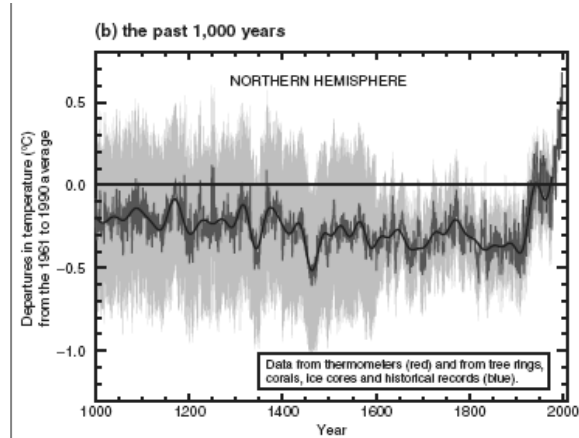
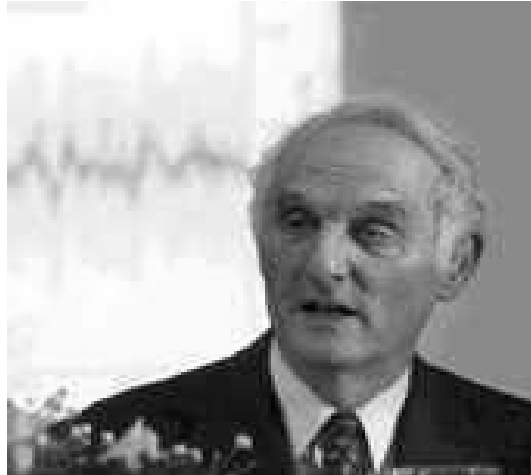


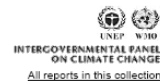
Certainty, uncertainty, and precaution

- Hockeystick Headlines
- Uncertainty in many guises
- Precaution in the face of uncertainty
- A personal perspective





Climate Change 2001



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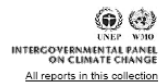
Documents 1 - 20 of 37 matches: (more *'s indicate a better match)

Climate Change 2001: Mitigation☆☆☆☆

... notes that proven reserves of oil are "generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions" (BP, 1999). Resources, therefore, are hydrocarbon ...

http://www.grida.no/climate/ipcc_tar/wg3/124.htm 2003-02-05, 18351 bytes

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Climate Change 2001: Working Group II: Impacts, Adaptation and Vulnerability Get Javascript Other reports in this collection 2.5.4. The Cost of Uncertainty This section reviews the primary methods for incorporating uncertainty into analyses of climate impacts. Here we look at how to judge the cost ...

http://www.grida.no/climate/ipcc_tar/wg2/098.htm 2003-02-05, 5807 bytes

Sources of uncertainty:

- Lack of information
- Misinformation
 - Biases, data errors
- Lack of knowledge: Processes, Feedbacks
- Lack of judgment
- Inherent unpredictability of complex systems

Table 1. A simple typology of uncertainties

Type	Indicative examples of sources	Typical approaches or considerations
Unpredictability	Projections of human behaviour not easily amenable to prediction (e.g. evolution of political systems). Chaotic components of complex systems.	Use of scenarios spanning a plausible range, clearly stating assumptions, limits considered, and subjective judgments. Ranges from ensembles of model runs.
Structural uncertainty e.g. methane	Inadequate models, incomplete or competing conceptual frameworks, lack of agreement on model structure, ambiguous system boundaries or definitions, significant processes or relationships wrongly specified or not considered.	Specify assumptions and system definitions clearly, compare models with observations for a range of conditions, assess maturity of the underlying science and degree to which understanding is based on fundamental concepts tested in other areas.
Value uncertainty	Missing, inaccurate or non-representative data, inappropriate spatial or temporal resolution, poorly known or changing model parameters.	Analysis of statistical properties of sets of values (observations, model ensemble results, etc); bootstrap and hierarchical statistical tests; comparison of models with observations.

Ref: IPCC: <http://www.ipcc.ch/activity/uncertaintyguidancenote.pdf>

Lack of data – spatial bias/incomplete coverage

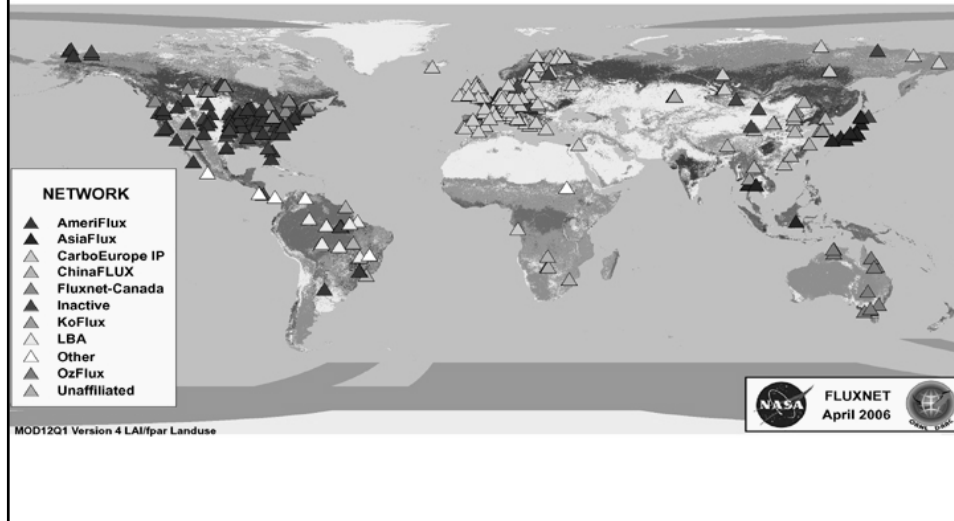


Table 2. Qualitatively defined levels of understanding

Level of agreement or consensus ↑	<i>High agreement limited evidence</i>	...	<i>High agreement much evidence</i>

	<i>Low agreement limited evidence</i>	...	<i>Low agreement much evidence</i>
	Amount of evidence (theory, observations, models) →		

Ref: IPCC: <http://www.ipcc.ch/activity/uncertaintyguidancenote.pdf>

Table 3. Quantitatively calibrated levels of confidence.

Terminology	Degree of confidence in being correct
<i>Very High confidence</i>	At least 9 out of 10 chance of being correct
<i>High confidence</i>	About 8 out of 10 chance
<i>Medium confidence</i>	About 5 out of 10 chance
<i>Low confidence</i>	About 2 out of 10 chance
<i>Very low confidence</i>	Less than 1 out of 10 chance

Ref: IPCC: <http://www.ipcc.ch/activity/uncertaintyguidancenote.pdf>

- The unknown

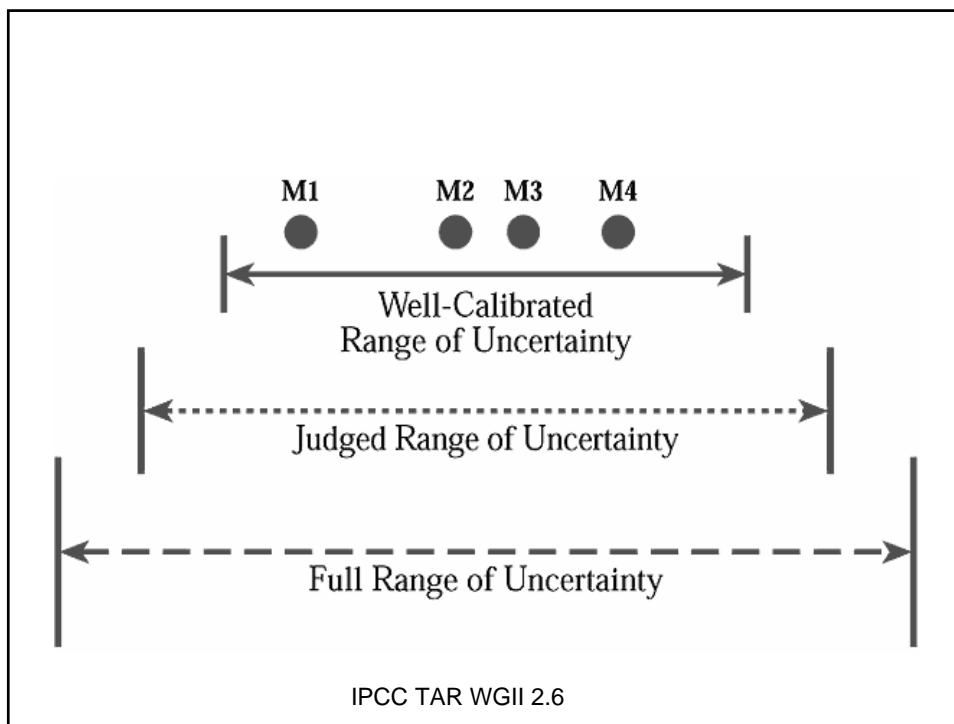
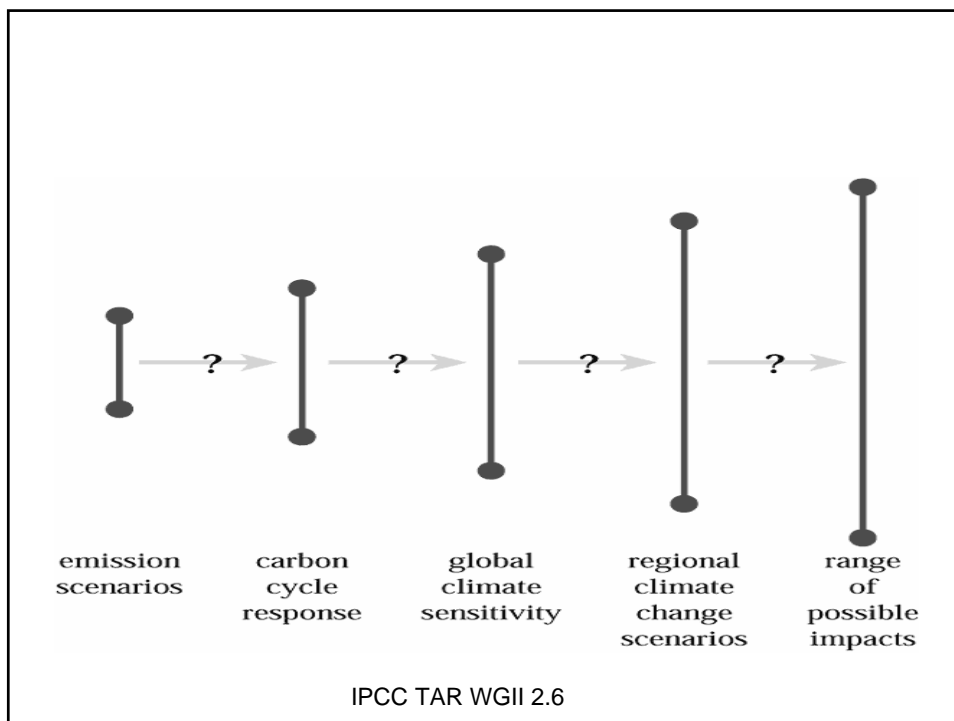


Table 4. Likelihood Scale.

Terminology	Likelihood of the occurrence/ outcome
<i>Virtually certain</i>	> 99% probability of occurrence
<i>Very likely</i>	> 90% probability
<i>Likely</i>	> 66% probability
<i>About as likely as not</i>	33 to 66% probability
<i>Unlikely</i>	< 33% probability
<i>Very unlikely</i>	< 10% probability
<i>Exceptionally unlikely</i>	< 1% probability

Ref: IPCC: <http://www.ipcc.ch/activity/uncertaintyguidancenote.pdf>



Fundamental uncertainty

- Quantum mechanics
- Chaos

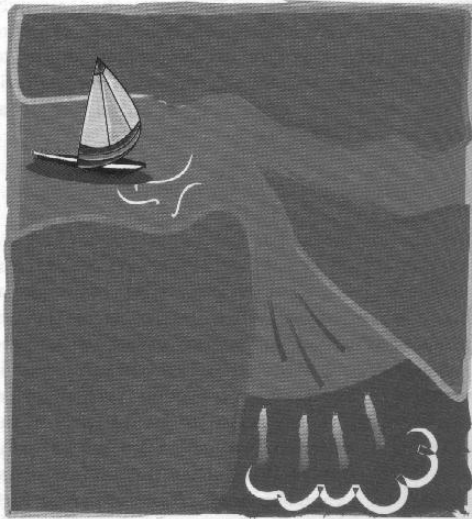
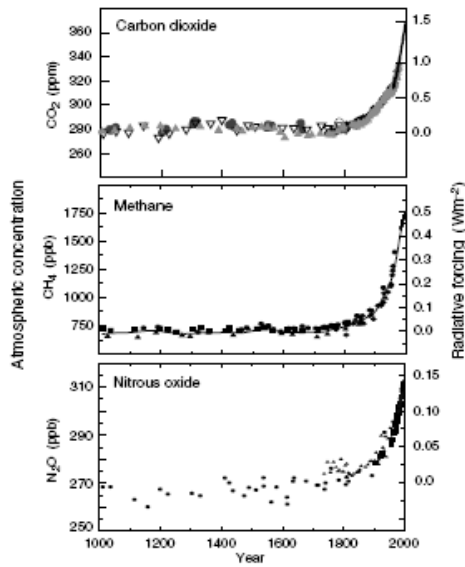
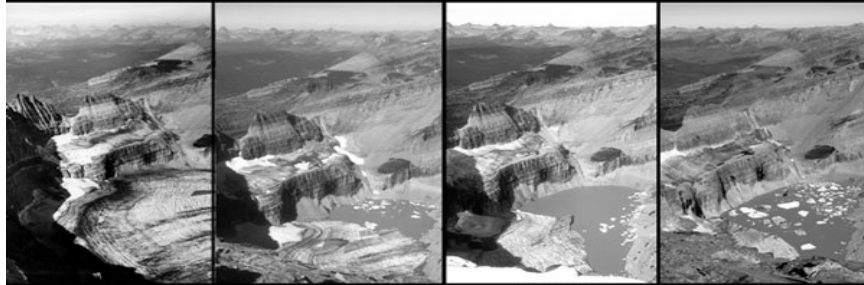


Fig. 6.27. Decision-making amid uncertainty (Schellnhuber 1998). A boat is situated upstream of a bifurcation in a river – one branch going over a harmless rapids and the other going over a big waterfall. The captain must make a decision as to which side of the river he should follow before he is fully aware of the consequences. In this analogy, the role of Earth System science is to provide the captain with an accurate map of the river so that he is aware of the dangers ahead and can chart a safe course

(a) Global atmospheric concentrations of three well mixed greenhouse gases



Grinnell Glacier from Mt. Gould



1938

*Hileman
photo/ GNP
Archives*

1981

*Key/ USGS
photo*

1998

*Fagre/ USGS
photo*

2005

*Reardon/
USGS photo*