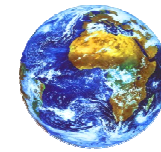


Climate Change and beyond - the EU project "Climate for Culture"

Grant agreement No. 22 6973 (2009 - 2014)



Climate
for Culture



Increasing Europe`s competitiveness through cultural heritage research

Conference of the NET HERITAGE project

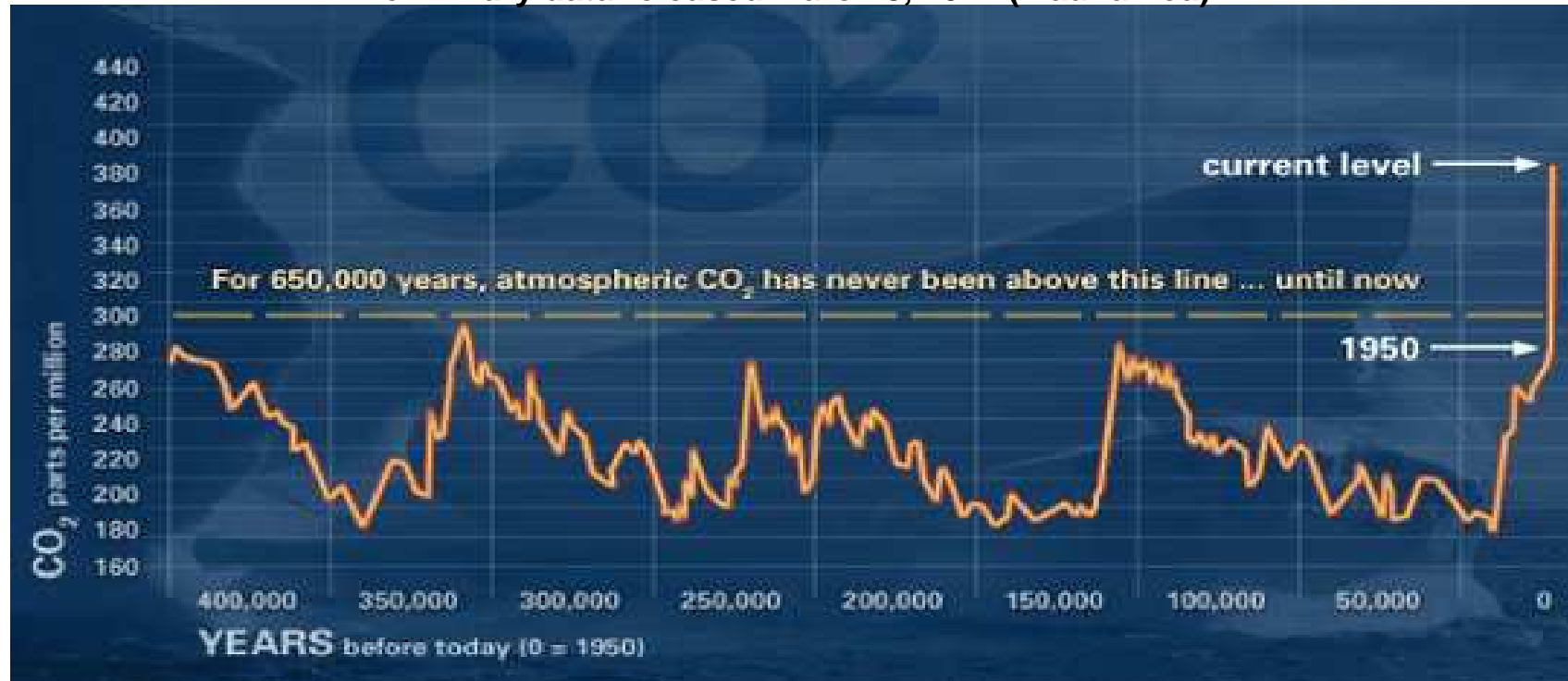
Brussels, 24 March 2011

Johanna Leissner, Fraunhofer Gesellschaft



CO₂ concentration in the atmosphere

[Earth's CO₂ Home Page](#) 391.76 ppm atmospheric CO₂ for February 2011
Preliminary data released March 8, 2011 (Mauna Loa)



How do we care for the welfare of future generations?



EU plan for a competitive low-carbon economy by 2050 to fight climate change

8 March 2011

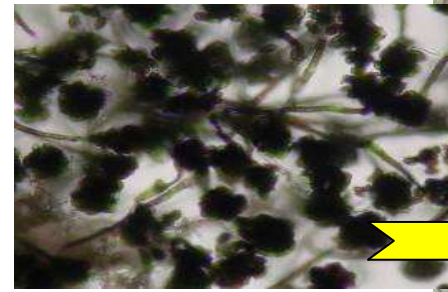
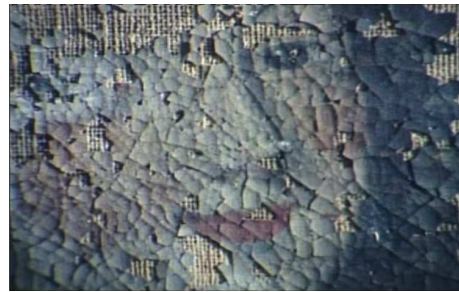


- To keep global warming below 2°C, the world will need to halve its emissions of carbon dioxide and other greenhouse gases by 2050 (compared with 1990 levels).
- Europe has to invest **270 billion € per year** for changing industrial production, renovating buildings and creating CO₂-free mobility (Commissioner Hedegaard)



Climate change impact on cultural heritage

- D**irect
- building envelope - T, rH, wind-driven rain, wind speed, solar radiation, sea level rise and land slide, frost/thaw cycles ...
 - building interior - changing indoor conditions ...



- I**ndirect
- low carbon economy and energy problem, scarcity of resources, financial crisis, budget restrictions in the public sector
 - destabilization of political systems and societies (climate refugees)
 - demographic change / change of interest / no visitors
 - destruction, abandoning of land - danger of landslides



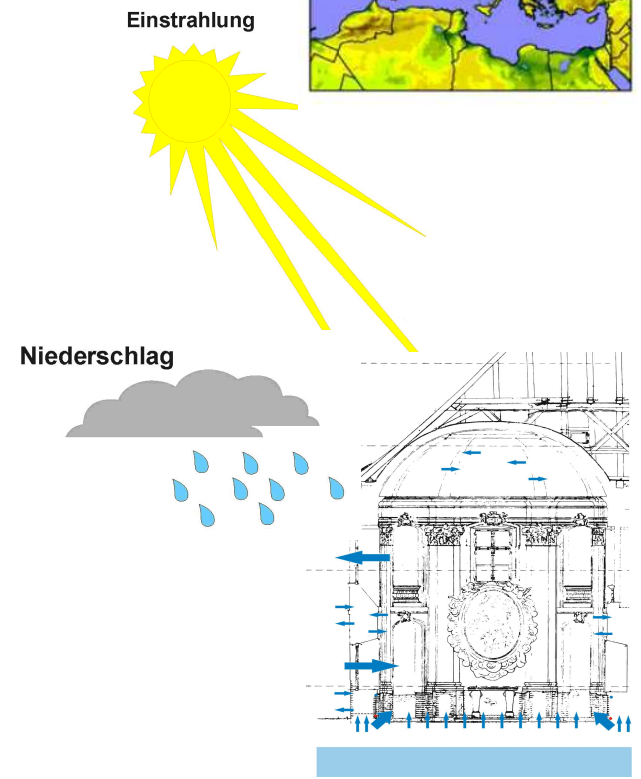
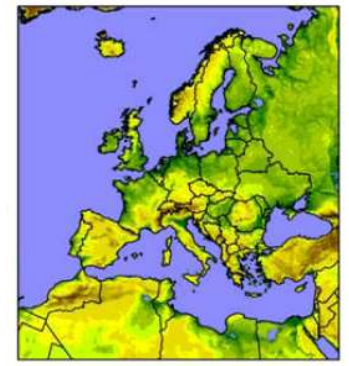
Project cornerstones

- High resolution climate modelling on a regional scale
- Development of hygrothermal building simulation software
- Case study data base and stakeholder contributions
- Economic impact report like the Stern Review

Climate for Culture



REMO
~11 km

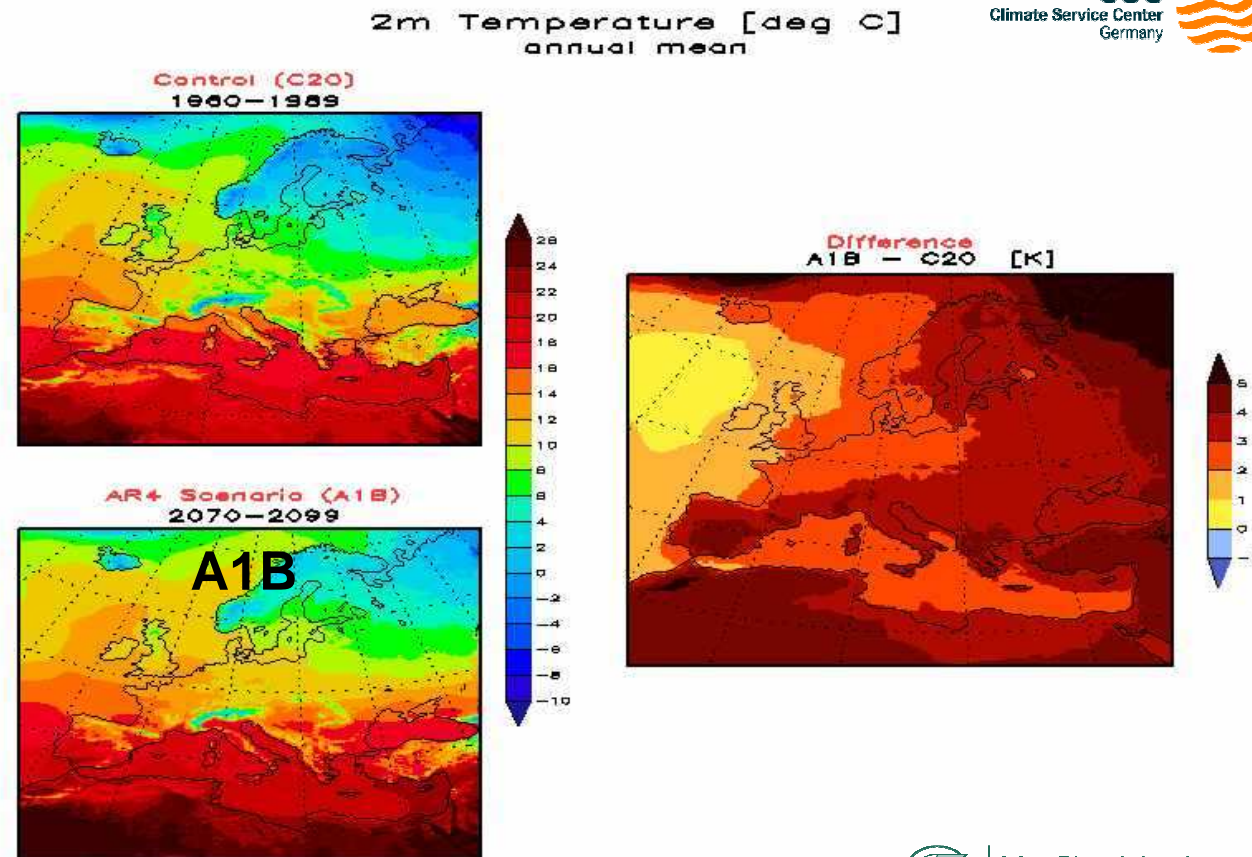


Climate modelling - A1B scenario



Assumptions

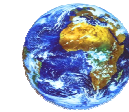
- rapid economic growth
- increasing global population until 2050, decline after 2050
- rapid introduction of new and more efficient technologies
- balanced energy sources



ENSEMBLES project (<http://ensembles-eu.metoffice.com>)



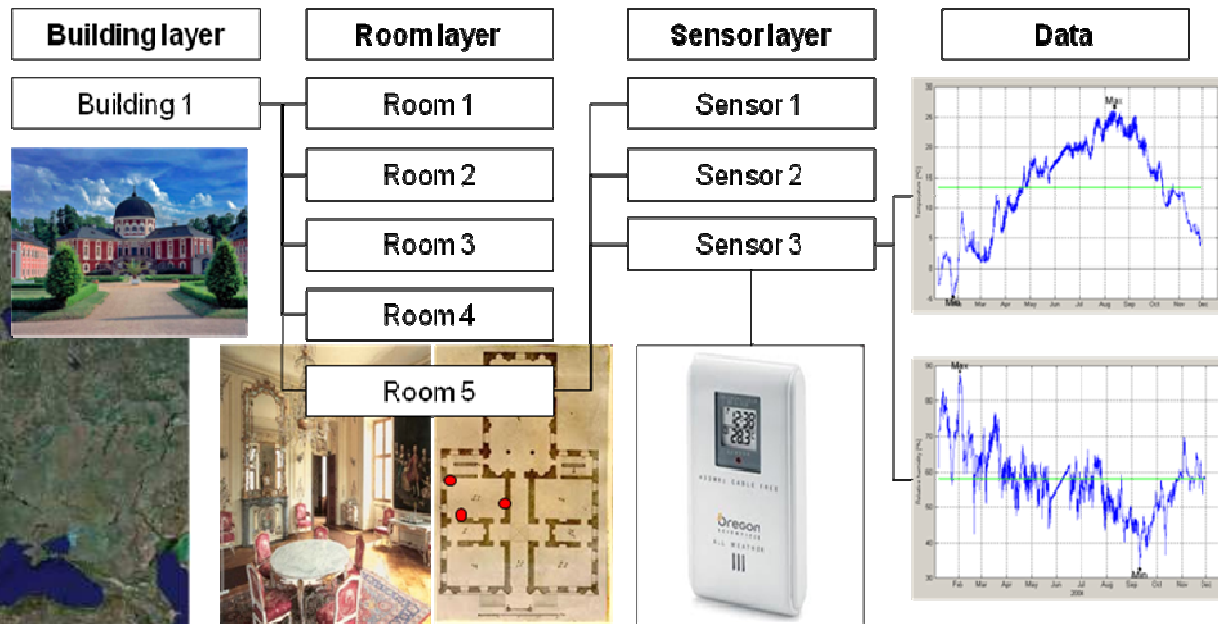
Distribution of *Case Studies* so far



Climate for Culture

Collection of data from Europe & Egypt

climate
microclimate
building
observed damages

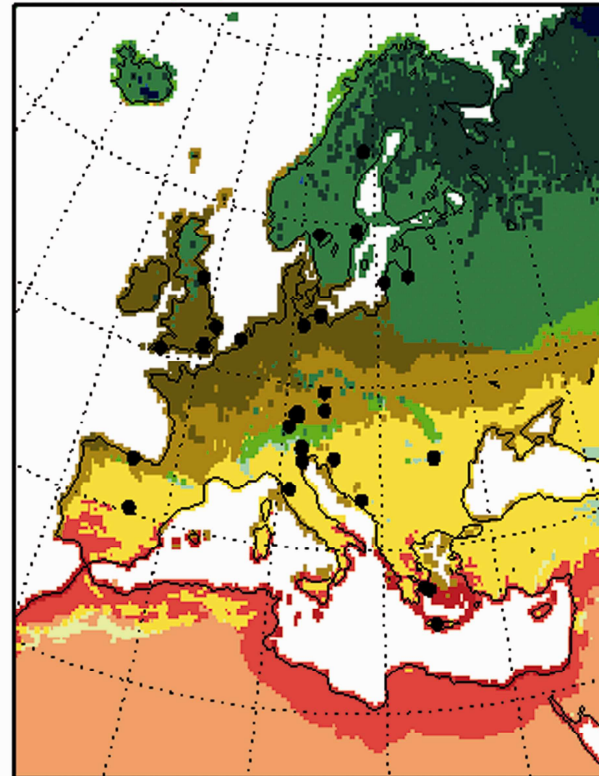
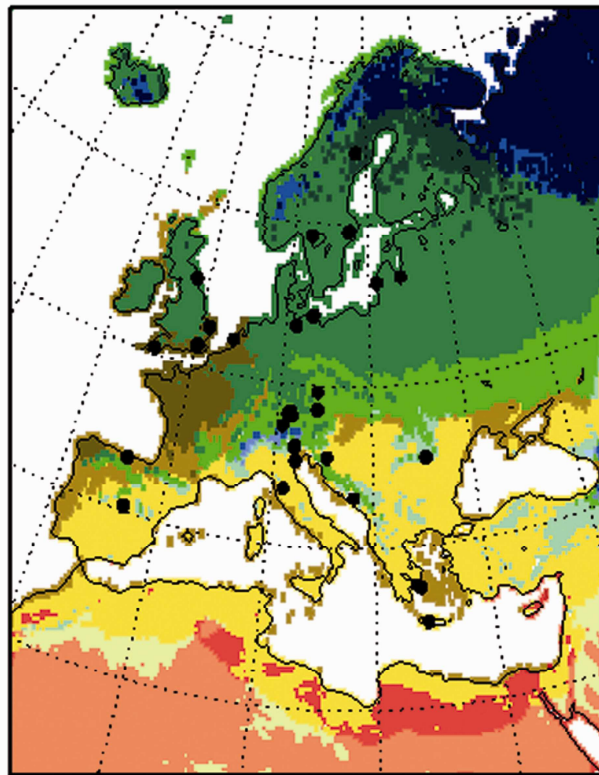


KYBERTEC Ltd. 2010

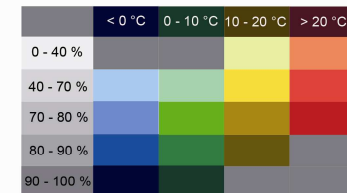


Climate classification maps

Baseline 1960-1989 vs Far Future 2070-2099



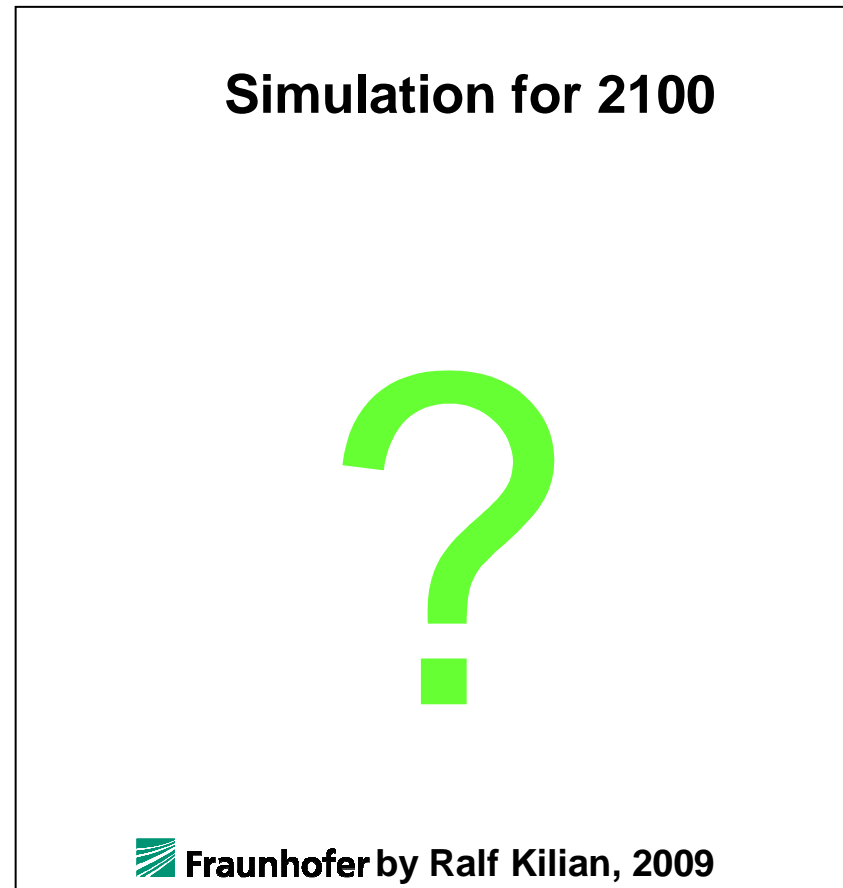
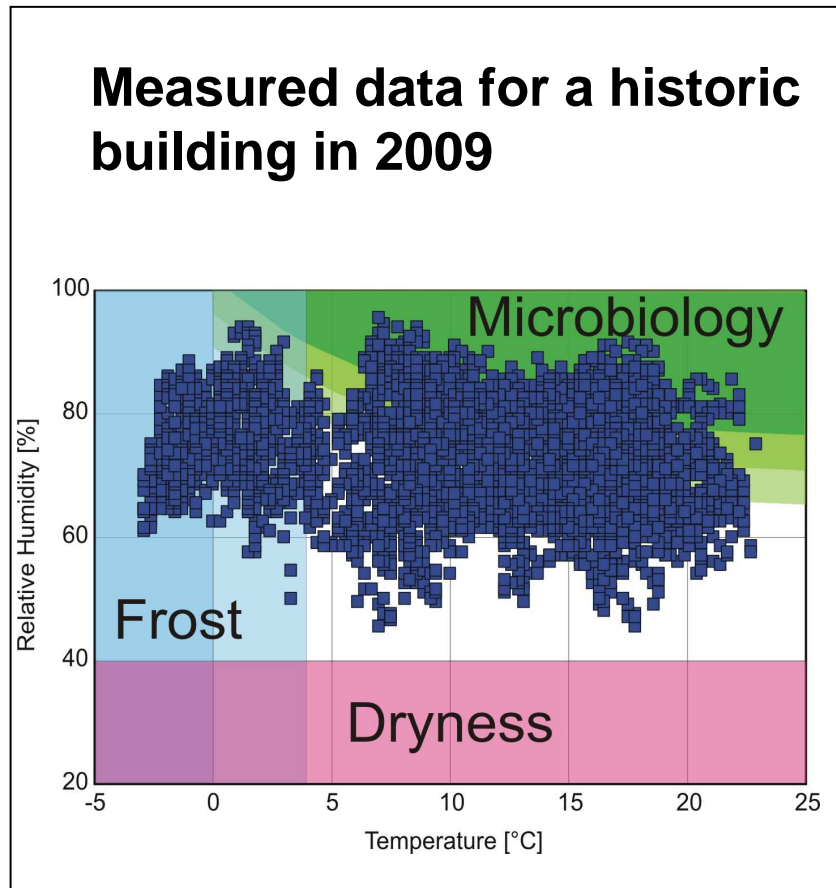
Climate for Culture
Baseline 1960 - 1989 (left)
Far Future 2070 - 2099 (right)
T and RH



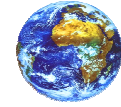
DOERNER INSTITUT by Melanie Eibl, 2011



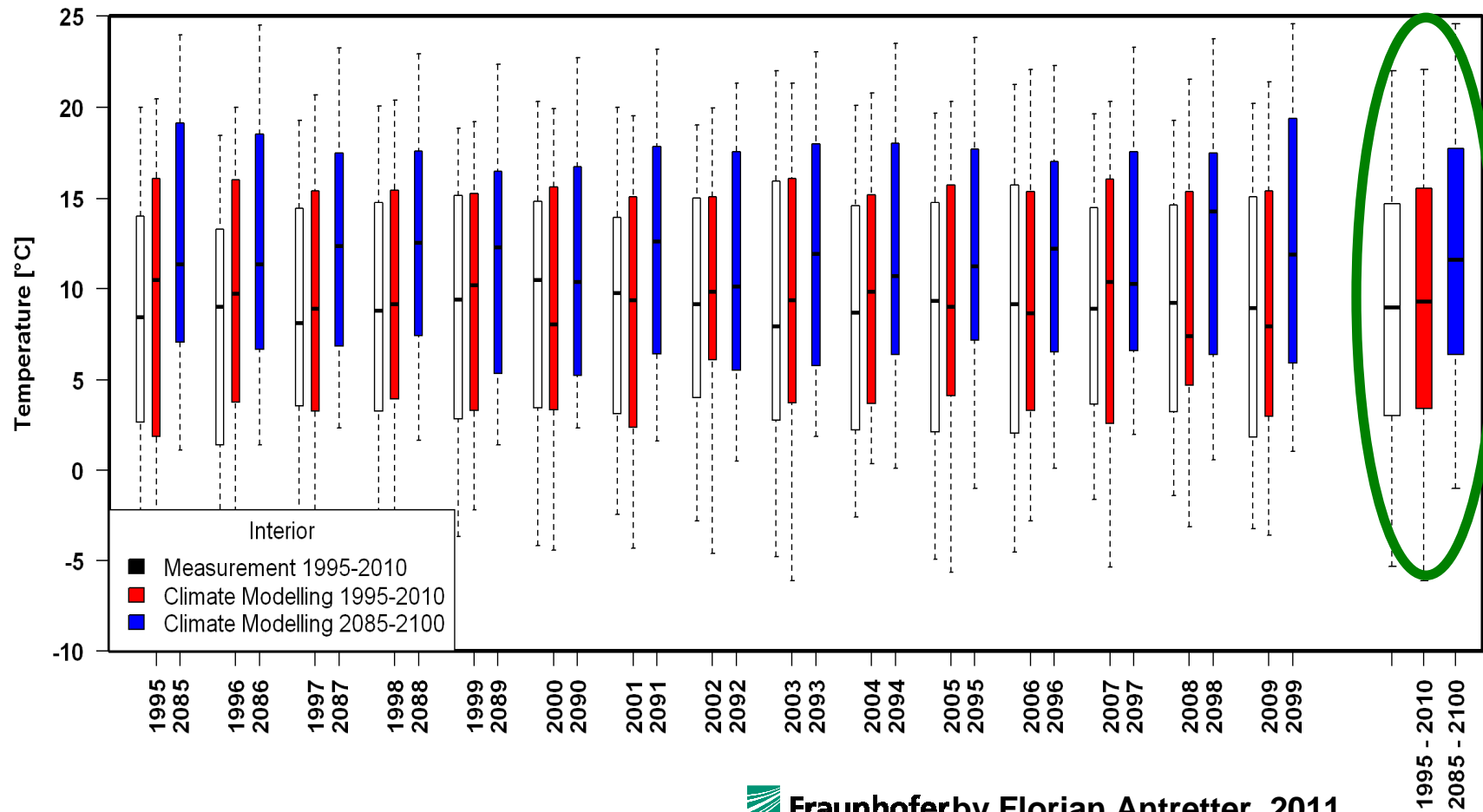
Hygrothermal building simulation and simulation of global climate change 2010 - 2100



Comparison of measured and modelled data for a building- first results



Climate for Culture



Fraunhoferby Florian Antretter, 2011



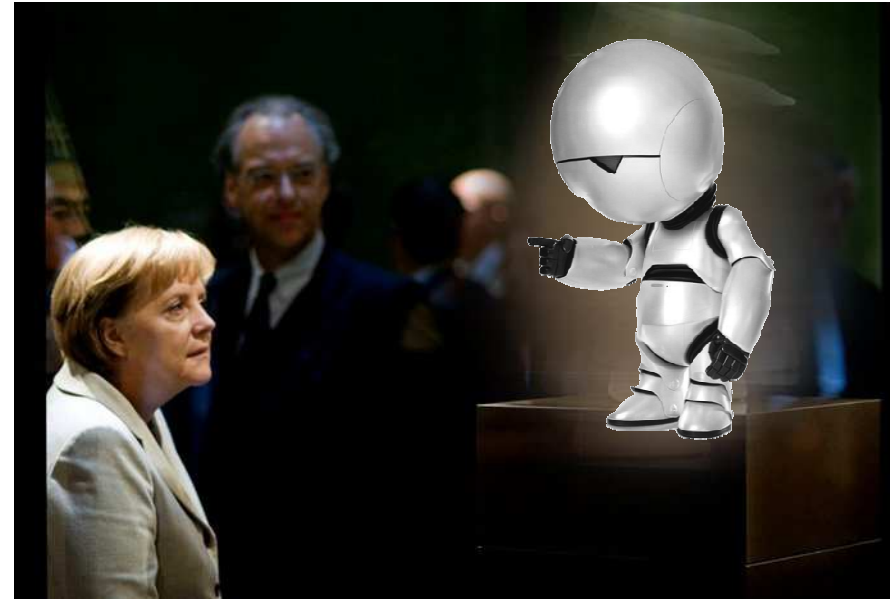
1. Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V., *Germany*
2. Czech Technical University in Prague, *Czech Republic*
3. Consiglio Nazionale Delle Ricerche-Istituto di Scienze dell'atmosfera e del Clima, *Italy*
4. University of Zagreb, *Croatia*
5. Institute of Electronic Structure and Laser, IESL/FORTH, *Greece*
6. Max Planck Institute for Meteorology, *Germany*
7. Technische Universität München, *Germany*
8. Eindhoven University of Technology, *Netherlands*
9. University of Ljubljana, *Slovenia*
10. Gradbeni Institut ZRMK, *Slovenia*
11. Gotland University, *Sweden*
12. Andreas Weiß, freelance conservator-restorer, *Germany*
13. Engineering Consulting & Software Development, *Poland*
14. Krah & Grote Measurement Solutions, *Germany*
15. TB Käferhaus GmbH, *Austria*
16. Haftcourt Ltd. *UK/Sweden*
17. ACCIONA, S.A, *Spain*
18. Bayerische Verwaltung der staatlichen Schlösser, Gärten und Seen, *Germany*
19. Bayerische Staatsgemäldesammlungen – Doerner Institut, *Germany*
20. National Trust for England, Wales and Northern Ireland, *UK*
21. Kybertec Ltd., *Czech Republic*
22. Glasgow Caledonian University, *UK*
23. Center for Documentation of Cultural & Natural Heritage, *Egypt*
24. Jonathan Ashley-Smith, Consultant for Conservation Risk Assessment, *UK*
25. Institut National du Patrimoine, *France*
26. London School of Economics & Political Science, *UK*
27. Fondazione Salvatore Maugeri - Clinica del Lavoro e della Riabilitazione, *Italy*



Cultural heritage 2010

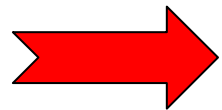


Cultural heritage 2100?



Chancellor Merkel 2006: "Wir dürfen unsere Zukunft nicht verbrauchen!" [We must not use up our future]

Cultural heritage is a **non-renewable resource**



we must take action now! EU Sustainability S & FP8

