

Future Scenarios and Climate Trends

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International Conference on Climate Change Impacts on Tourism
Lisbon, Portugal - 7-8 September 2007

Future Scenarios and Climate Trends

The future is sure to bring change
not only to planetary **Climate**
but also to the planetary **Human Society**.

It would be **naïve** to study how
Climate and Tourism relationships evolve
without trying to include long term
changes in the Society
as well as the Global Warming effects.



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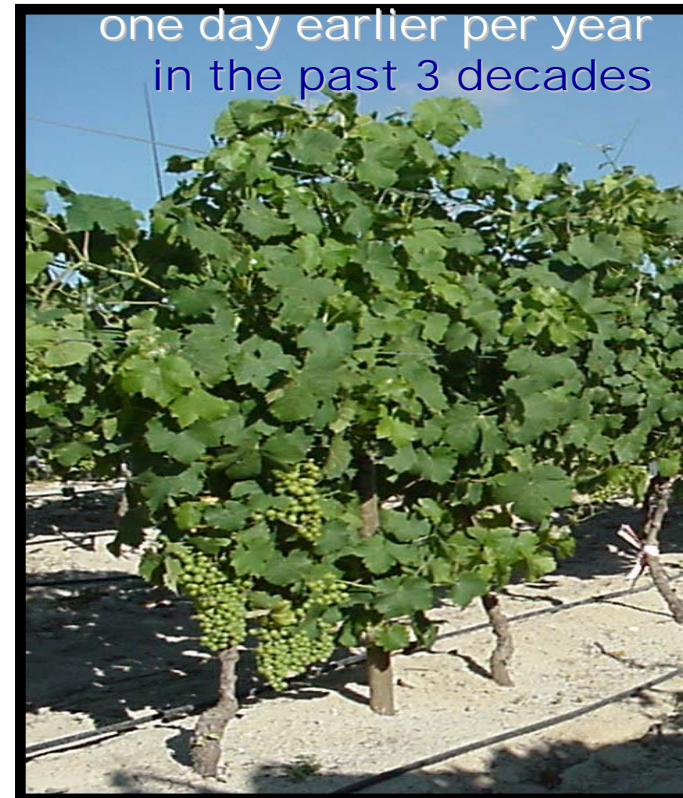
Future Scenarios and Climate Trends

Evidence for climate change is already abundant...

Muir and Riggs Glaciers



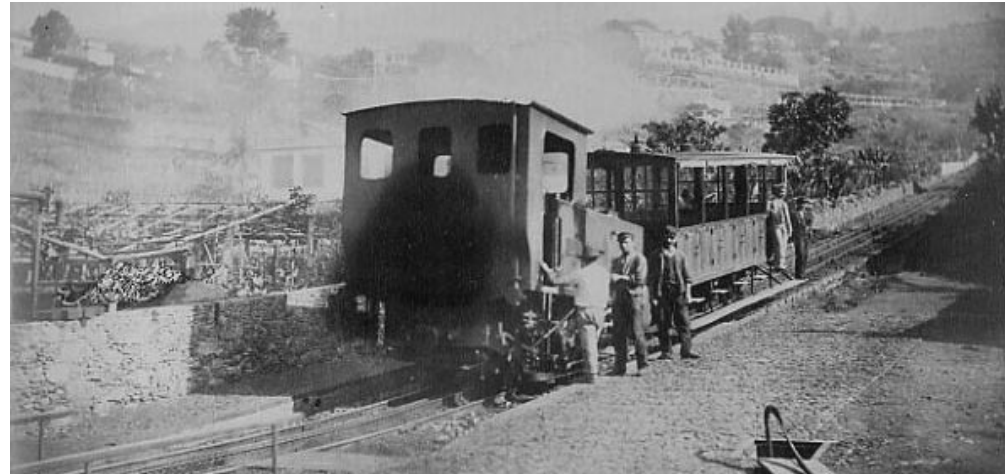
In Portugal, wine grapes
have matured
one day earlier per year
in the past 3 decades



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... technological change is continuous ...



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...socio-economic change too!



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Projections vs. Scenarios

society behaviour up to
5-10 years

short term society
motivations and mechanisms

more sophisticated models
give better results



long term coherent possible
states of the society



examine a range of future
society motivations



results are mostly controlled
by assumptions



Coherence

Socio-economic scenarios
provide emissions data,
that provide input to climate models,
that provide input to impact studies,
that must be interpreted according to the scenarios



Quantification

Socio-economic scenarios translate into models that provide hard numbers, not just qualitative statements as usual from 'expert judgment'



Objectiveness

Socio-economic scenarios reduce the subjectiveness of 'expert judgement' by clearly identifying assumptions



Dealing with Uncertainty

Using various socio-economic scenarios and
sensitivity analysis enables objective
assessment of uncertainties



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Scenario examples: Canada

**Environment
Canada**

**Environnement
Canada**

**Canada**

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**Adaptation & Impacts Research**

**UNIVERSITY OF
REGINA**
Environmental Informatics Laboratory

Climate Change Scenarios Network - National Node
[EC - GC](#)

Climate Change Scenarios Network - National Node

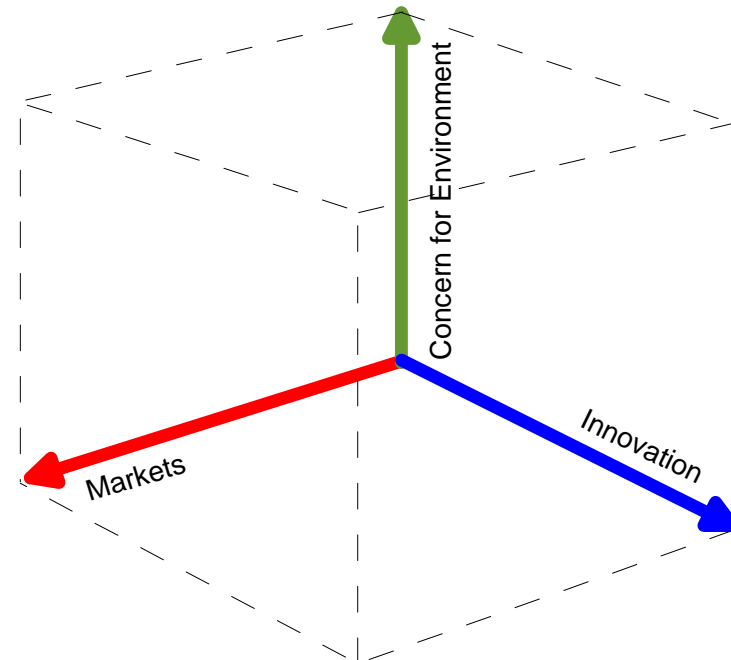
Welcome to the Climate Change Scenarios Network (CCSN). The CCSN is Environment Canada's new vehicle for distributing climate change scenarios and adaptation research. It provides both a national perspective on impacts and adaptation as well as a regional perspective. This website is one node in a national network of regional nodes which have the following goals:

- support climate change impact and adaptation research in Canada and other countries,
- support other stakeholders who require scenario information for decision making,
- provide access to the work of Adaptation and Impact Research Group (AIRG), an Environment Canada research group under the auspices of the Meteorological Service of Canada are recognized and
- provide access to Canadian research on the development of scenarios and adaptation research.

This network will achieve these goals through the dissemination of

- climate change scenarios, particularly from Canadian research;
- downscaling tools;

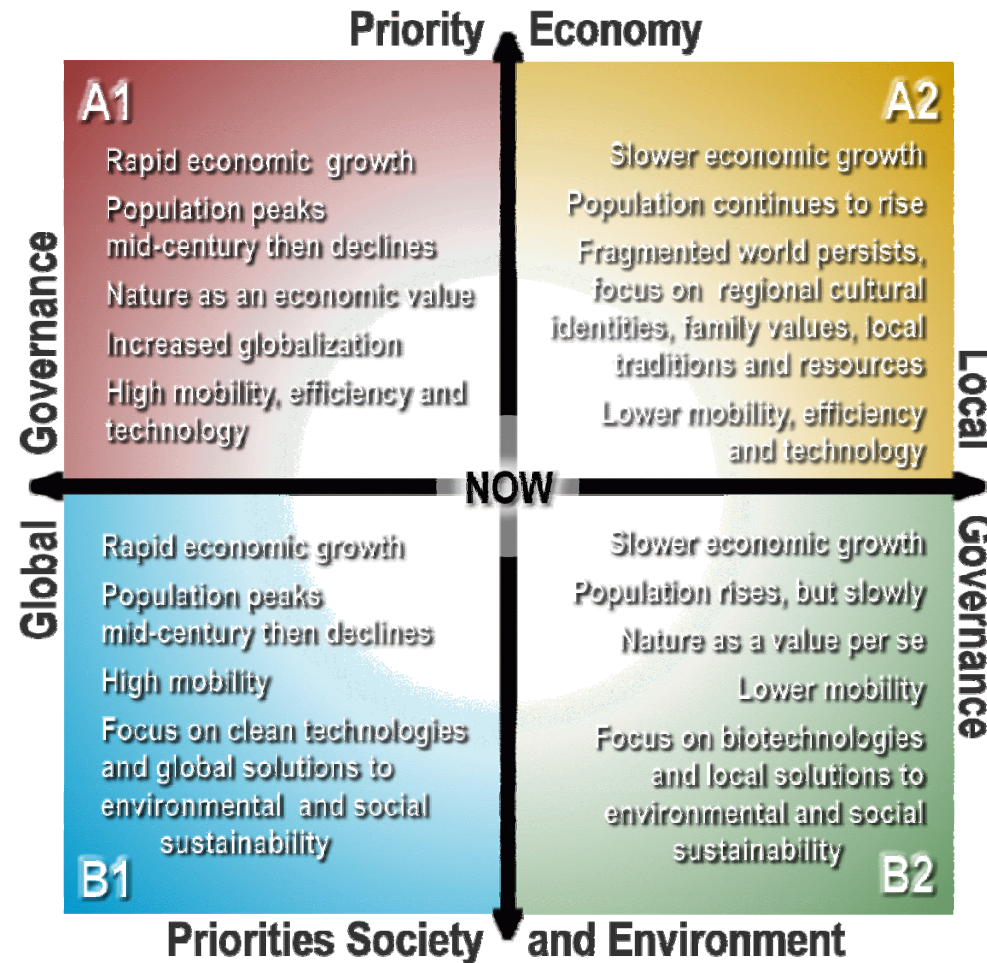
Energy Technology Futures 2050



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Scenario examples: IPCC SRES



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Scenario examples: EU 2030

European Environment Agency 

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Data

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- » by keyword
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- » Terms of use
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Home » Products » Climate change scenarios ...

Climate change scenarios data

Data are for trends and projections of energy, emissions of members countries. Data have been compiled and Climate Change.

European data set (language: English, version 1)

Data

Baseline Scenario (LREM-E): driving forces indicators	LREM-E Driving forces Indicators_Europe  Microsoft Excel format
Baseline Scenario (LREM-E): impact indicators	LREM-E CC Impact Indicators_Europe  Microsoft Excel format
Baseline Scenario (LREM-E): pressure indicators	LREM-E CC Pressure Indicators_Europe  Microsoft Excel format
Baseline Scenario (LREM-E): state indicators	LREM-E CC State Indicators_Europe  Microsoft Excel format

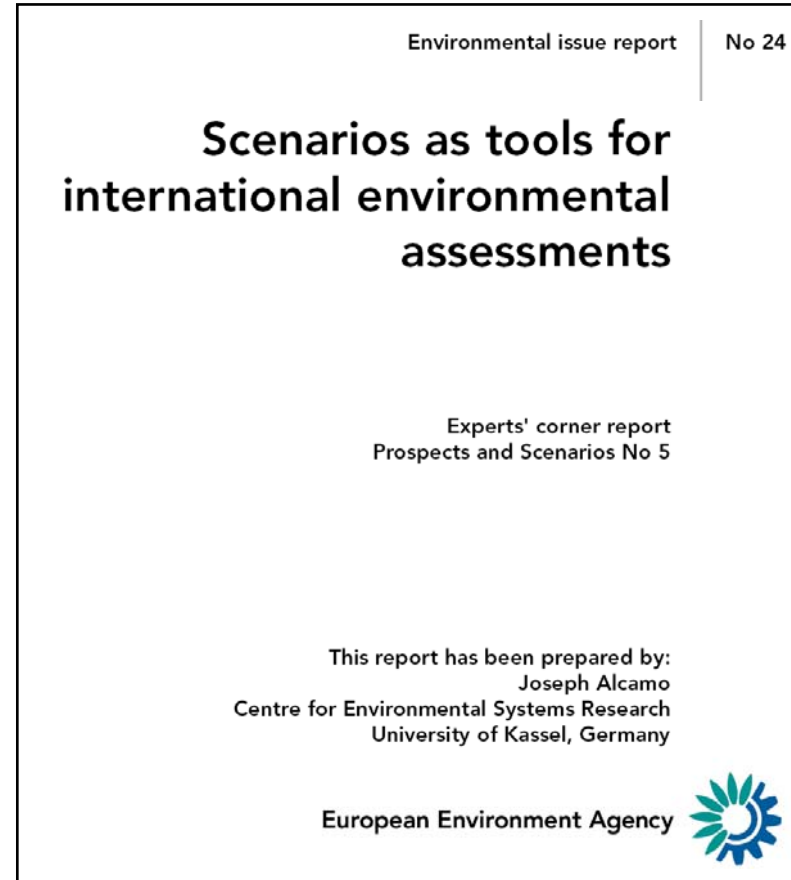
<http://dataservice.eea.europa.eu/dataservice/metadetails.asp?id=806>



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A good guidance document



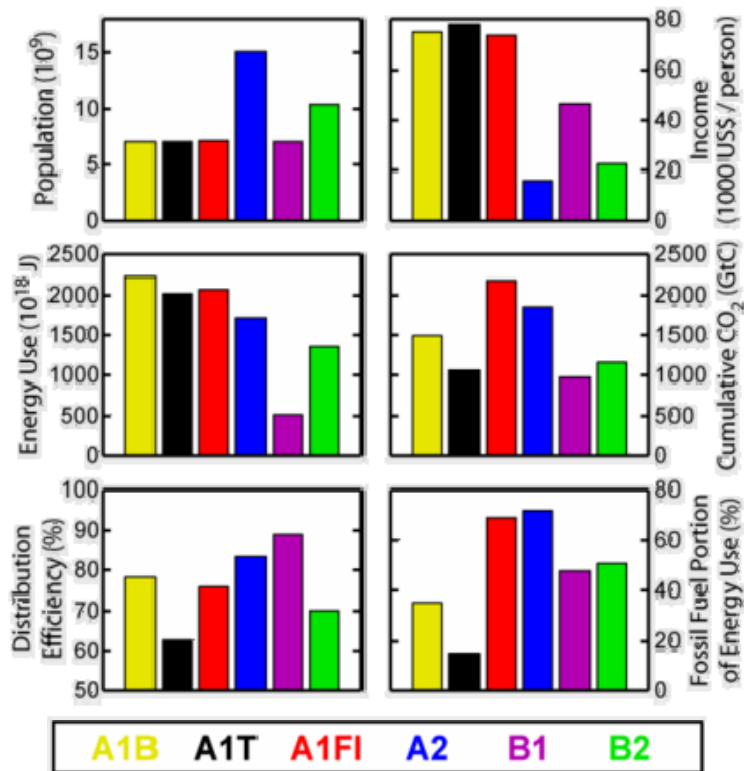
http://reports.eea.europa.eu/environmental_issue_report_2001_24/en



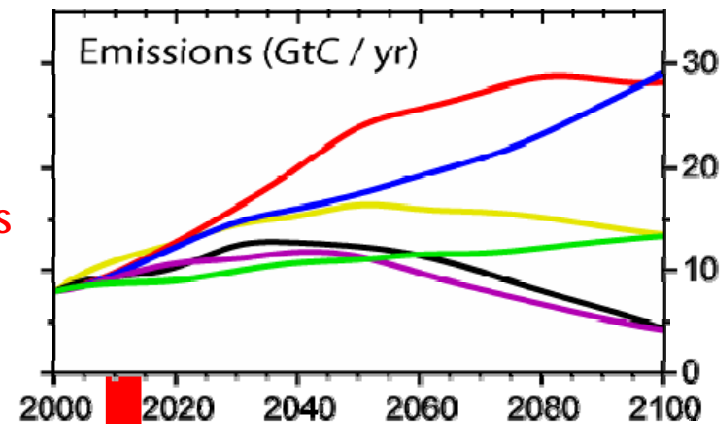
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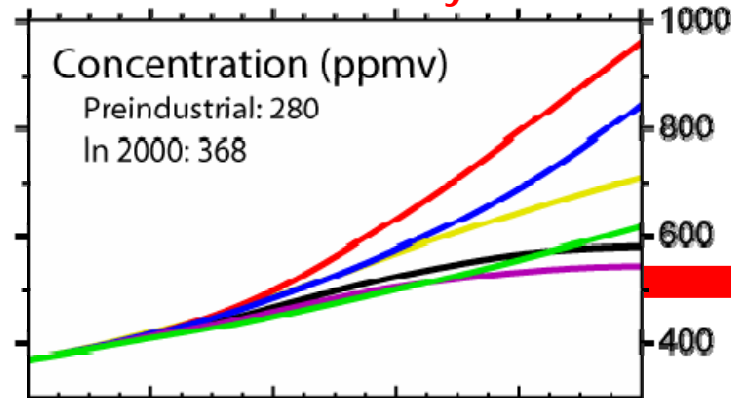
Using the scenarios



Scenarios



Carbon cycle models



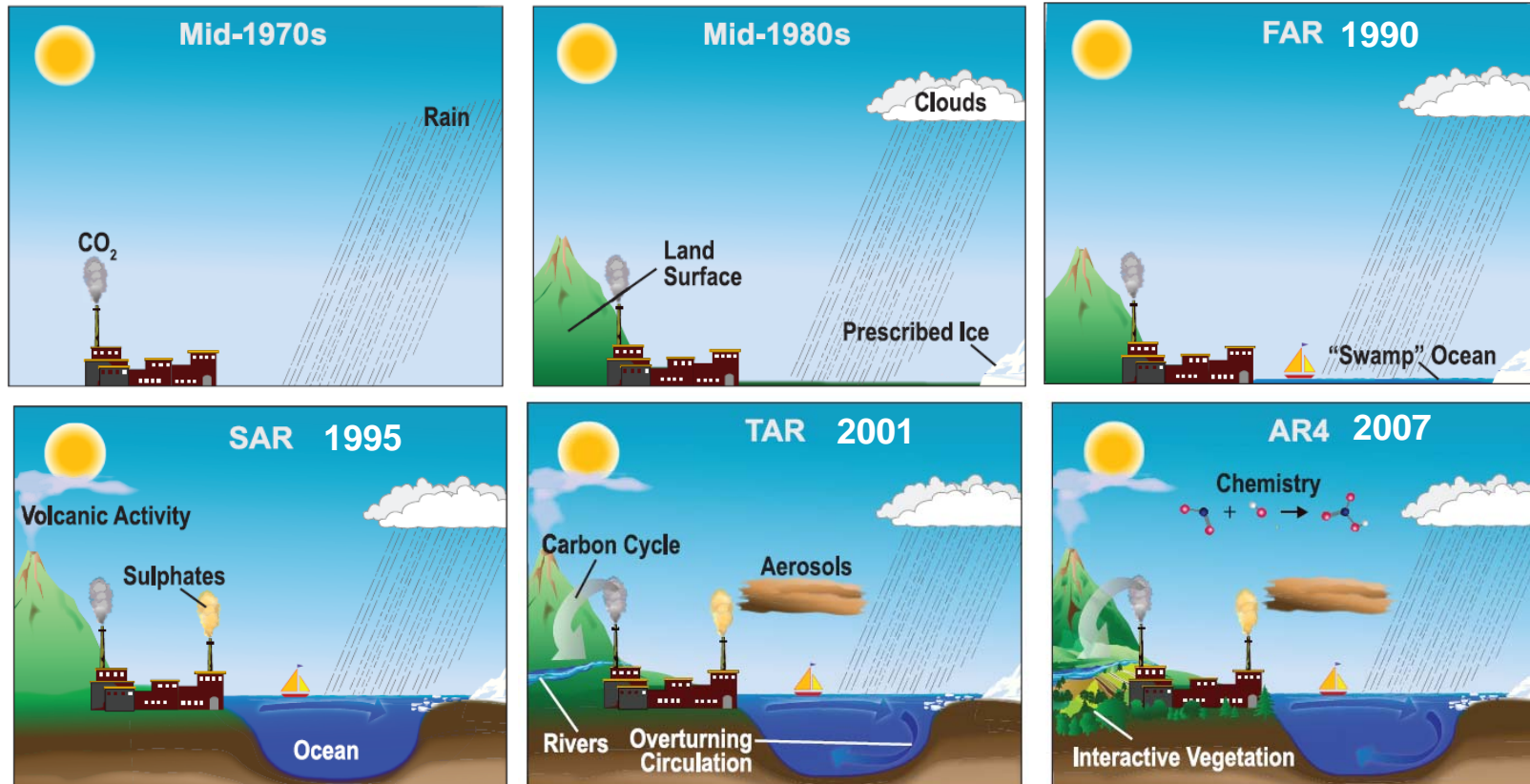
Climate models



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Global climate modelling



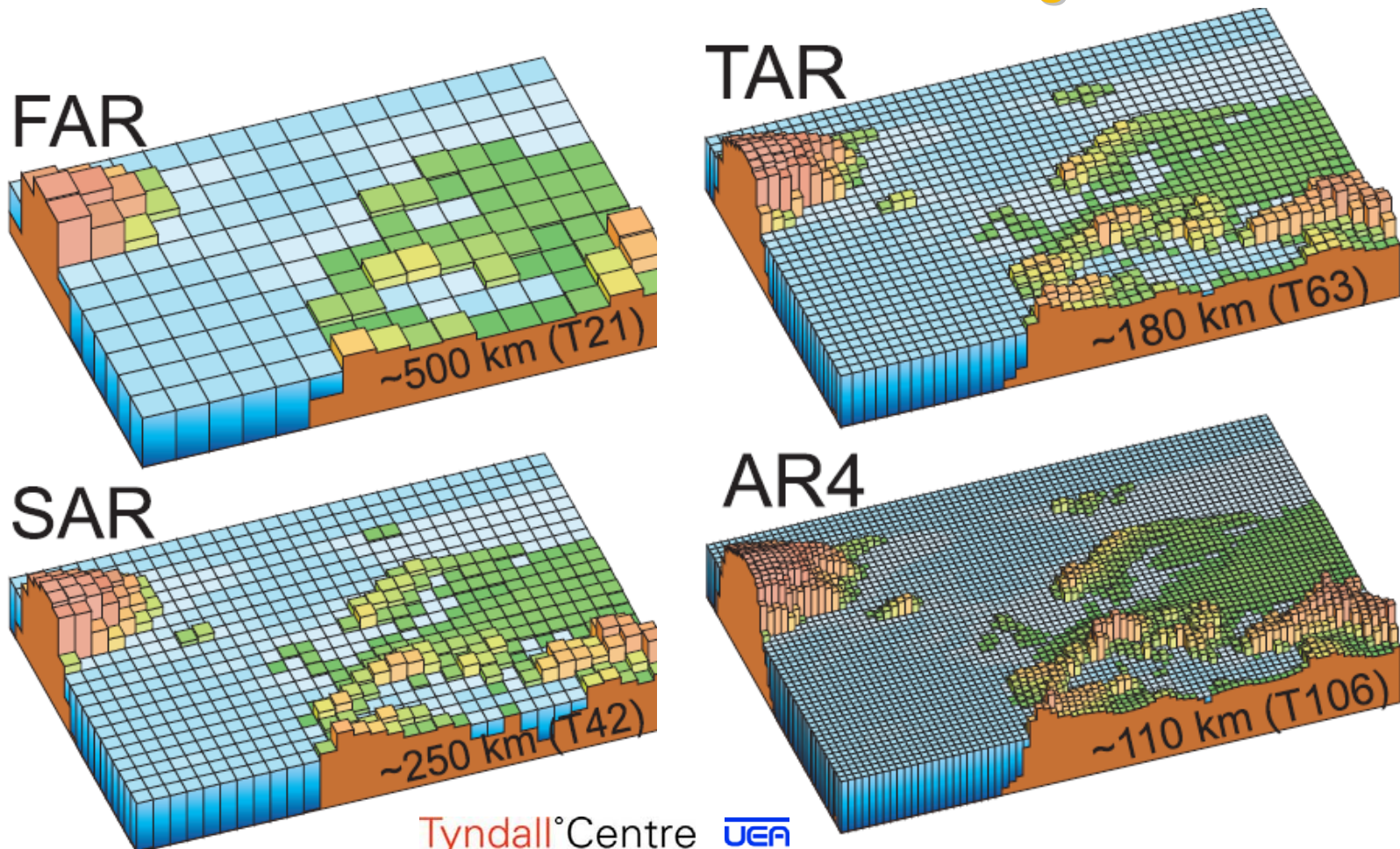
Thanks Suraje Dessai (Tyndall Centre)

Tyndall[°]Centre
for Climate Change Research
UEA
NORWICH



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Global climate modelling

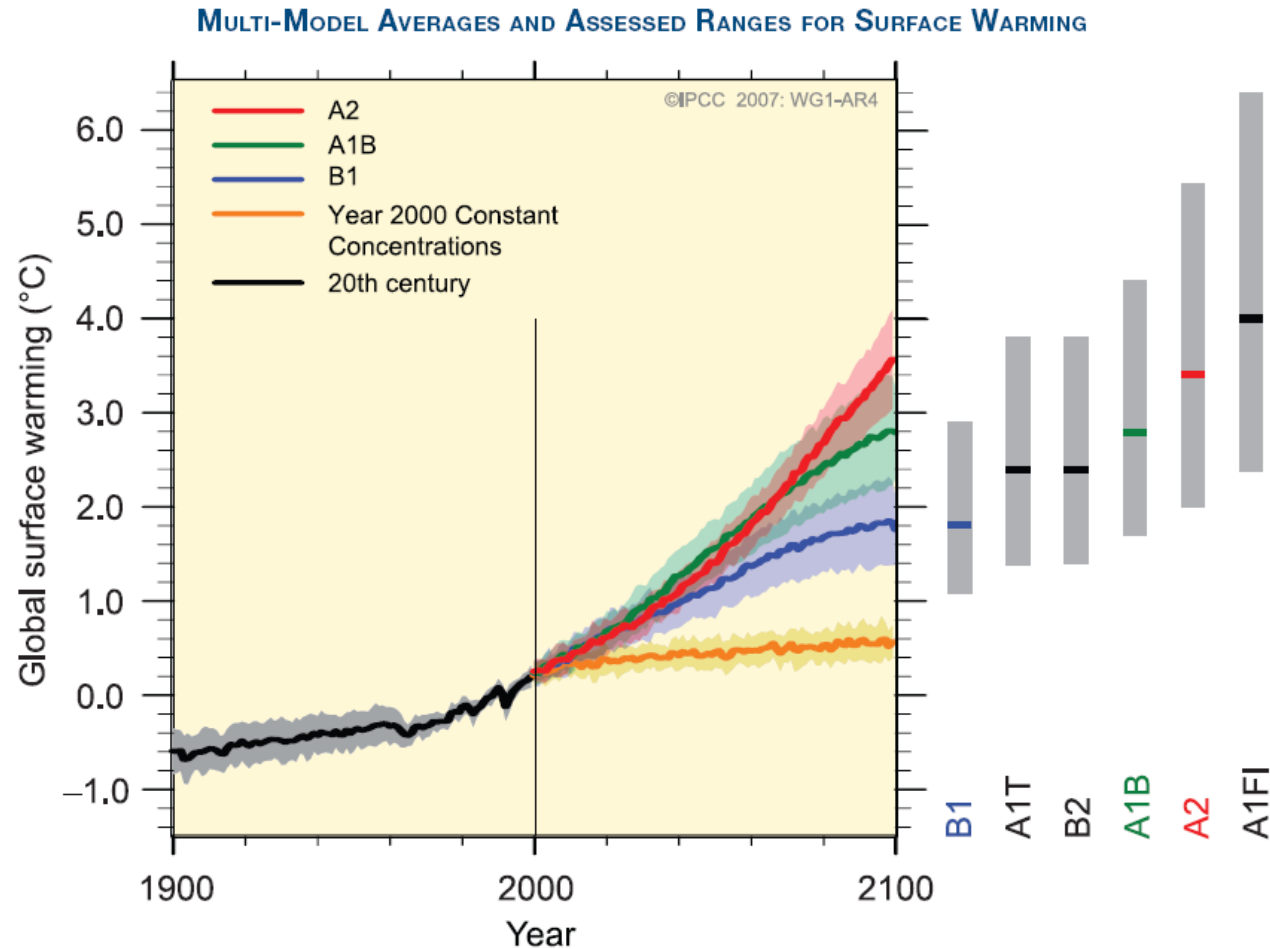


Tyndall Centre
for Climate Change Research



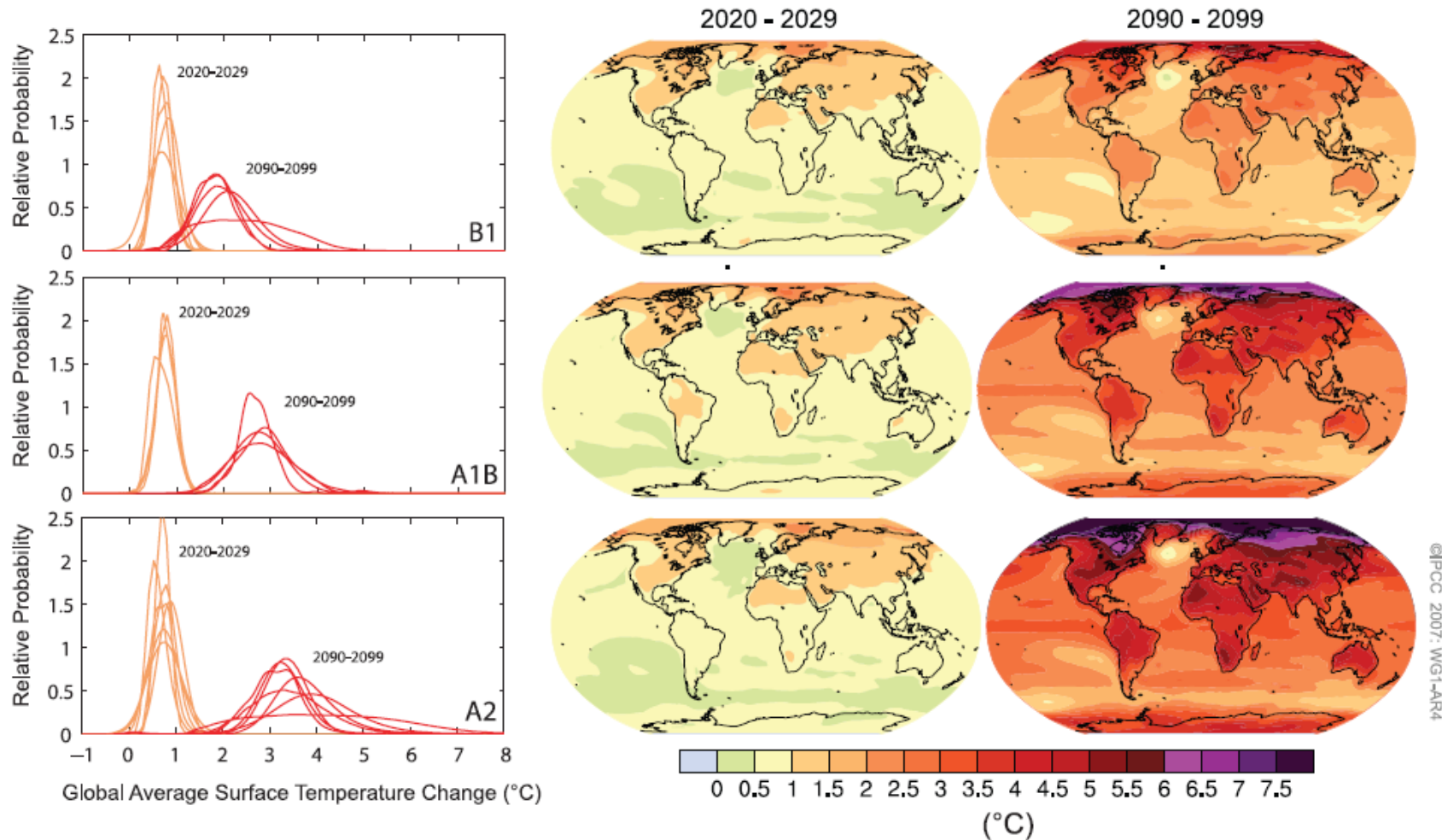
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Global climate models and scenarios



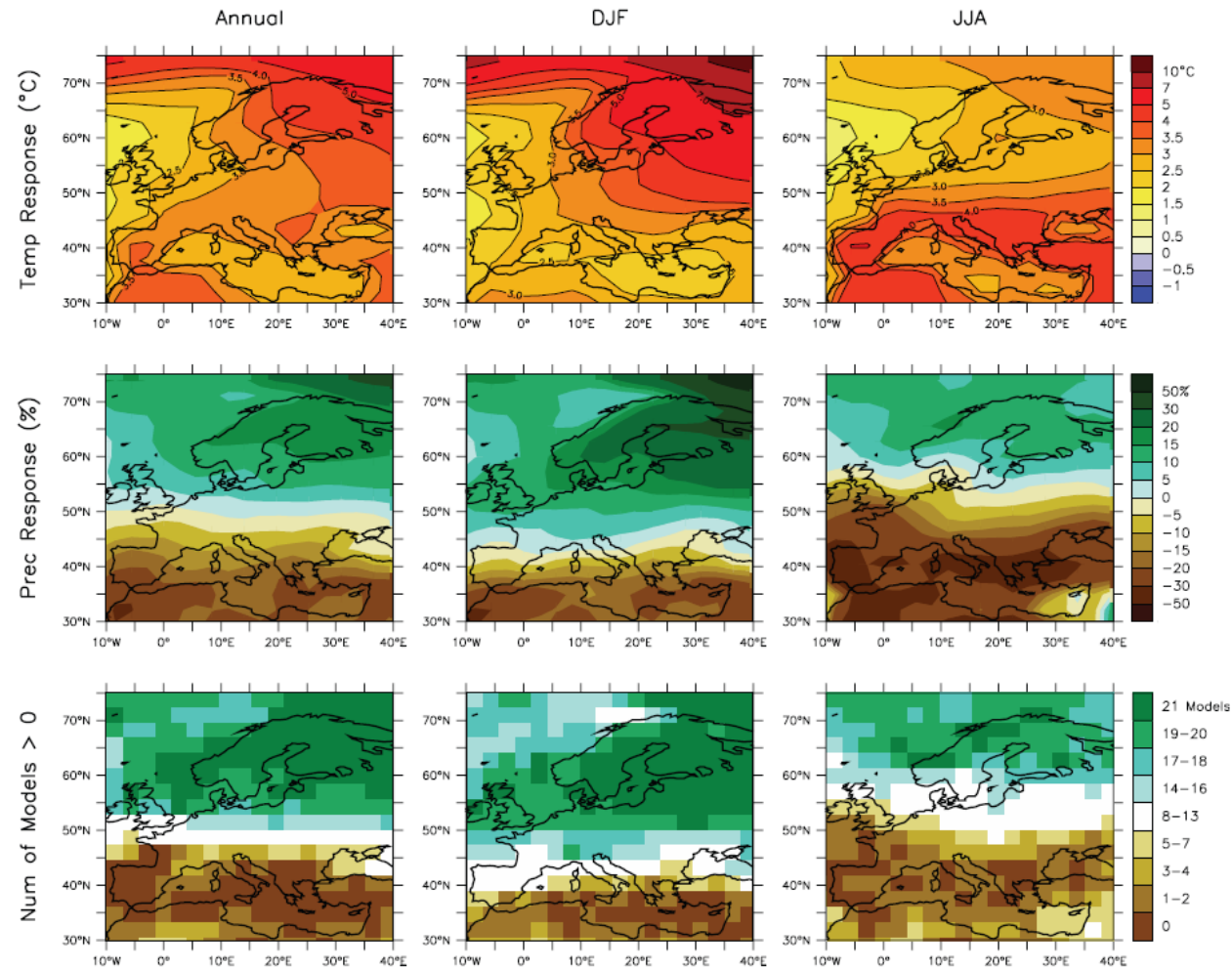


Global climate trends: temperature



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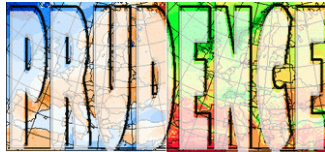
Global climate data is not enough for impact studies



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Climate: downscaling by nesting numerical physical models



Prediction of Regional scenarios and
Uncertainties for Defining European
Climate change risks and Effects
<http://prudence.dmi.dk>

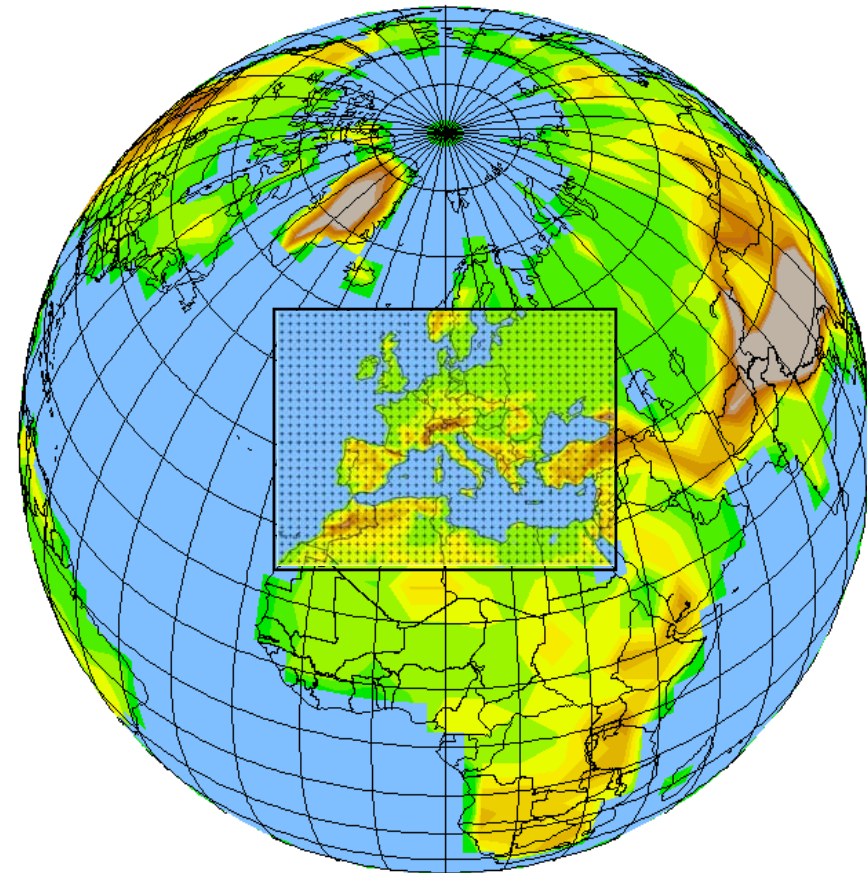


HadRM2, HadRM3

Project LINK

<http://badc.nerc.ac.uk/data/link/>

etc...



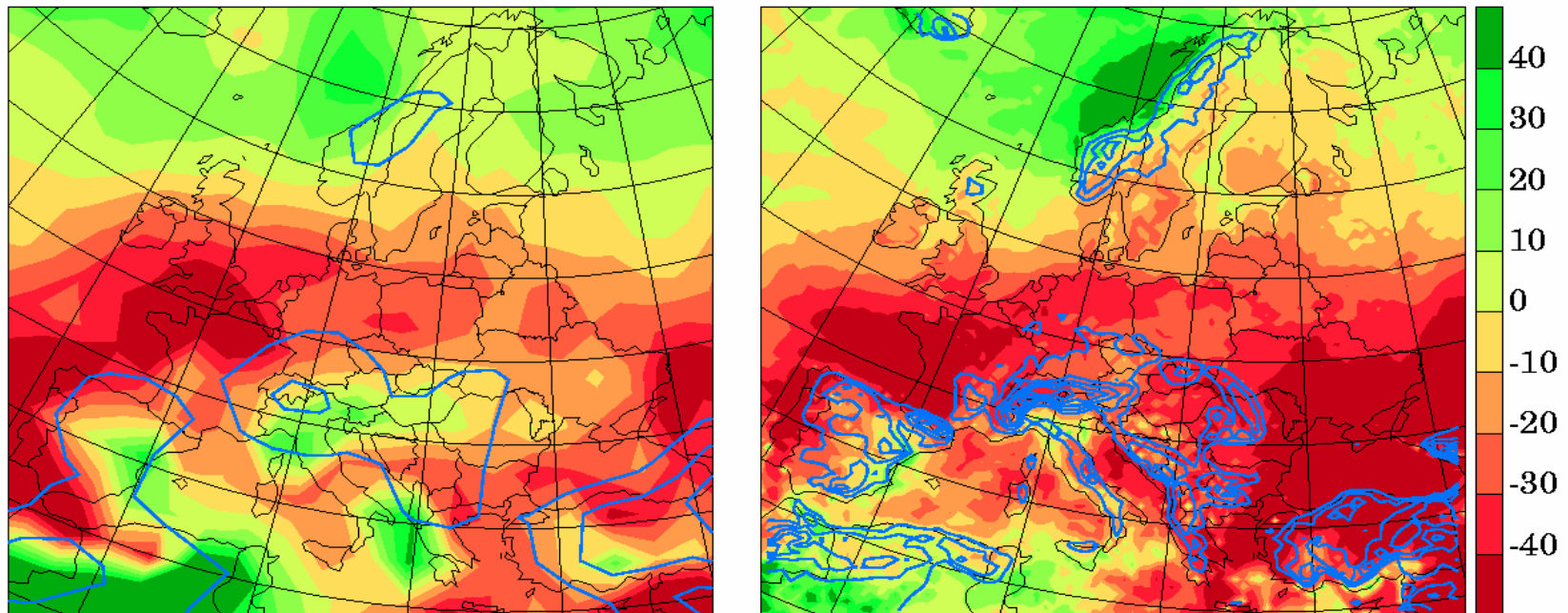
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Climate: downscaling by nesting numerical physical models

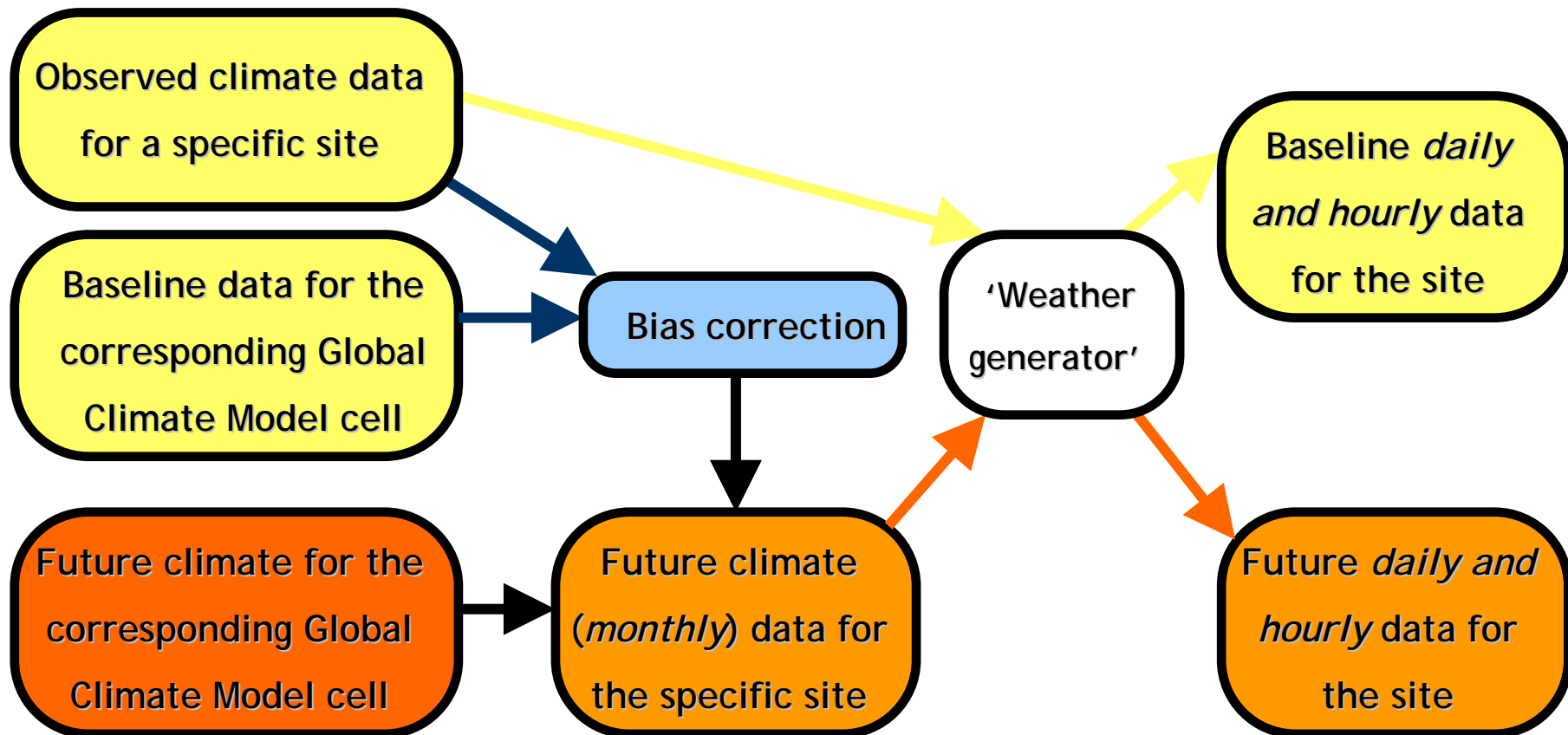


Change in JAS mean precip (2071-2100 minus 1961-1990)



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Climate: downscaling by statistical methods



Example of a weather generator

SDSM 4.2 — A decision support tool for the assessment of regional climate change impacts



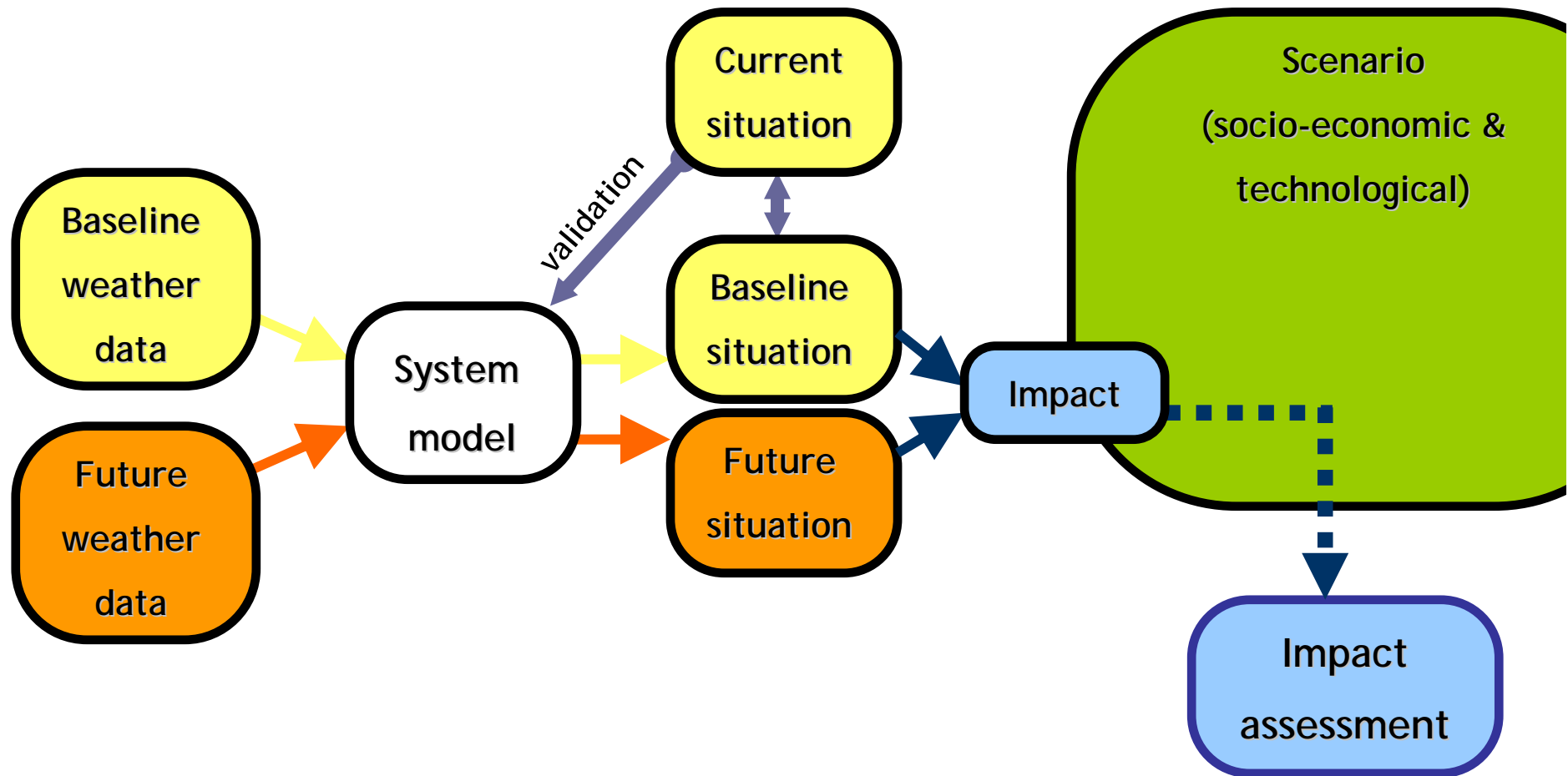
<http://www-staff.lboro.ac.uk/~cocwd/SDSM/index.html>

Thanks Project 2FUN



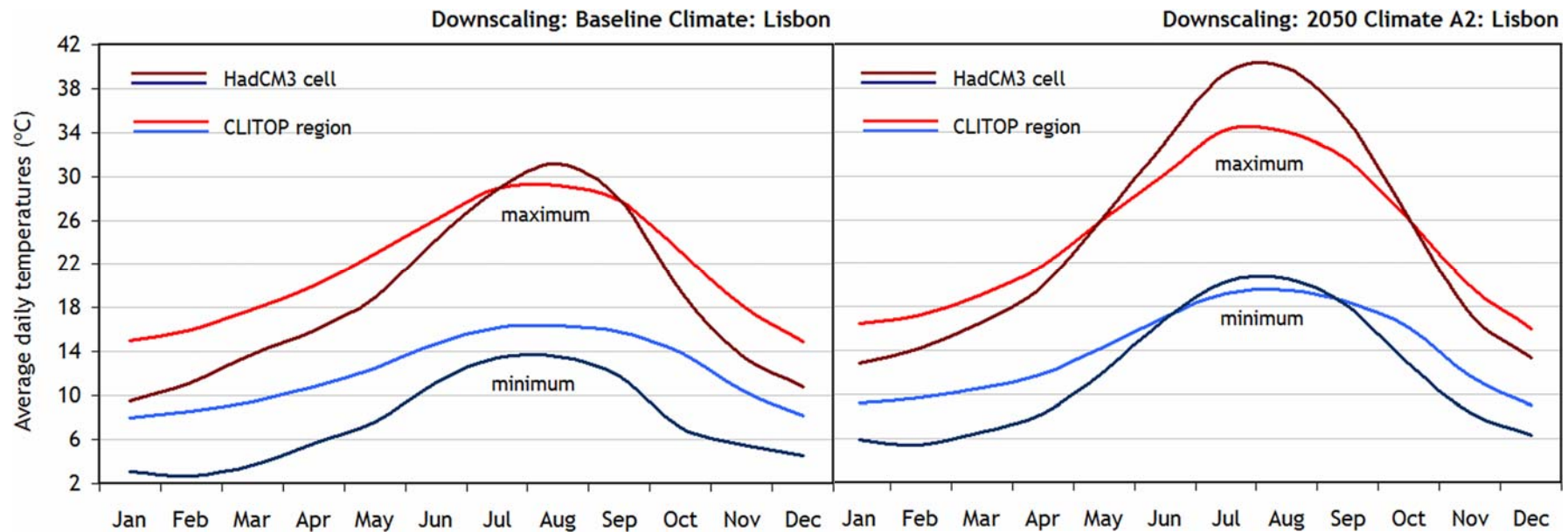
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Impacts within Scenarios



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Case study: heating and cooling



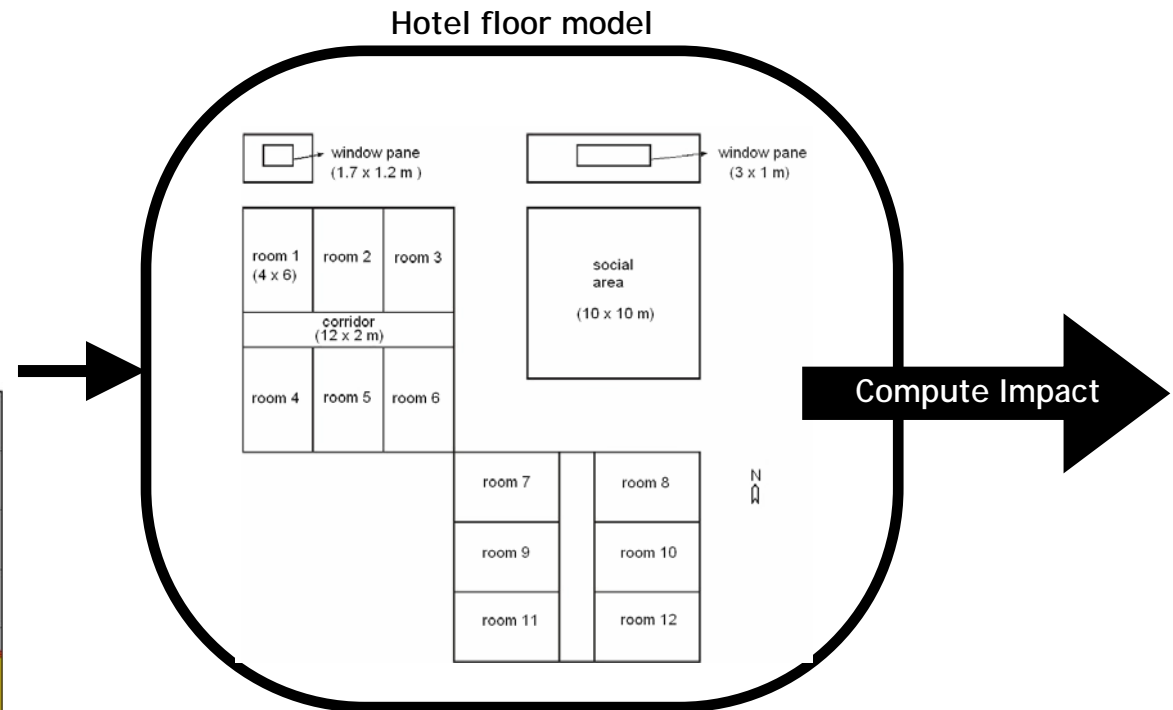
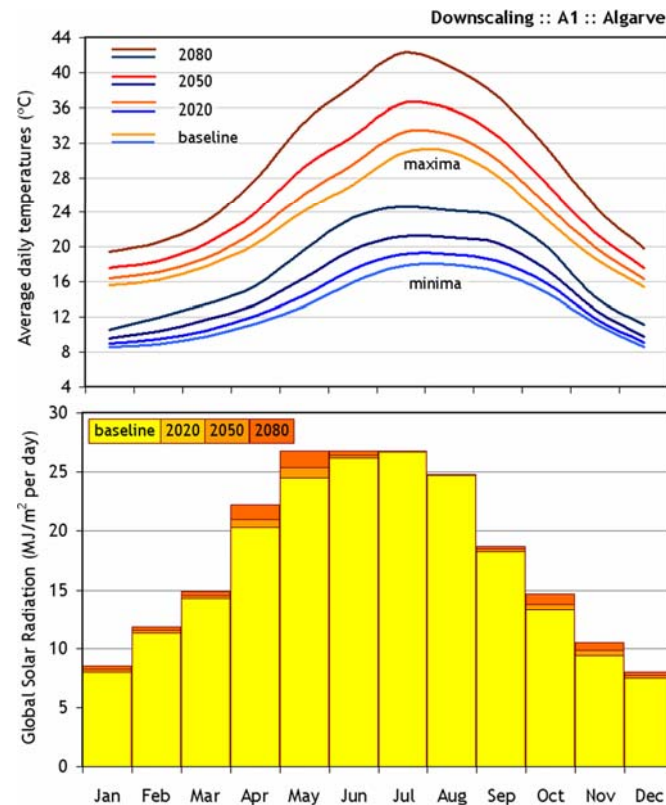
Thanks Project CLITOP



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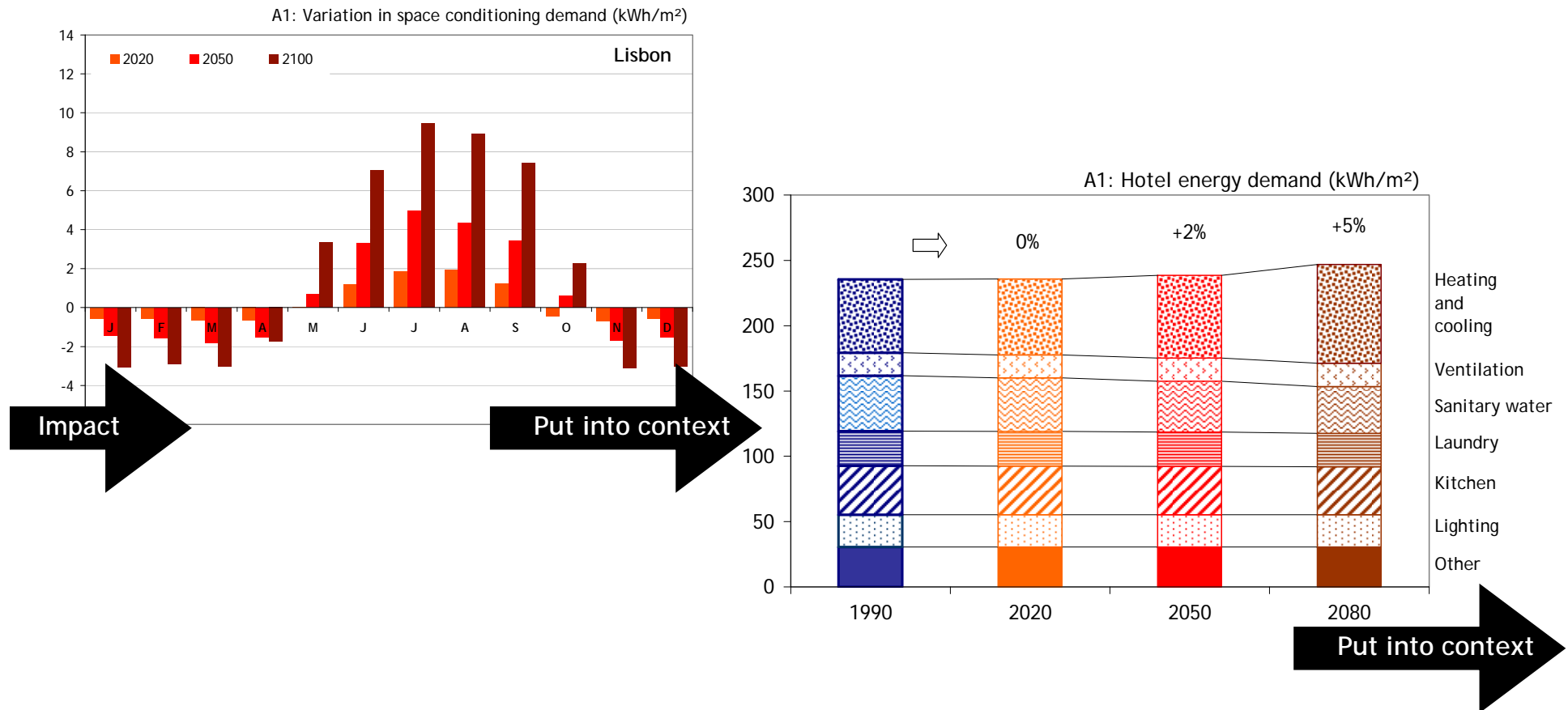
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Case study: heating and cooling



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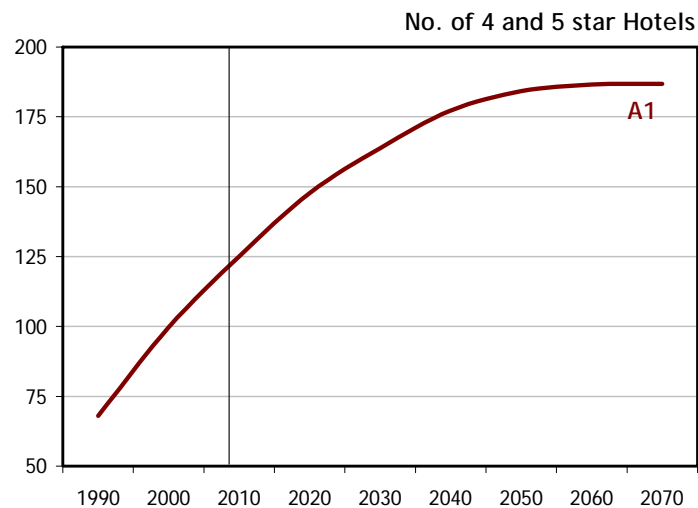
Case study: heating and cooling



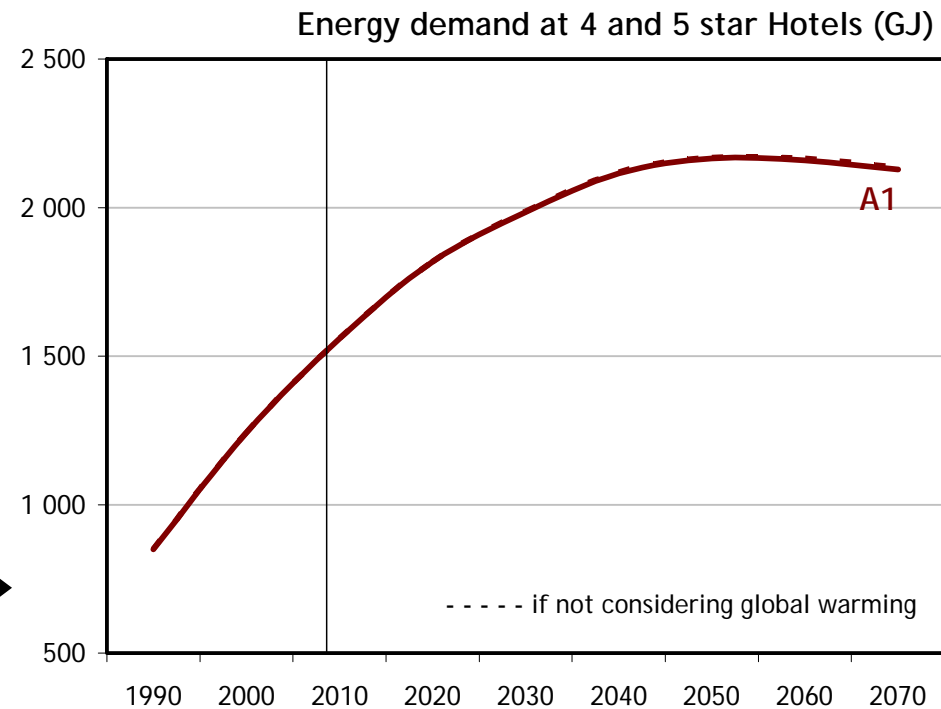
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Case study: heating and cooling



Put into context

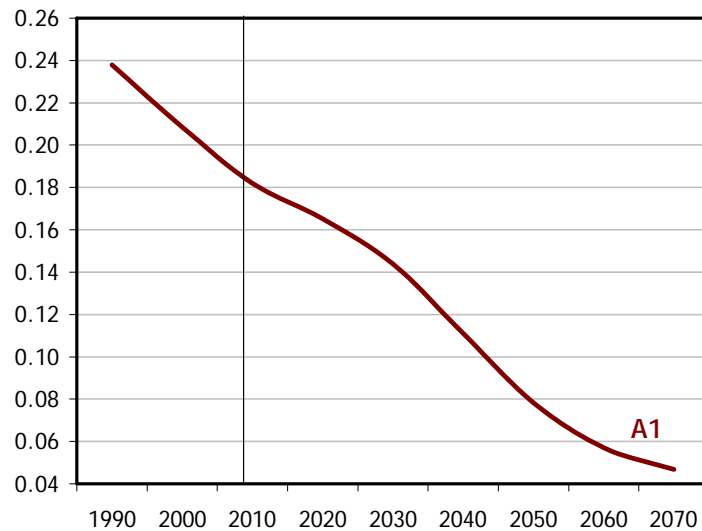


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Case study: heating and cooling

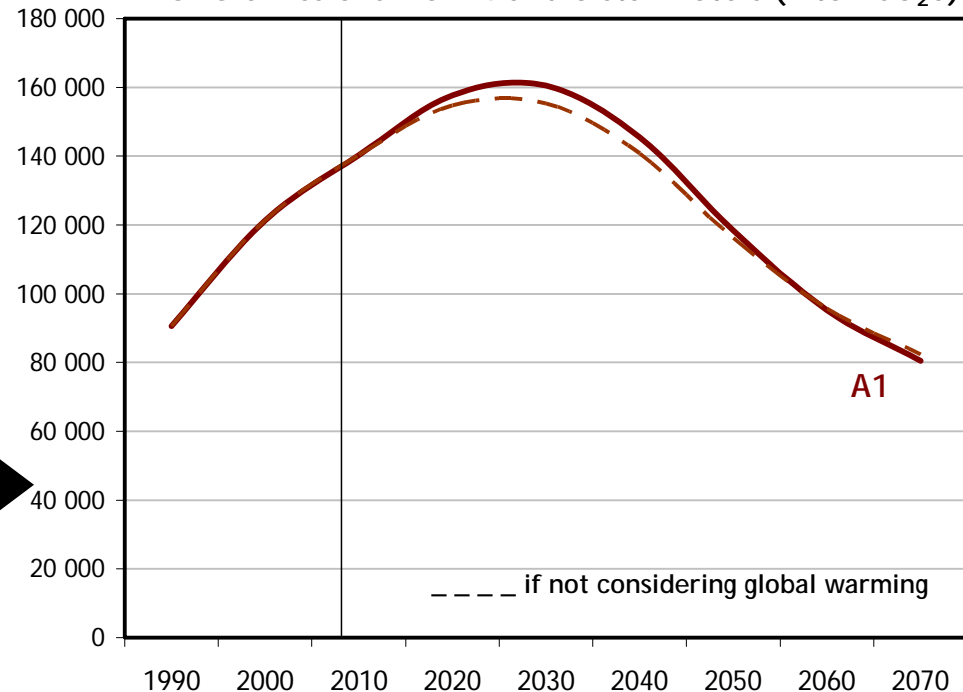
GHG emission factor for electricity (ton CO₂e / MJ)



Put into (another) context

Thanks Project MISP

GHG emissions from 4 and 5 star Hotels (k ton CO₂e)

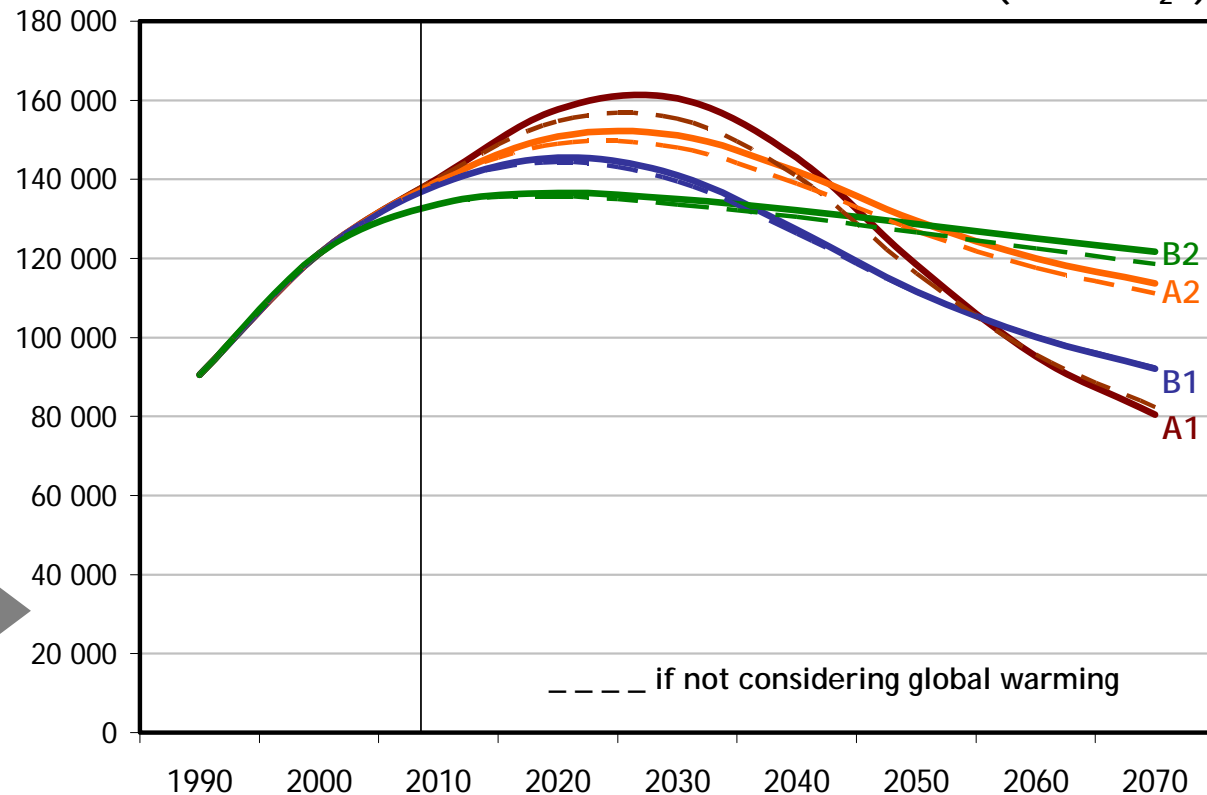


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Future Scenarios and Climate Trends

Case study: heating and cooling

GHG emissions from 4 and 5 star Hotels (k ton CO₂e)



assess uncertainty



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Conclusions

Impact assessment for global warming is based on scenarios of the future, they

- provide the *emission scenarios* for climate modeling
- provide the *macro context* for interpretation of impacts
- can *amplify or reduce* impact strength (even change its signal)
- provide information on *uncertainty*



Conclusions

Using scenarios may be laborious but is not really too difficult nowadays, even for small groups:

- various large scale exercises exist
- global climate data for scenarios is available
- high resolution (time and space) weather data can be obtained (from other Projects or through statistical downscaling)
- for a specific sector such as Tourism, socio-economic and technological scenarios can be adapted (or developed)

(final slide)

