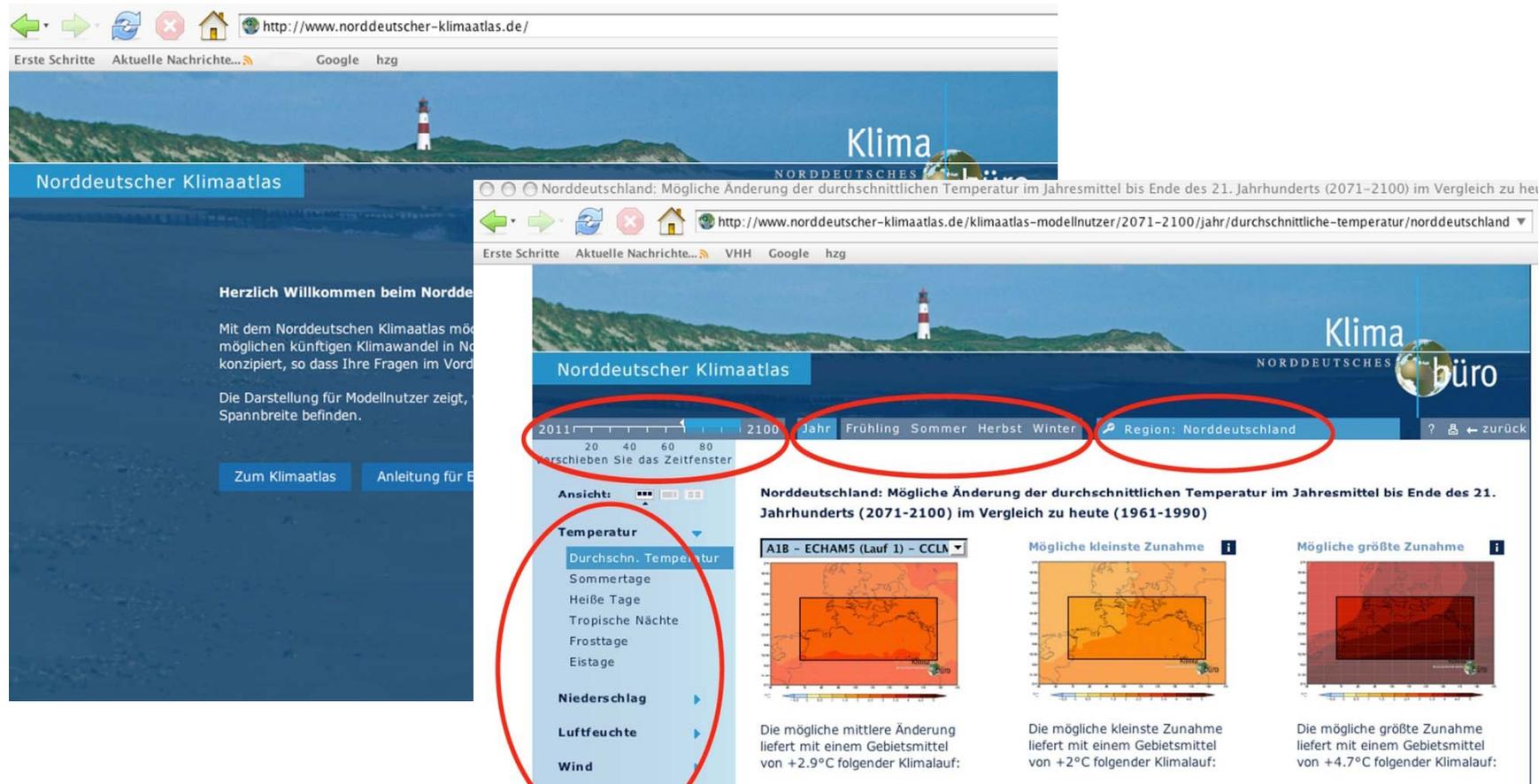
An institution set up to enable **communication** between science and stakeholders

- that is: making sure that science understands the **questions and concerns** of a variety of stakeholders
- that is: making sure that the stakeholders understand the **scientific assessments** and their **limits**.



**Typical stakeholders:**

Coastal defense, agriculture, off-shore activities (energy), tourism, water management, fisheries, urban planning



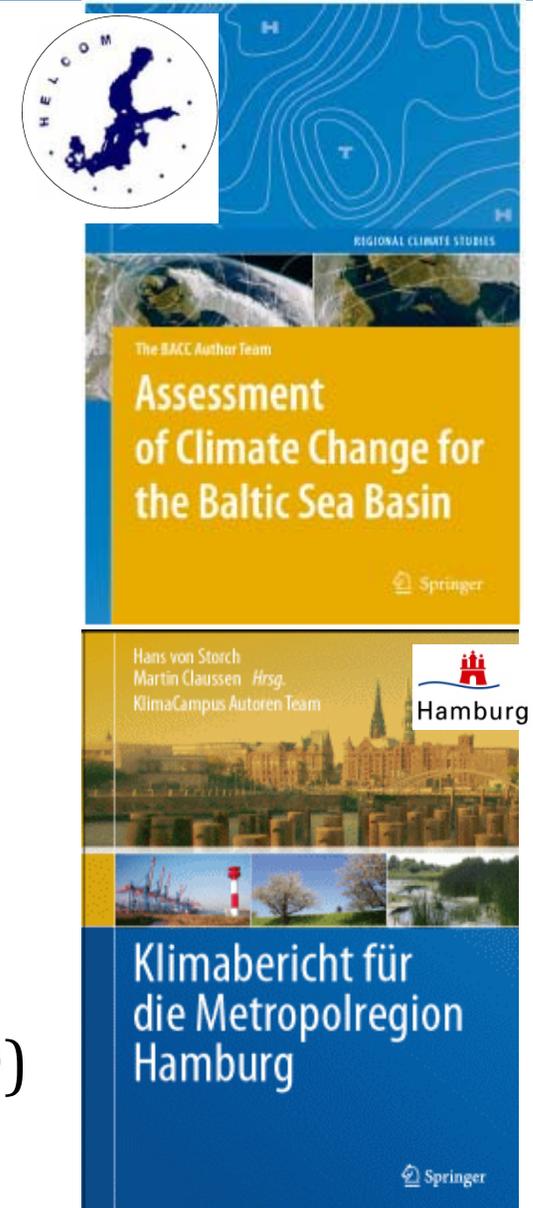
- Raw data from 12 regional climate projections
- Analyzed for Northern Germany
- Interactive user interface

## Assessments of knowledge about regional climate change

- for the recent past (200 years), for present change and possible future change
- consensus of what is scientifically documented
- documentation of contested issues.

for

- + Baltic Sea (BACC) – BACC 1 done in 2008, BACC 2 launched
- + Hamburg region (published November 2010)
- + North Sea (launched)



### The CoastDat data set:

- Long (60 years) and high-resolution reconstructions of recent offshore and coastal conditions mainly in terms of wind, storms, waves, surges and currents and other variables in N Europe
- Scenarios (100 years) of possible consistent futures of coastal and offshore conditions
- extensions – ecological variables, Baltic Sea, E Asia, Laptev Sea

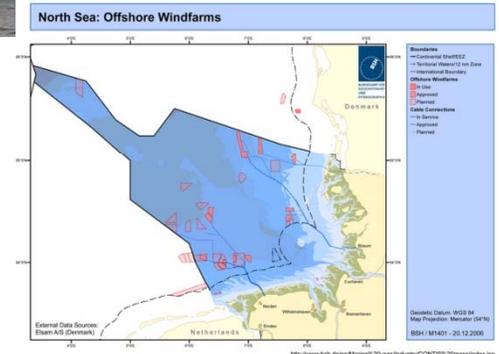
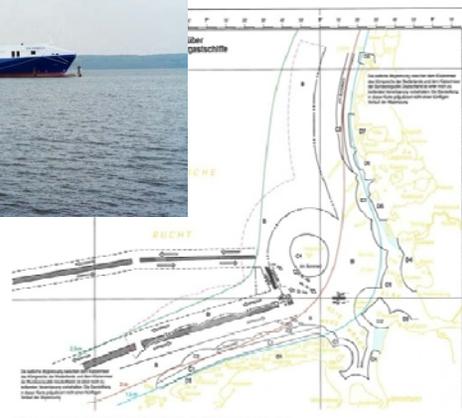
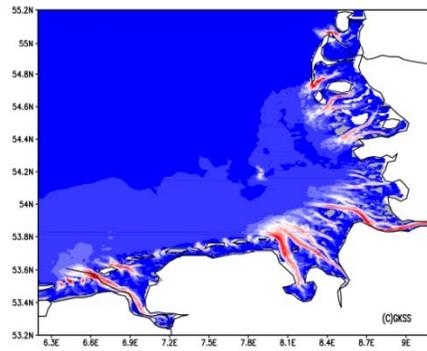
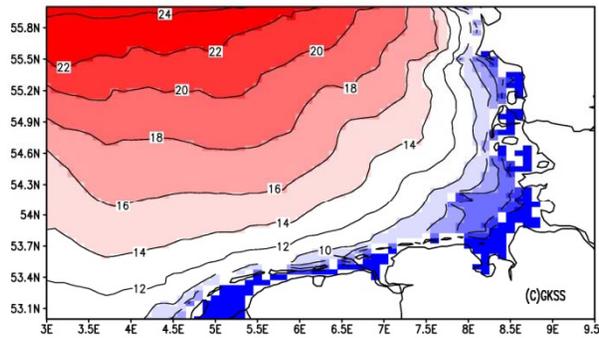
### Clients:

- Governmental: various coastal agencies dealing with coastal defense and coastal traffic
- Companies: assessments of risks (ship and offshore building and operations) and opportunities (wind energy)
- General public / media: explanations of causes of change; perspectives and options of change

[www.coastdat.de](http://www.coastdat.de)

# Some applications of

- Ship design
- Navigational safety
- Offshore wind
- Interpretation of measurements
- Oils spill risk and chronic oil pollution
- Ocean energy
- Scenarios of storm surge conditions
- Scenarios of future wave conditions



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- One construction is scientific, i.e. an „objective“ analysis of observations and interpretation by theories.
- The other construction is cultural, in particular maintained and transformed by the public media.
- Climate science operates in a post-normal situation, which goes along with a tendency of politicizing science, and scientizing politics. Cultural science need to support climate science to deal with this challenge.
- The cultural and scientific constructions mix.
- The utility of scientific assertions in the political arena compete with their accuracy.

- Climate Science needs to offer “Climate Service”, which includes the establishment of a dialogue with the public (direct or via media) and stakeholders –*recognizing the socio-cultural dynamics of the issue.*
- Climate service must take into account competing alternative knowledge claims.
- Climate Service should adhere to the principle of sustainability – building trust by avoiding overselling and being explicit in spelling out contested issues.
- Also precise language should be used, no more “*the science is settled*”, no cavalier usage of the term “*predictions*”, when “*projections*” are meant.