

Changements climatiques: ce qui est en jeu à Copenhague

Hervé Le Treut

Copenhague (COP15) ?

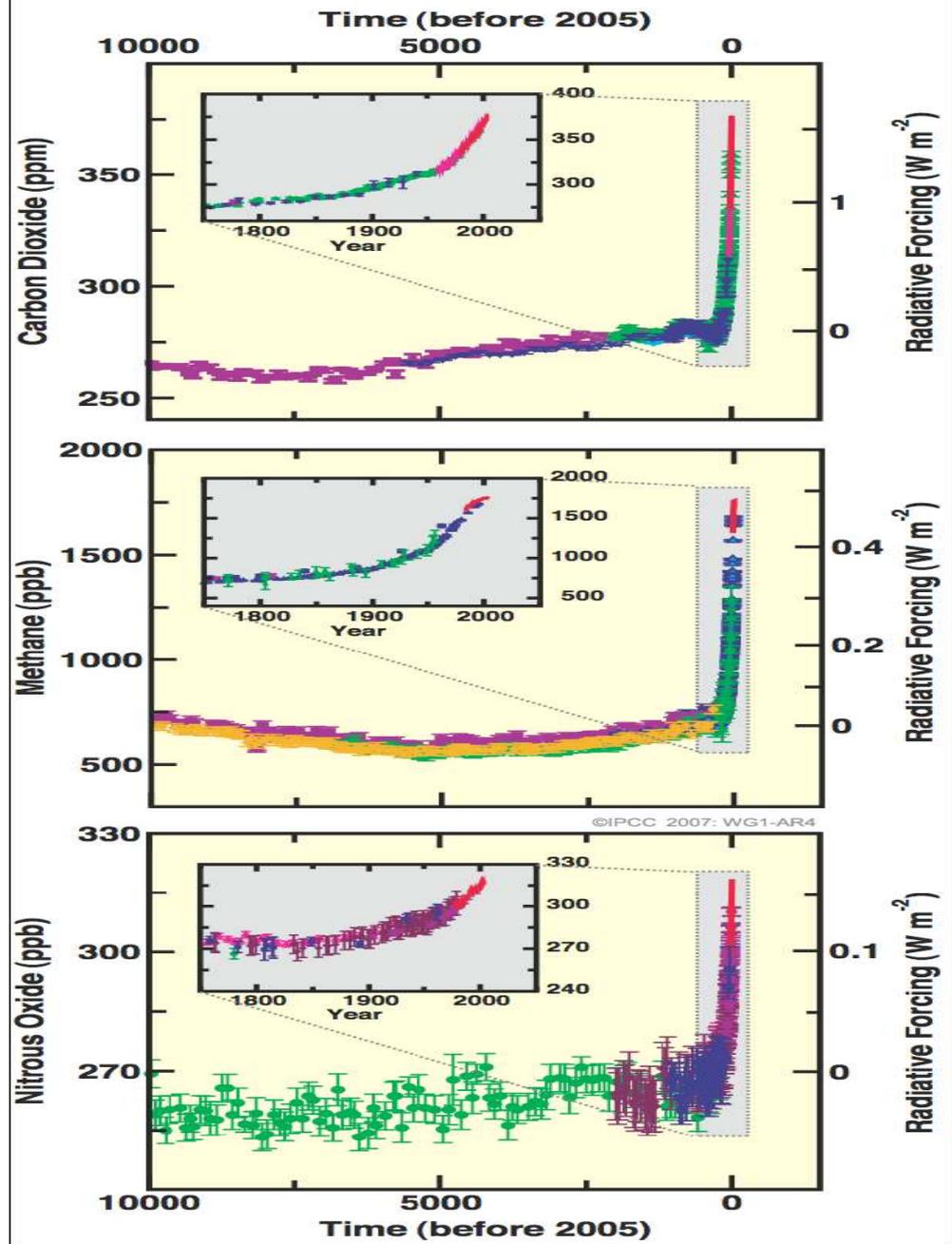
- Un moment très particulier : le protocole de Kyoto a programmé des efforts de réduction d'émissions de gaz à effet de serre jusqu'en 2012
- Le protocole de Kyoto ne peut être reconduit à l'identique

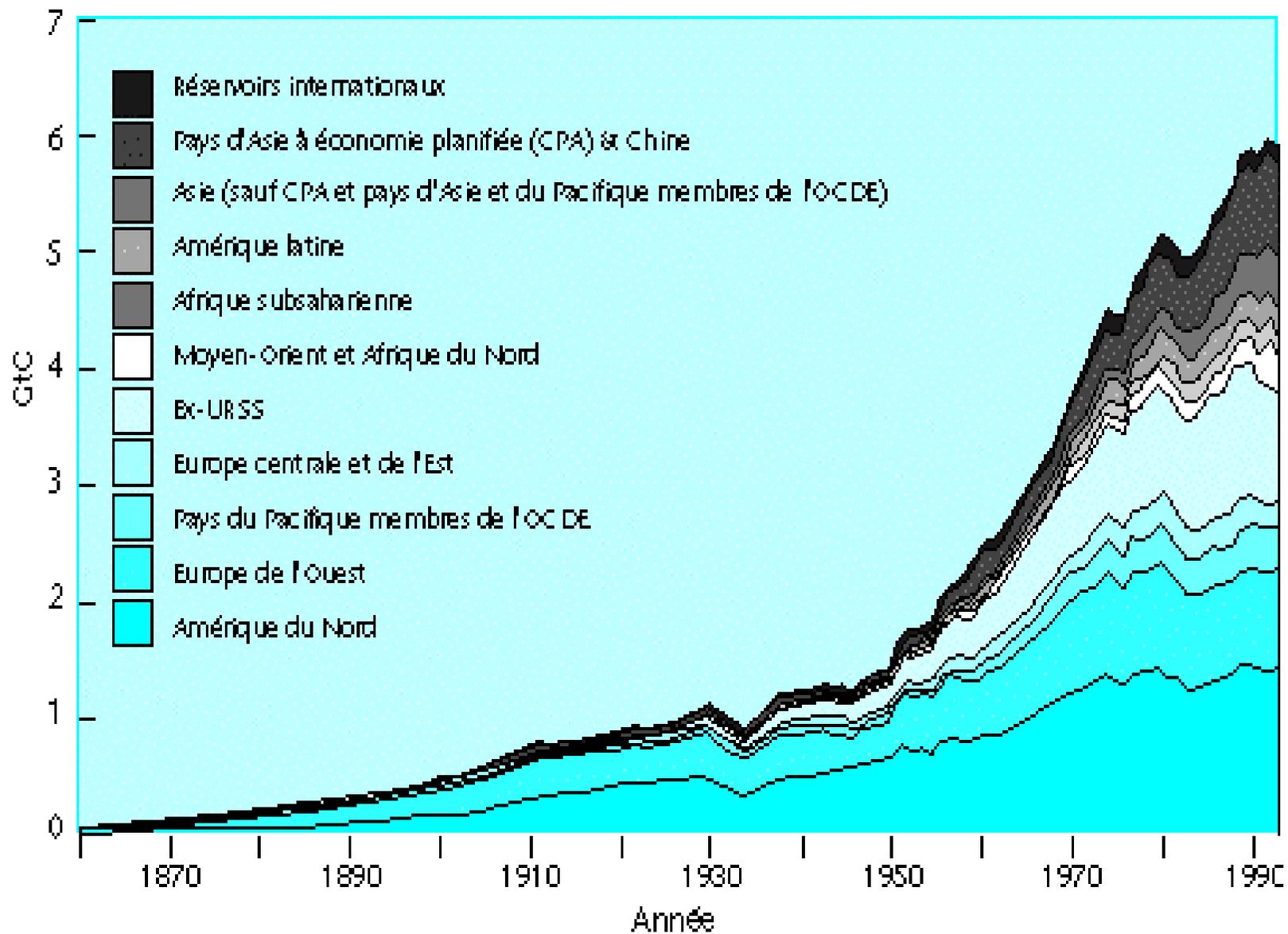
Le problème climatique, un problème d'échelle:

- des échelles temporelles mal comprises, à l'origine de malentendus et de débats

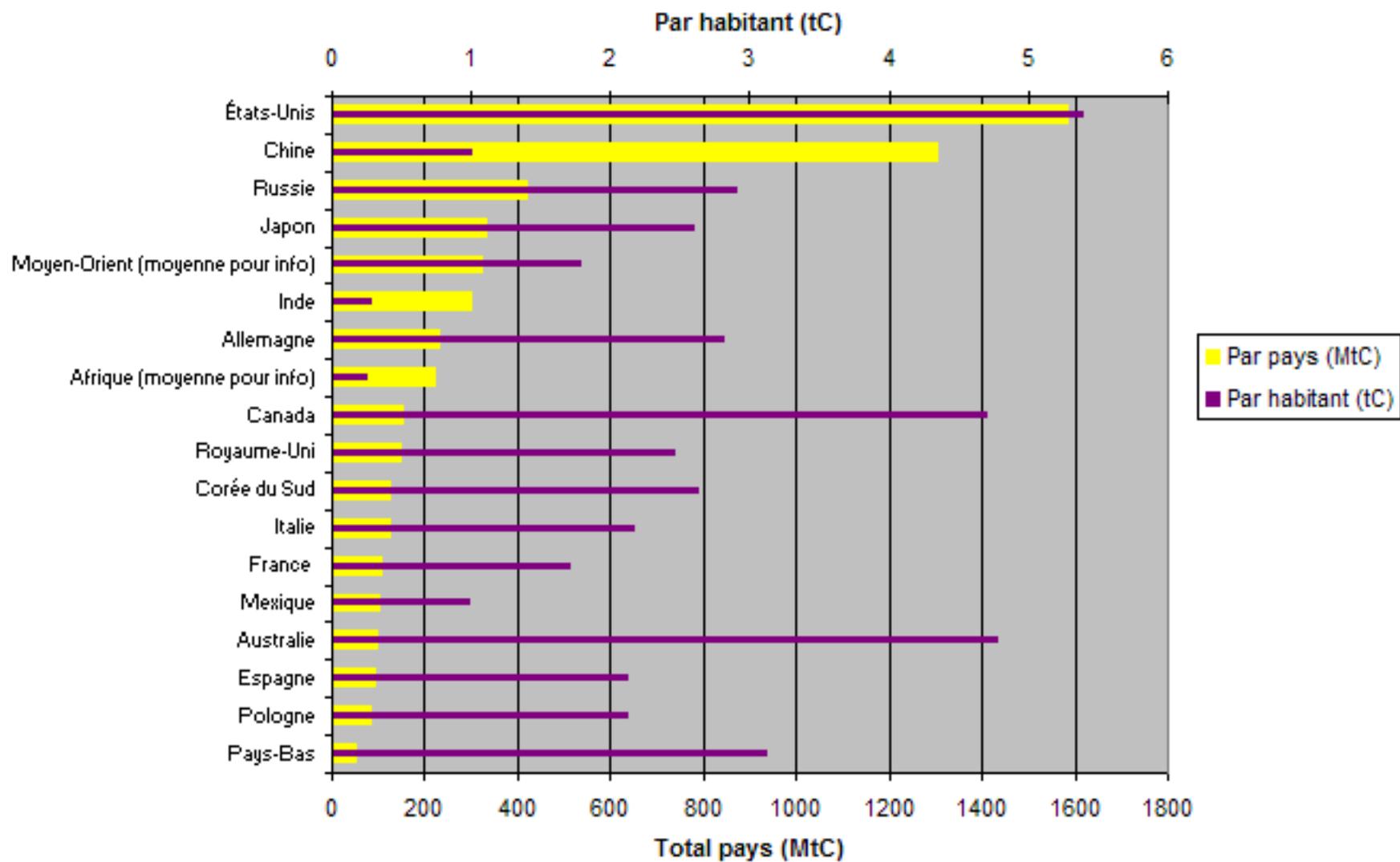
- Des échelles spatiales qui posent des problèmes scientifiques difficiles

Changes in Greenhouse Gases from ice-Core and Modern Data



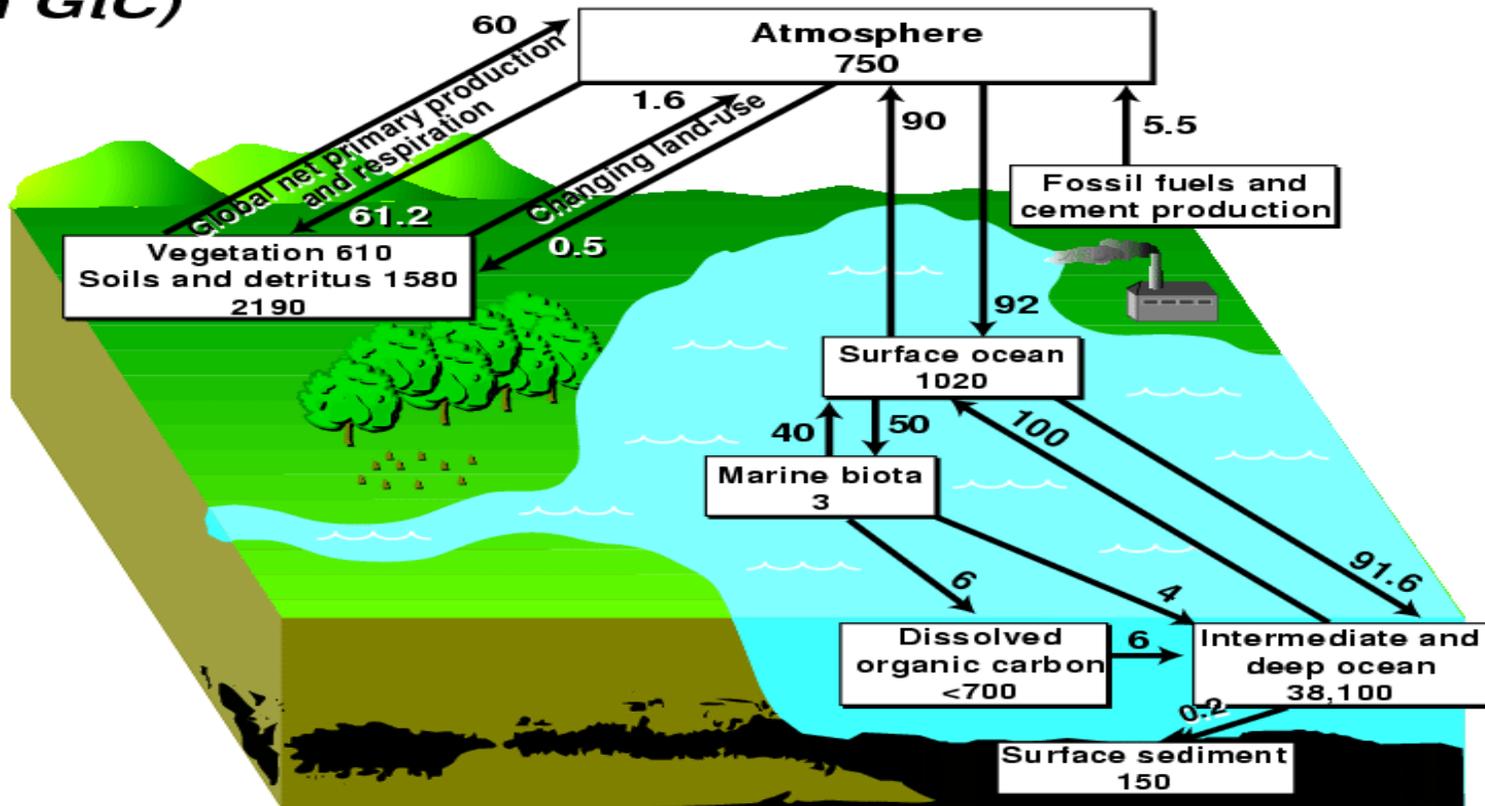


Emission de CO2 en 2004. Source AIE-OCDE. Disponibilité DGEMP



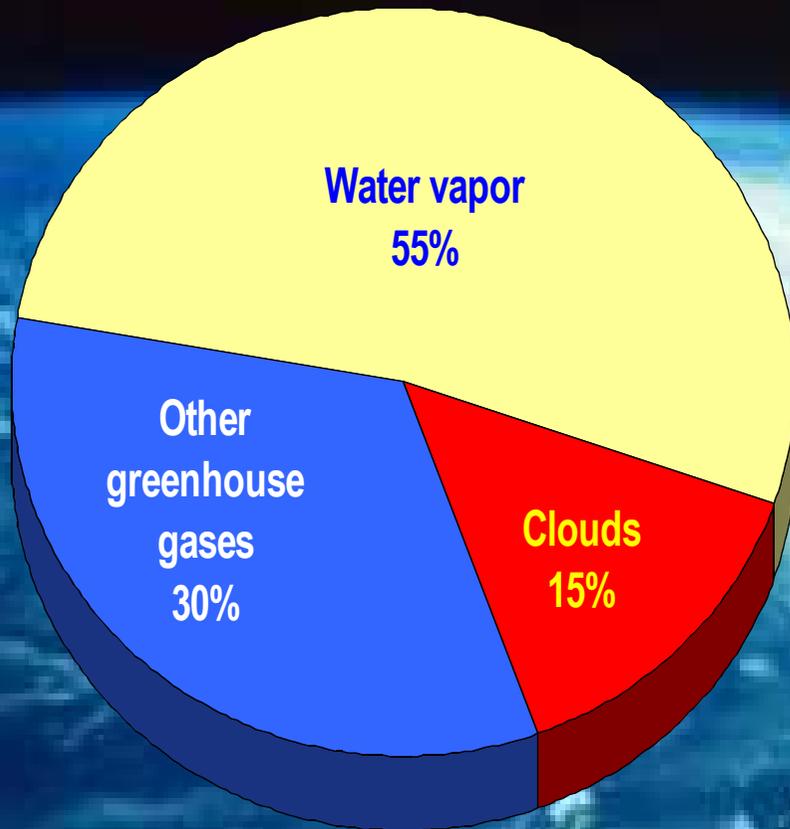
Le cycle du carbone: un “léger” déséquilibre

Global Carbon Cycle (in GtC)

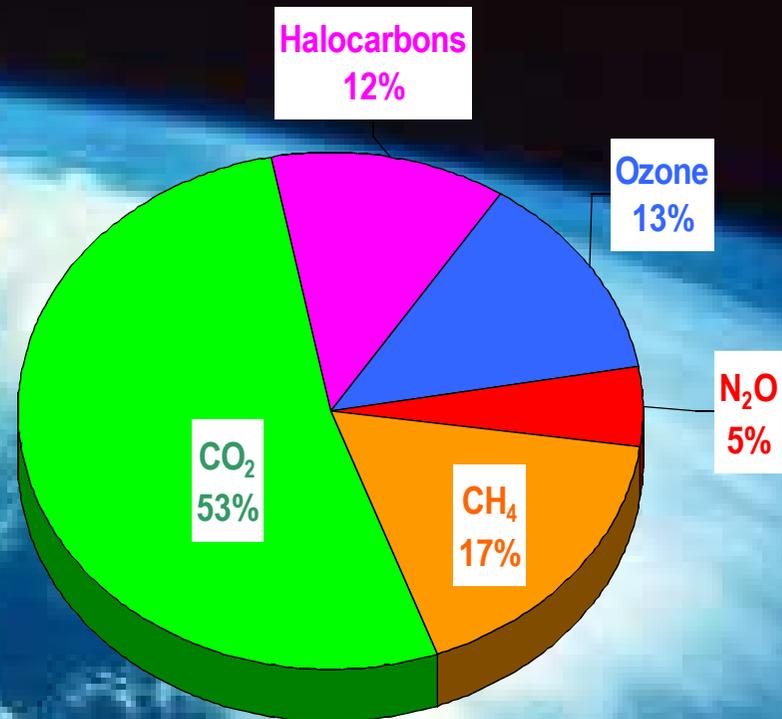


GIEC, 1990 - CDIAC

Atmospheric components contributing to greenhouse effect

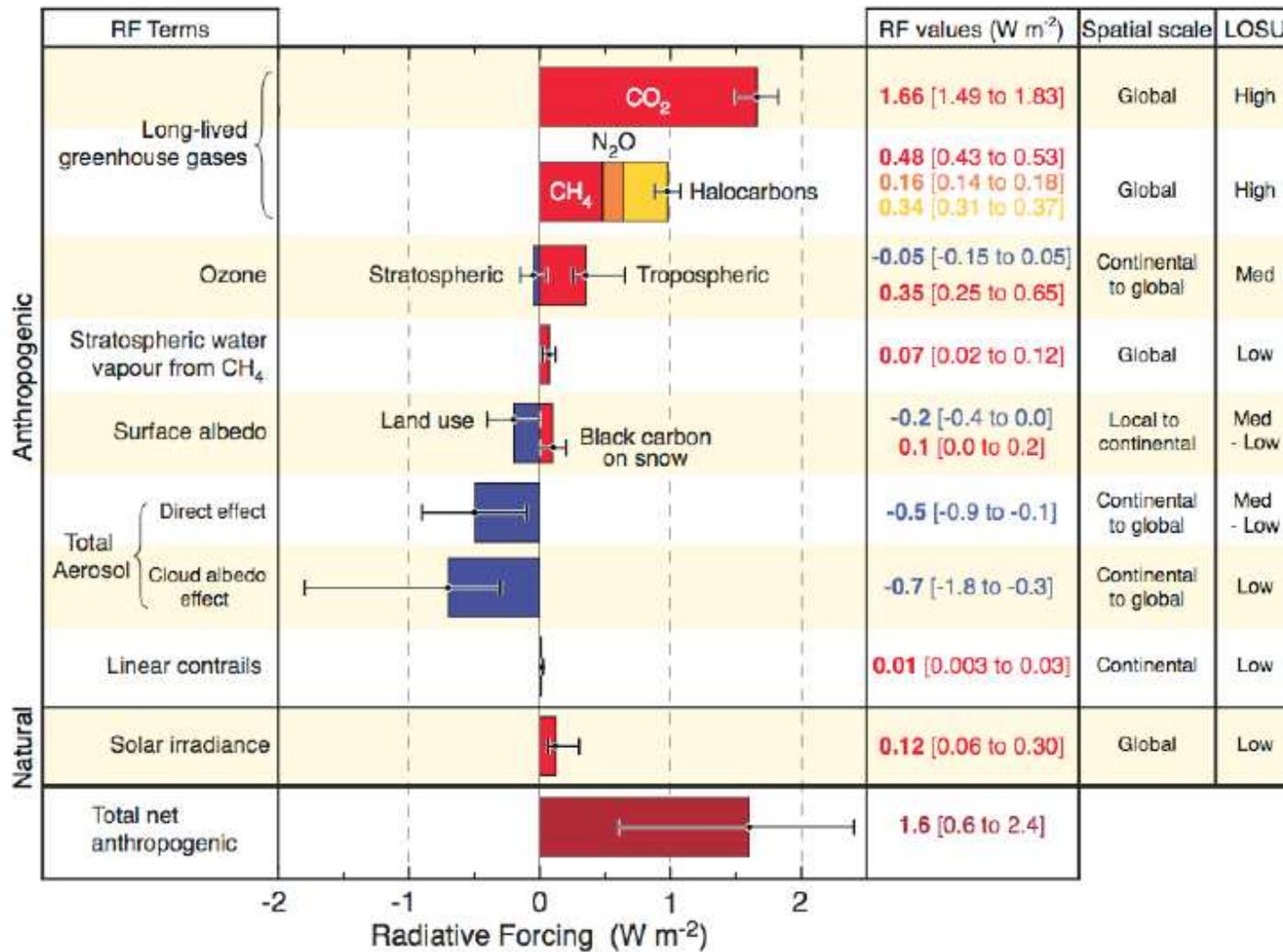


Natural
(155 W/m²)



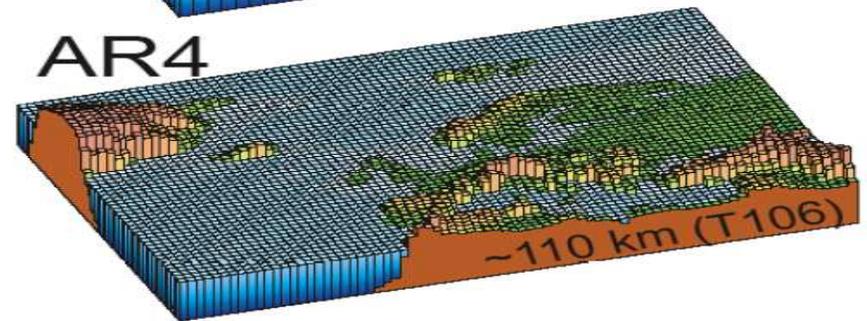
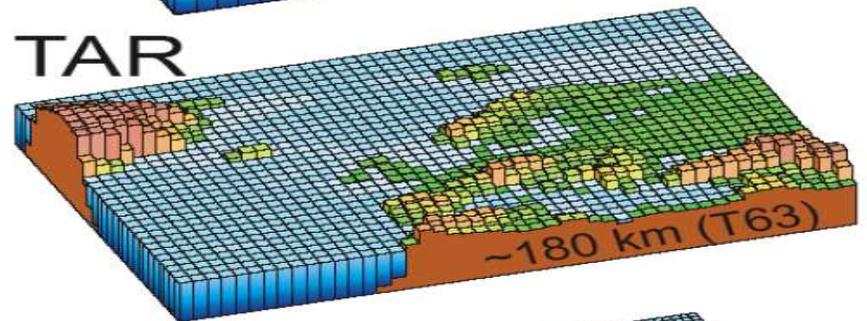
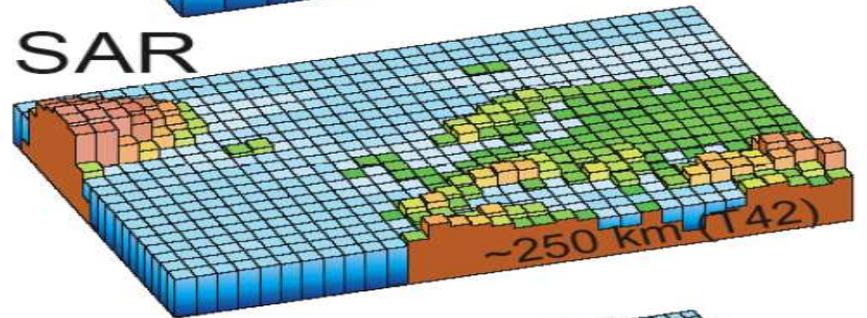
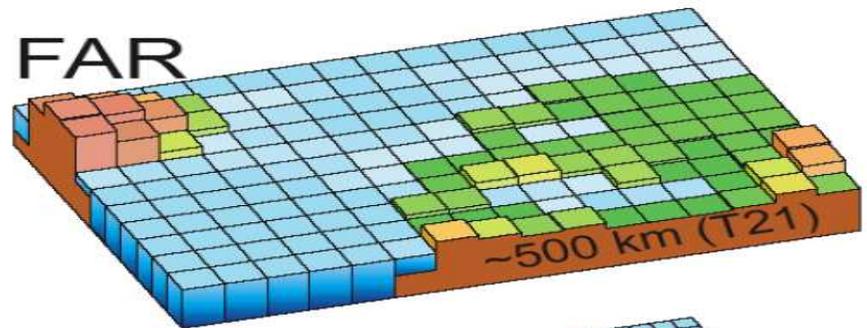
Additional
(2.8 W/m²)

Radiative Forcing Components

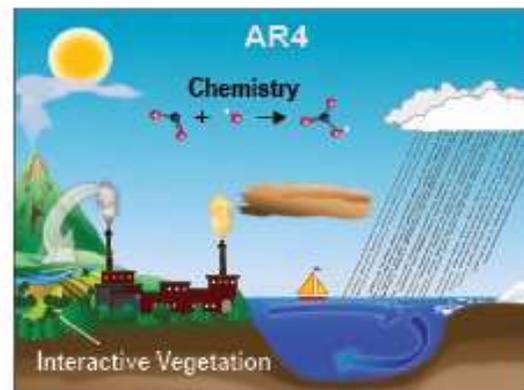
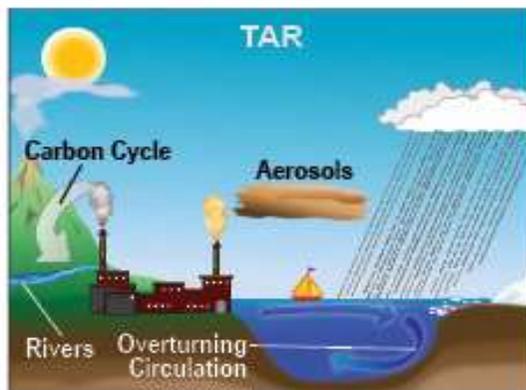
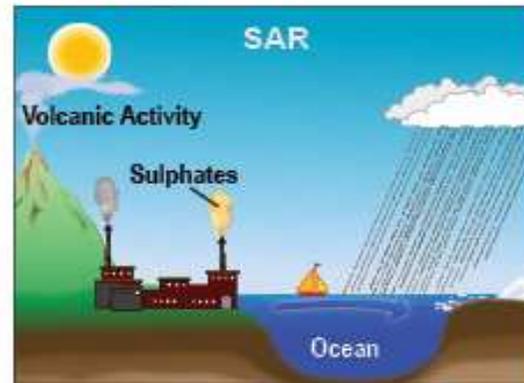
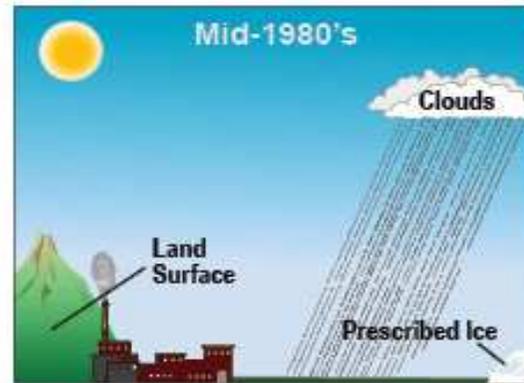


©IPCC 2007: WG1-AR4

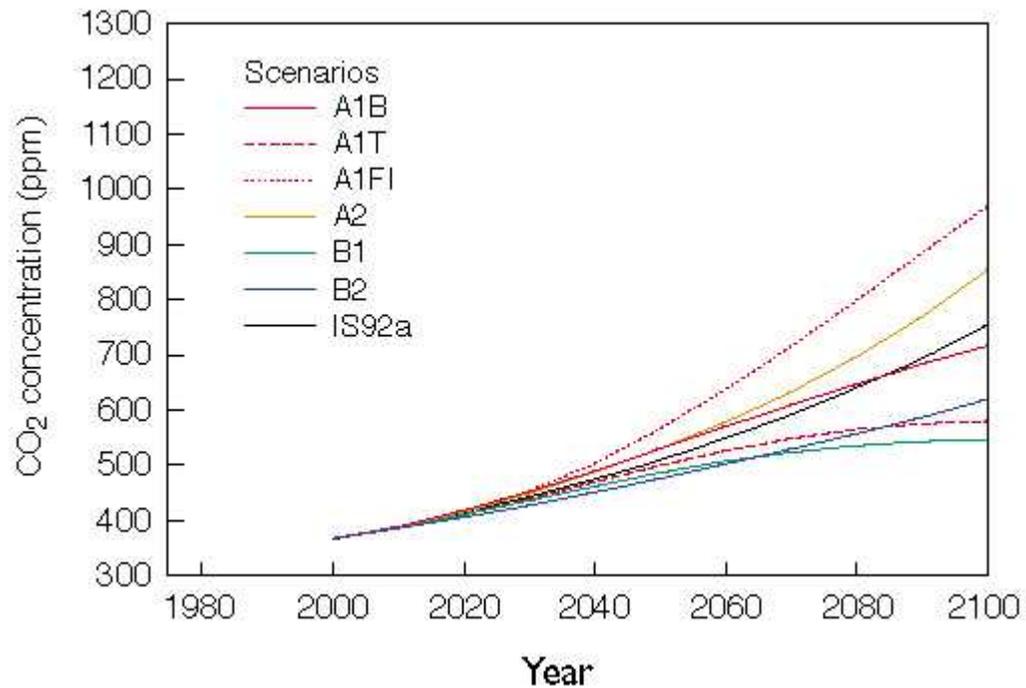
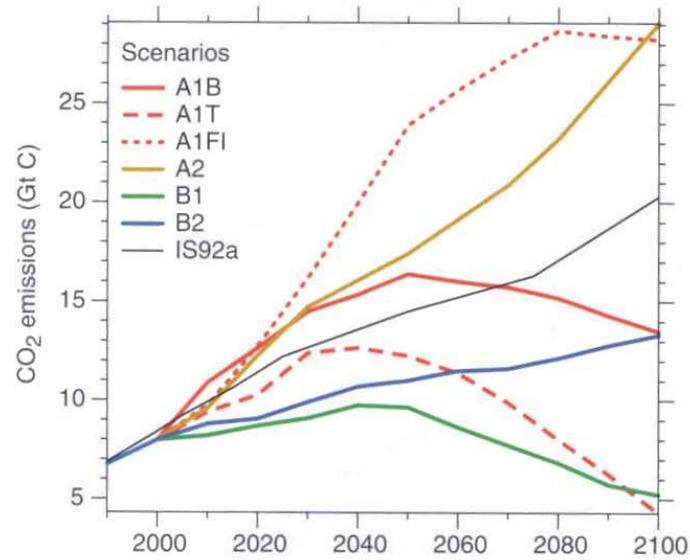
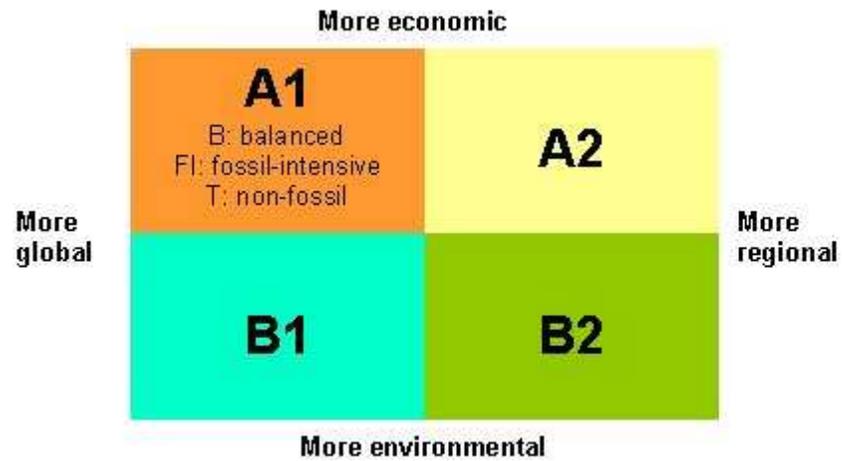
IPCC, WGI, 2007



The World in Global Climate Models

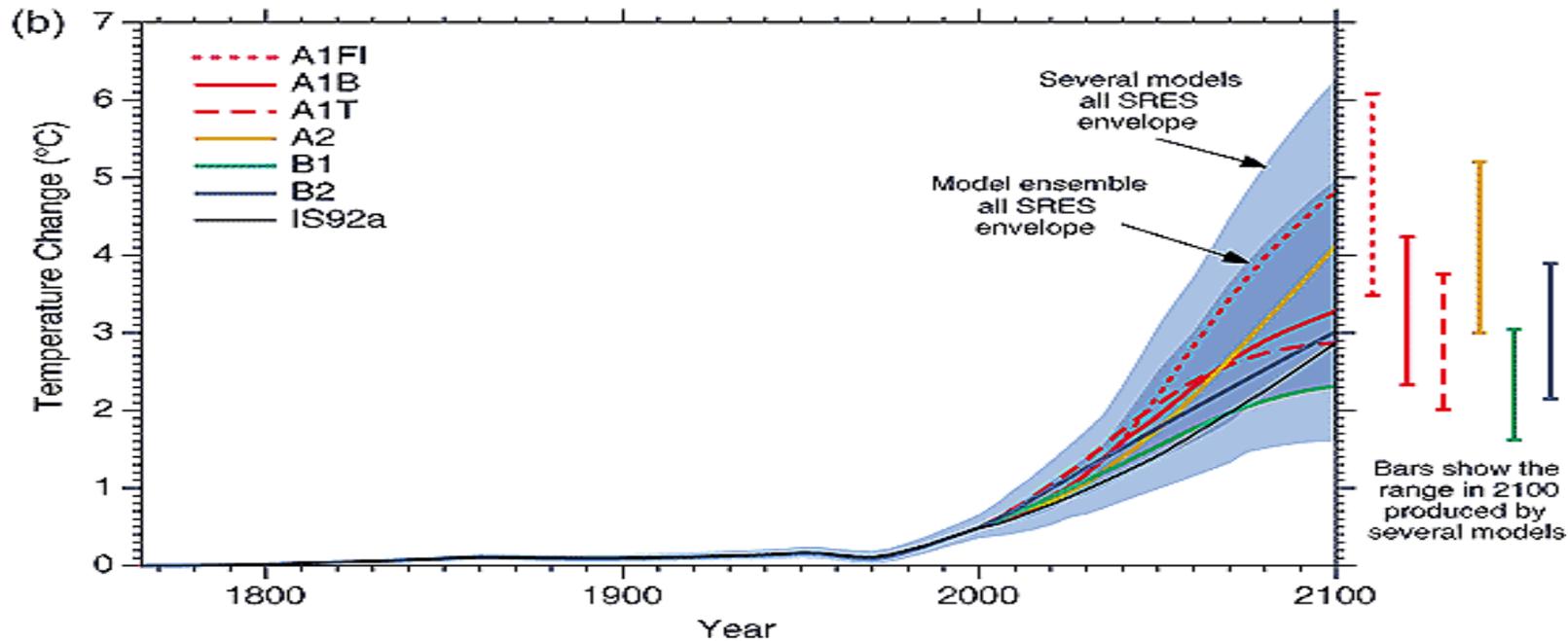


IPCC Scenarios: the basis of The 2001 and 2007 reports

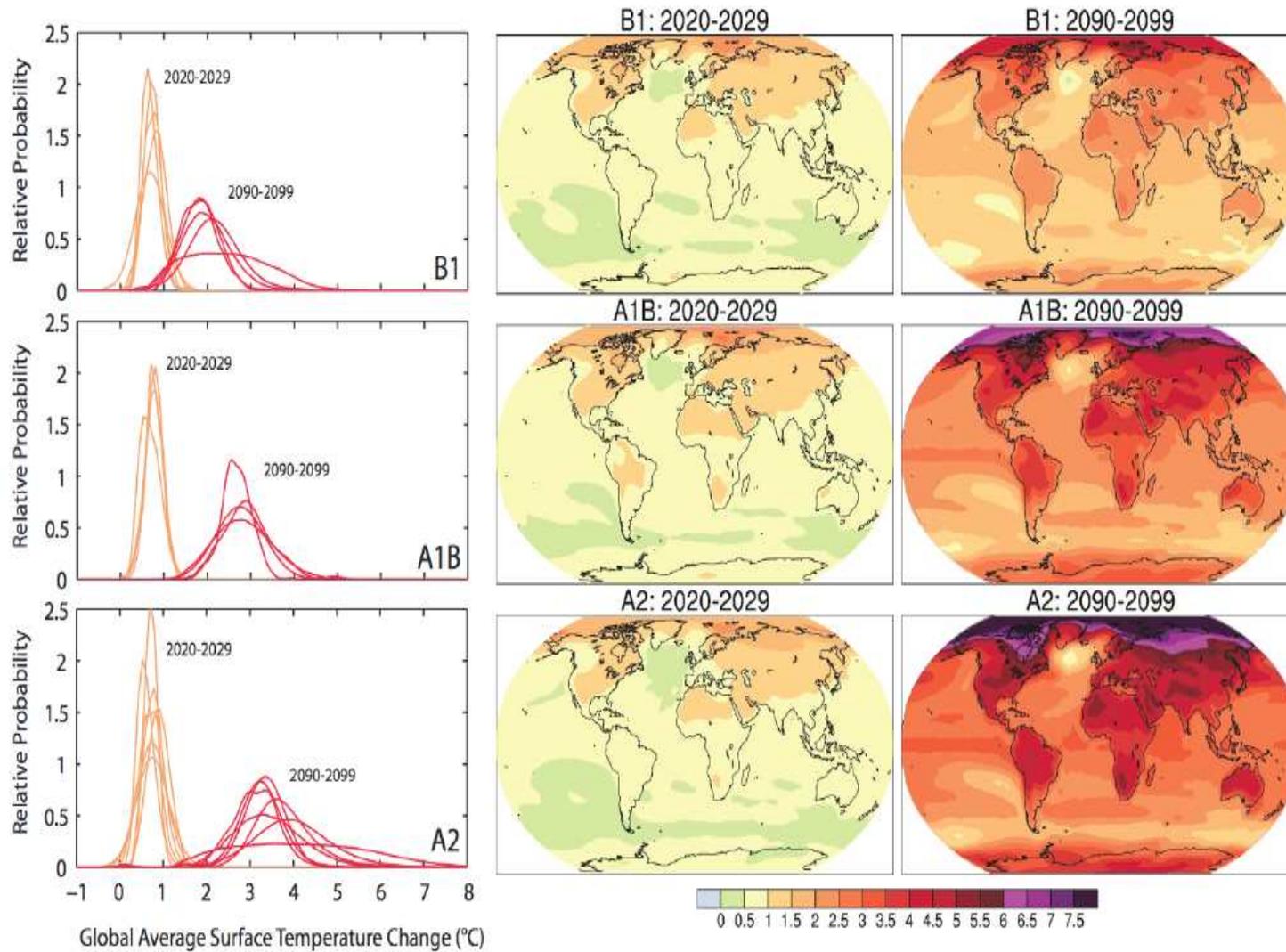


Conclusions from last IPCC report

- Persistent spread in model behaviour:



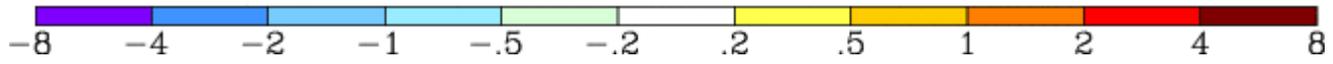
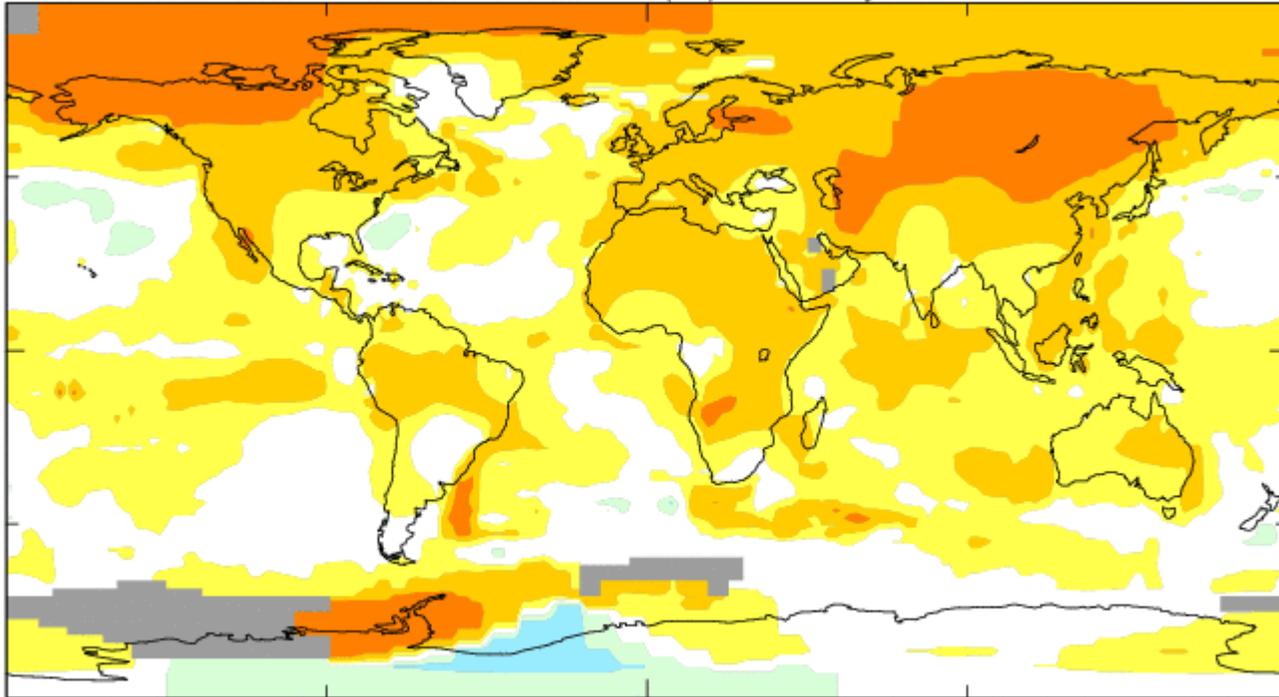
AOGCM Projections of Surface Temperatures



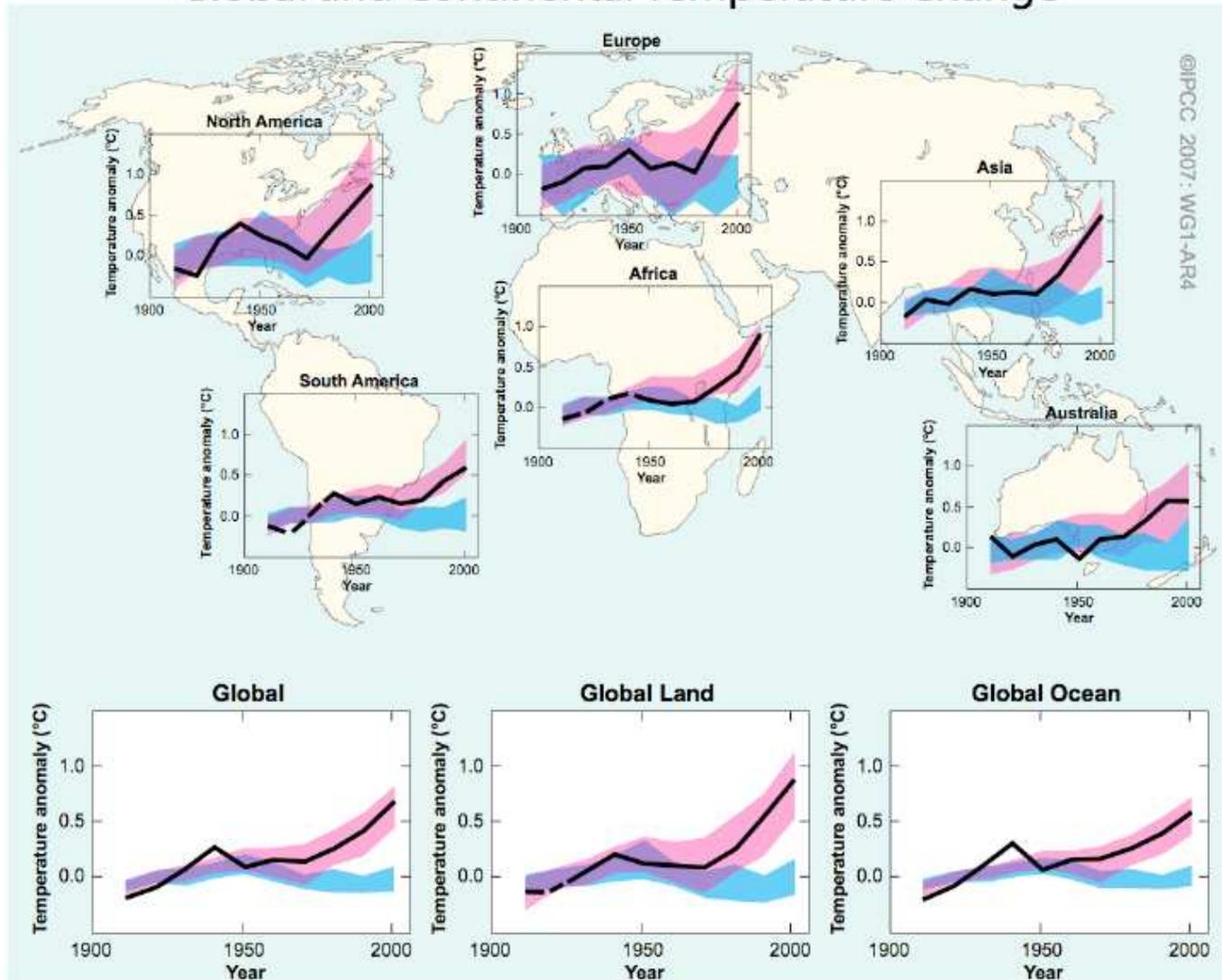
Nov-Oct 1991-2006

L-OTI(°C) Anomaly vs 1951-1980

.40

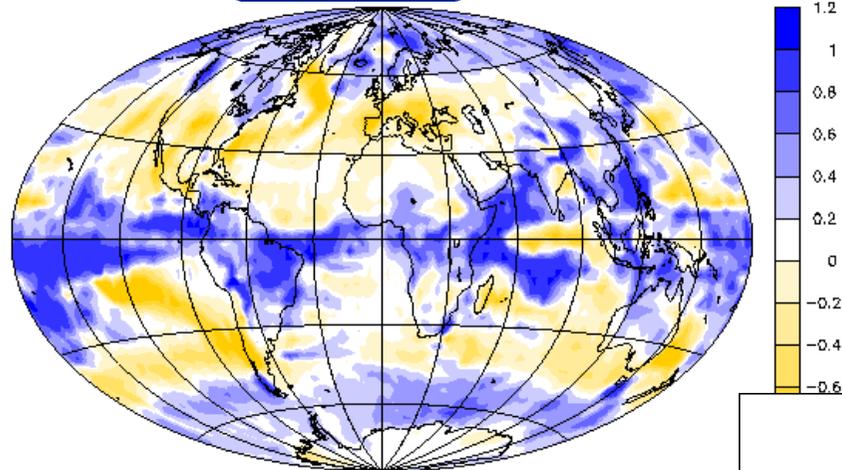


Global and Continental Temperature Change



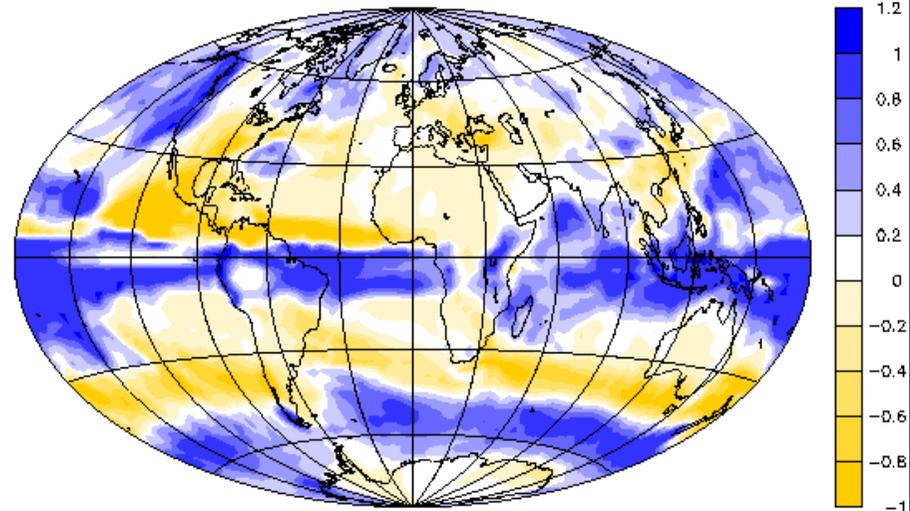
Precipitation changes in a warmer world from the two French models

CNRM



IPCC / CNRM – SRESA2 scenario – Anomalies de la precipitation (mm/jour)
(2090–2099) comparee a (2000–2009)

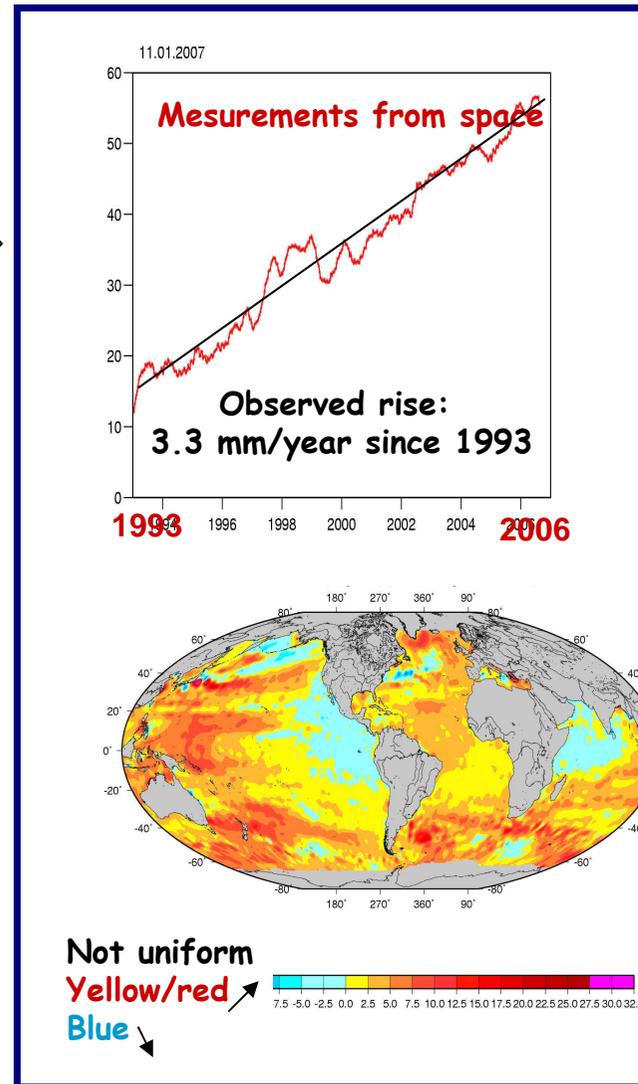
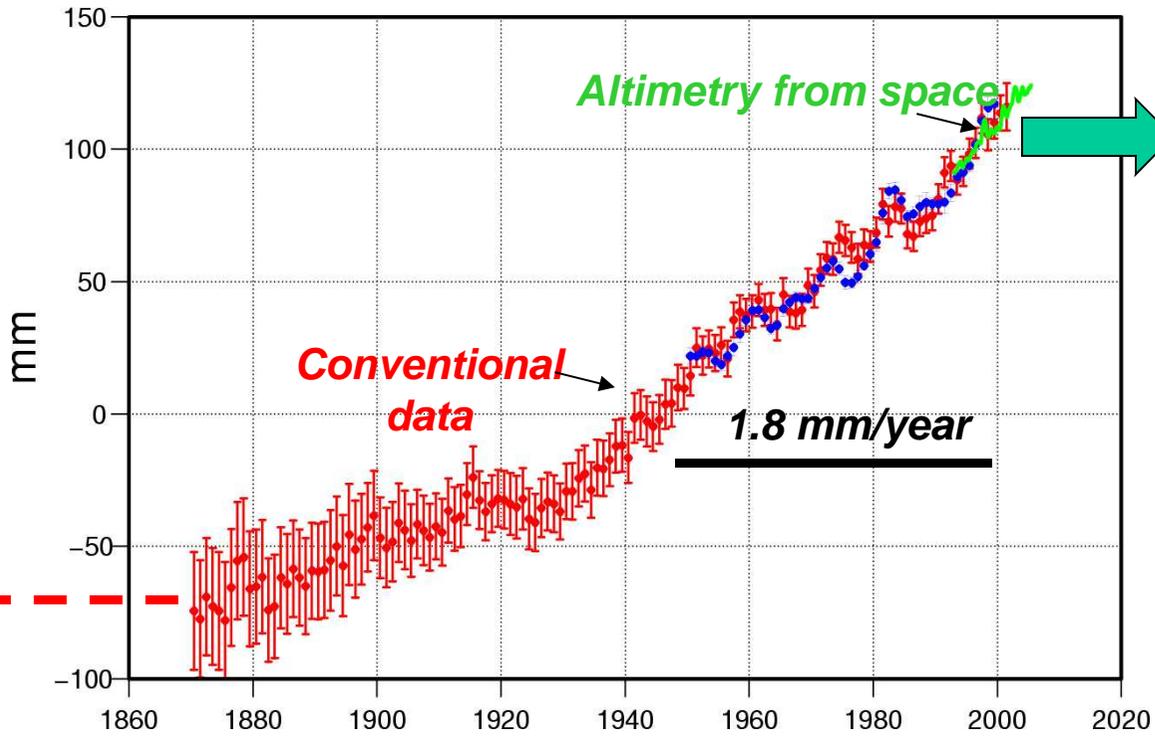
IPSL



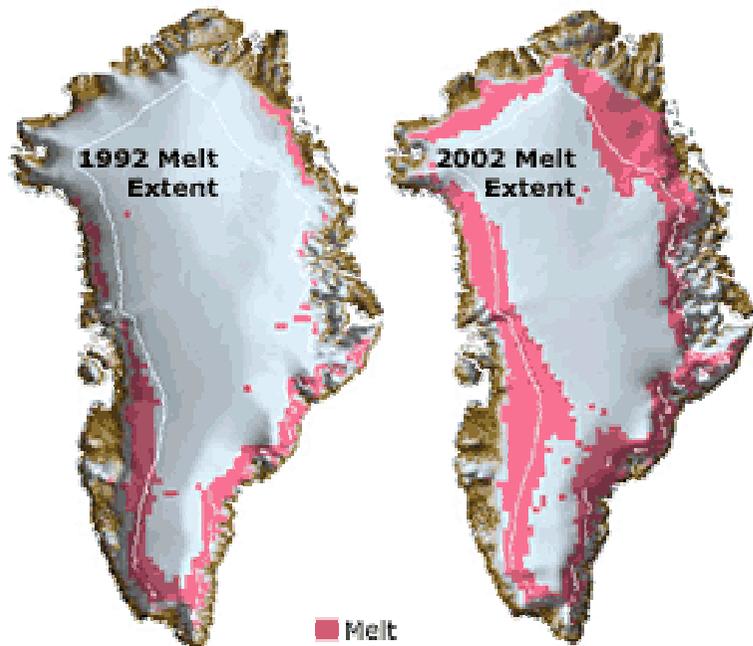
IPCC / IPSL – SRESA2 scenario – Anomalies de la precipitation (mm/jour)
(2090–2099) comparee a (2000–2009)

A2

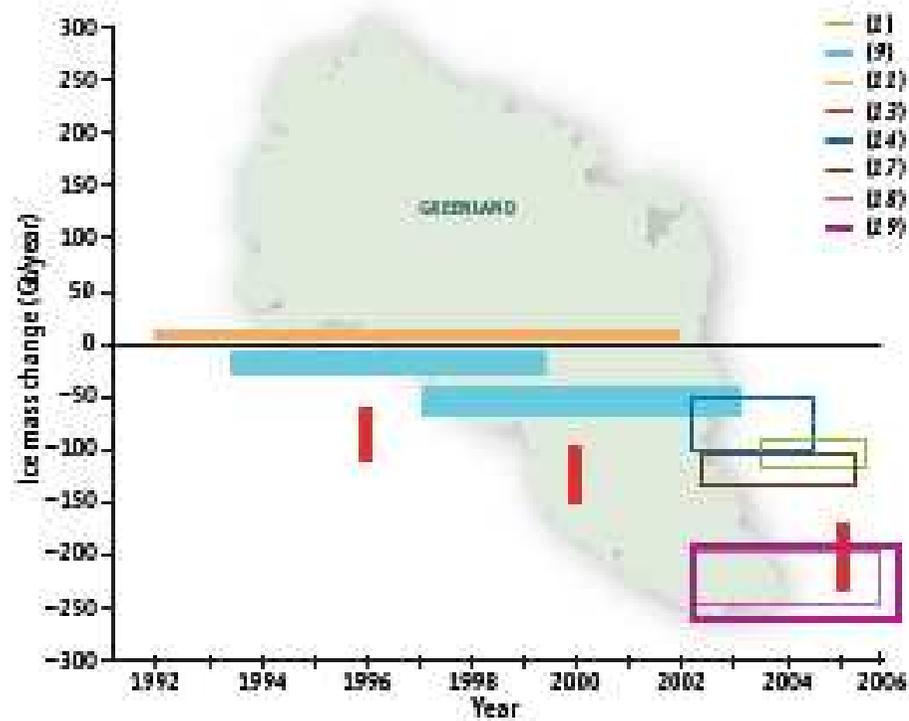
Sea-level rise throughout the 20th century



Perte de masse de glace (gigatonnes/an) au Groenland depuis 1992

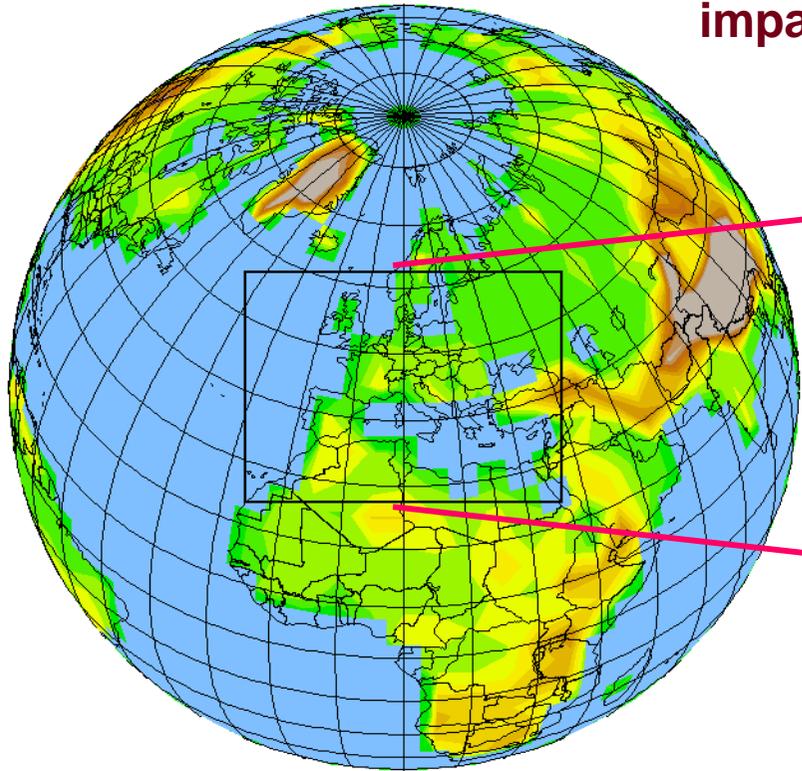


Contribution
au niveau de la mer
(1993-2006) :
~ 0.3 mm/an



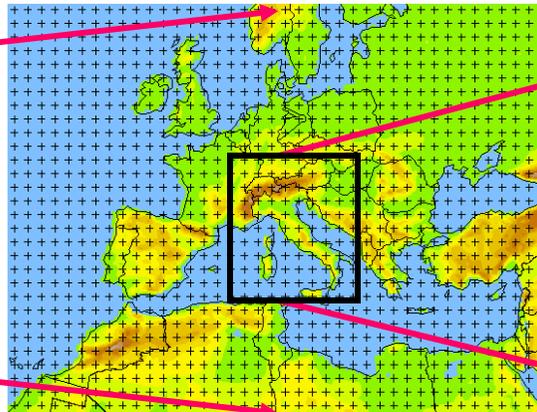
Climate projections on regional and local scales

Global

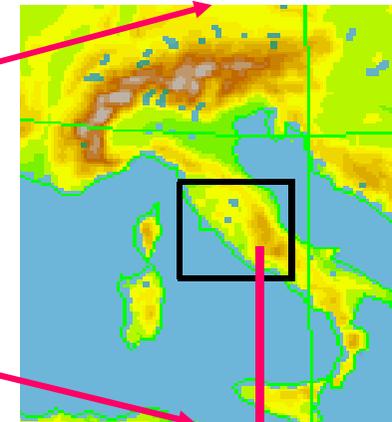


Performance of current AOGCMs (like those from CMIP3) deteriorate when looking at finer temporal and spatial scales which are needed for many impact assessment studies.

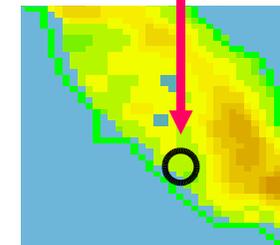
Continental



Regional



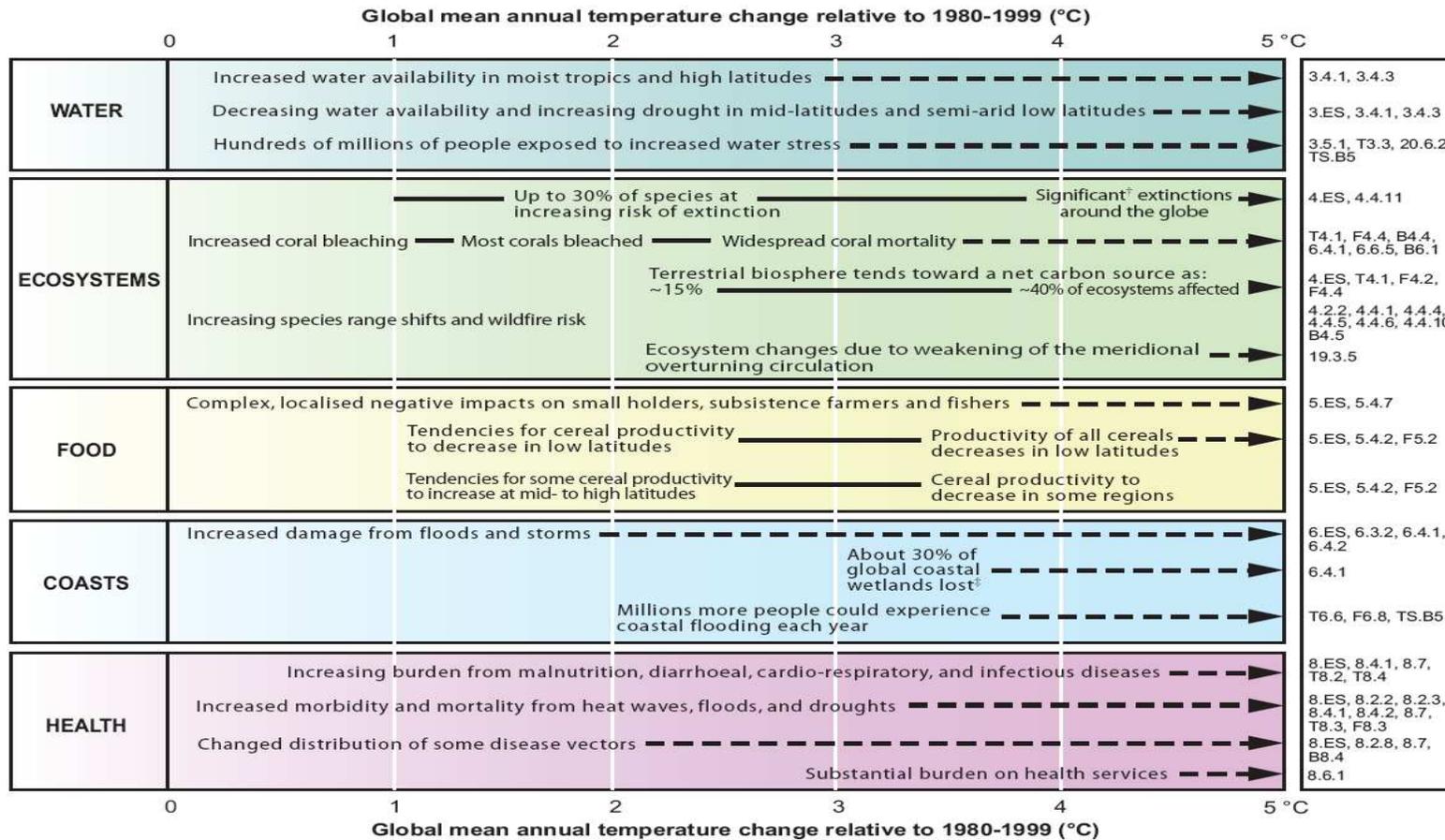
Local



Giorgi 2007

Key impacts as a function of increasing global average temperature change

(Impacts will vary by extent of adaptation, rate of temperature change, and socio-economic pathway)



[†] Significant is defined here as more than 40%.

[‡] Based on average rate of sea level rise of 4.2 mm/year from 2000 to 2080.

Figure SPM.2. Illustrative examples of global impacts projected for climate changes (and sea level and atmospheric carbon dioxide where relevant) associated with different amounts of increase in global average surface temperature in the 21st century [T20.8]. The black lines link impacts, dotted arrows indicate impacts continuing with increasing temperature. Entries are placed so that the left-hand side of the text indicates the approximate onset of a given impact. Quantitative entries for water stress and flooding represent the additional impacts of climate change relative to the conditions projected across the range of Special Report on Emissions Scenarios (SRES) scenarios A1FI, A2, B1 and B2 (see Endbox 3). Adaptation to climate change is not included in these estimations. All entries are from published studies recorded in the chapters of the Assessment. Sources are given in the right-hand column of the Table. Confidence levels for all statements are high.

Une double contrainte temporelle:

- Le problème climatique est récent: peu d'expérience et de recul
- Le problème climatique est urgent: on changé une perspective à l'échelle du siècle pour une perspective à l'échelle des quelques décennies à venir
- L'attente augmente les problèmes d'adaptation, et va écarter les positions des différents pays.