Regional climate information and services

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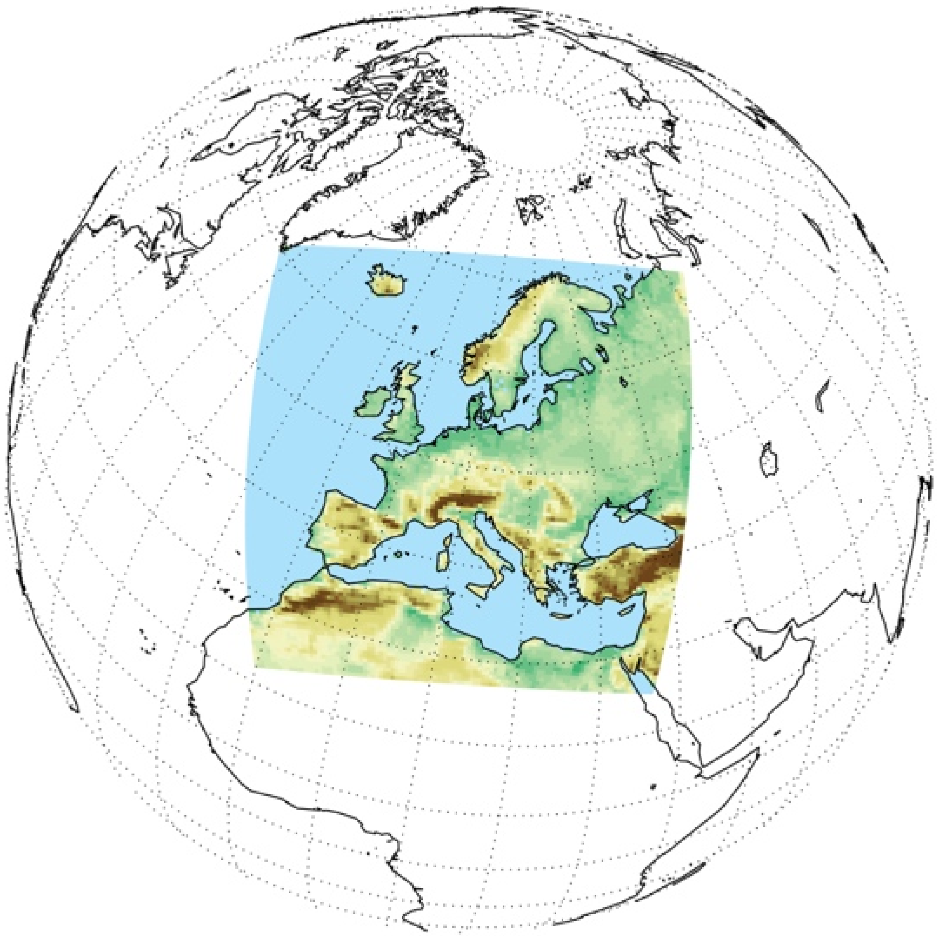
Eine Einrichtung des Helmholtz-Zentrums Geesthacht

Schalke Arena
DAPD_Welt Online_28.12.2010



Regional Climate Information

Demand

Climate services

Services and products: 2 Examples

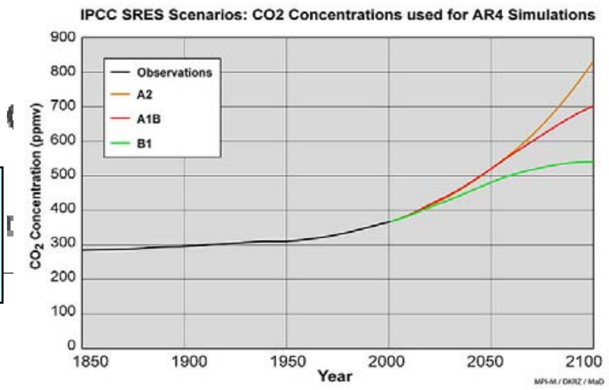
European and international context

First lessons learned

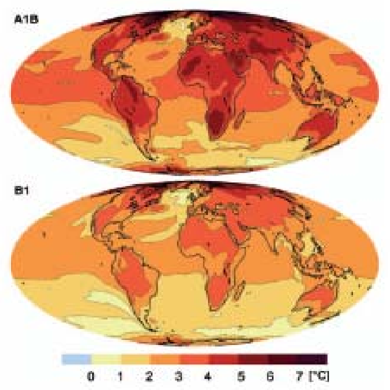
Regional Climate Information

It is of utmost importance
to observe climatic changes in regions
(challenge for monitoring infrastructure)

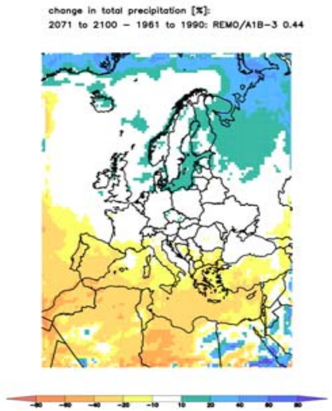
Concept



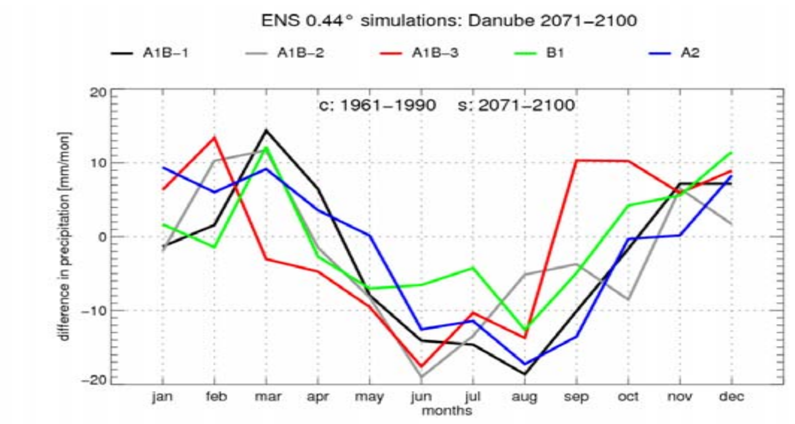
Emission Scenarios (IPCC)



Global climate change simulations (GCMs)



Regional climate change simulations (RCMs)



Regional climate change signals

Addressing the Bandwidth of the Climate Projections

Uncertainties associated with methods of downscaling →	Use different regional models and different approaches (dynamic, statistic)
Natural Climate variability →	Implement several model realizations for each scenario
Uncertainties in future development →	Consider several scenarios
Requirement for a clear and synthetic message →	Provide a probability distribution of the climate projection

Demand

Product: **combination analyses on ice loads**
Sector: **infrastructure, construction sector**

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Electrical tower in eastern Thuringia

dpa_kreiszeitung.de 09.12.2010

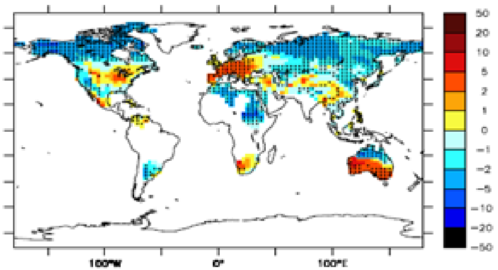
Electrical tower close to Münster
Sueddeutsche.de 04.12.2005

where and how often?

Climate Services : Building an Information System

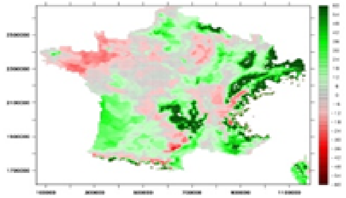
Interactions with users/stakeholders

Decision support tools
Dedicated analyses
Support Innovation : eg EIT



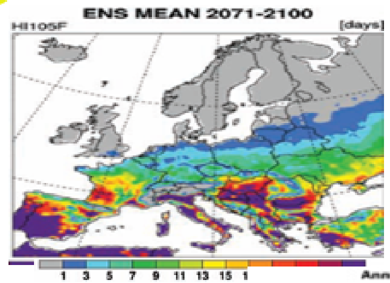
Energy supply
Threshold diurnal amplitude

Impact studies
Socio-economy, Ecosystems, Health
Develop Interdisciplinarity



Maize yield change

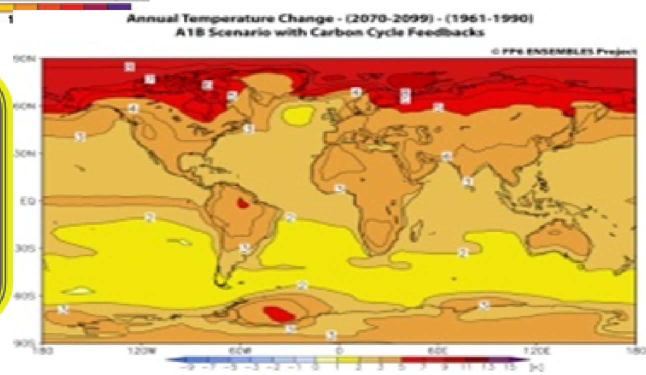
Climate Indicators
Heat waves, drought/floods



Heat index
(ENSEMBLES FP6)

Climate projections
Global models
downscaling

Climate Observations

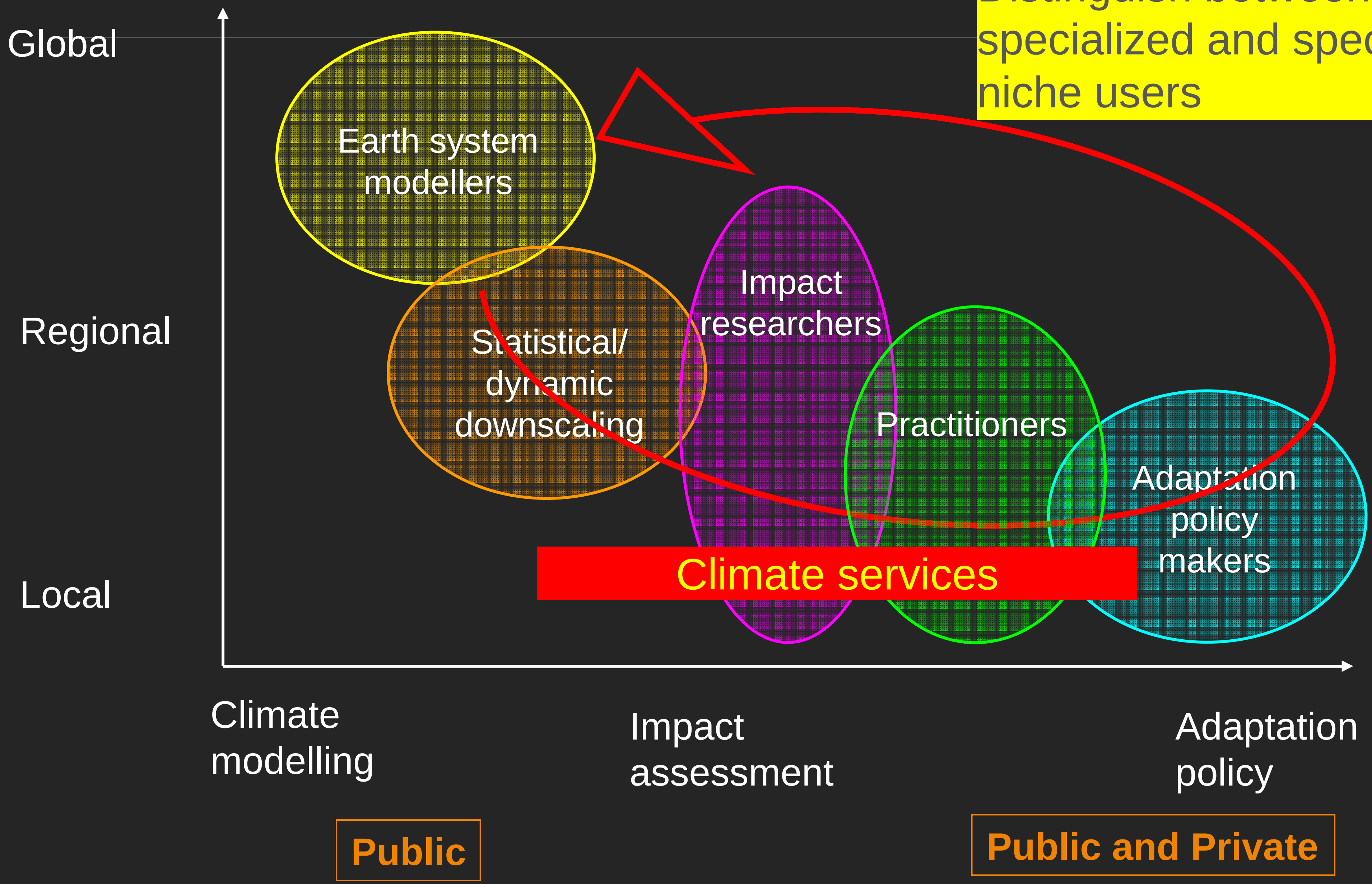


From: Sylvie Joussaume

Climate Services

Linking with the Users

Account for a diverse group of users.
Distinguish between non-specialized and specialized, niche users



Role of climate services (CS)

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➢ Climate information

- ✓ CS as a facilitator, integrator, communicator and community builder

➢ Private-Public Partnership

- ✓ CS as a *neutral* reference for the interpretation of climate data

➢ Operational Center

- ✓ CS as an information/data provider to address the *needs* of private and public institutions

Attributes of a Climate Service

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- Provide balanced, credible, cutting edge scientific and technical **information**
- Engage a **diversity of users** in meaningful ways to ensure their needs are being met
- Provide and contribute to **science-based products** and services to minimize climate-related risks
- Strengthen **observations**, standards, and data stewardship
- Improve **regional and local** projections of climate change
- Identify, quantify and price the direct and indirect **risks** associated with climate changes. Inform **policy options**

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Many Sectors will benefit from and contribute to Climate Services:

- Energy
- Agriculture
- Forestry and land management
- Water management
- Coastal management
- Fisheries
- Transport
- Tourism
- Trade and Commerce
- Human health
- Financial services and insurances
- Construction and urban development
- Civil protection and environmental security

The socio-economic and environmental benefits of a revolution in weather, climate and Earth system analysis and prediction

Melvyn Shapiro, Jagadish Shukla, Brian Hoskins, John Church, Kevin Trenberth, Michel Beland, Guy Brasseur, Mike Wallace, Gordon McBean, Jim Caughey, David Rogers, Gilbert Brunet, Leonard Barrie, Ann Hendersen-Sellers, David Burridge, Tetsuo Nakazawa, Martin Miller, Phillippe Bougeault, Rick Anthes, Zoltan Toth and Tim Palmer

Scientists from the World Weather Research Programme (WWRP), World Climate Research Programme (WCRP), International Geosphere-Biosphere Programme (IGBP) and the natural-hazards and socio-economic communities[1] have identified an urgent necessity for establishing a weather, climate and Earth-system prediction project. This will increase the capacity of disaster-risk reduction managers and environmental policy makers to make sound decisions, in order to minimize and adapt to the societal, economic and environmental vulnerabilities arising from high-impact weather and climate.

Title required

Clockwise from top left: Brush fire in Macedonia during the south-eastern European summer heat wave of 2007; the town of Upton-upon-Severn in Worcestershire, England, surrounded by water during the devastating flooding of July 2007; an Ethiopian goat herder leads his livestock through the dust in the desert where severe drought in East Africa has forced overgrazing, which destabilizes the soil; refugees from Hurricane Katrina wait for evacuation

Rationale

The socio-economic, environmental and health impacts of recent extreme weather and climate events, such as the destructive flooding rains over India, China, England, and the United States and the simultaneous south-eastern Europe severe heat wave and drought during the summer of 2007; the devastation of New Orleans by Hurricane Katrina in 2005; the deadly European heat wave of August 2003, and the persistent multi-decadal African drought that ravaged the semi-arid regions of the Sahel, demonstrate the vulnerability of modern humanity, economies, and the environment to high-impact weather and climate. Effective mitigation of, and adaptation to, such events requires accurate prediction of the likelihood of changing weather and climate at global, regional and local scales, combined with enhancing the capacity of disaster-risk reduction managers and environmental policy makers to utilize this information to make sound decisions that minimize the societal vulnerability, economic and environmental losses and that maximize economic opportunities arising from high-impact weather, climate variability and climate change.

We stand at the threshold of providing and responding to major advances in observations, analysis and prediction of high-impact weather and climate events, and the complex interaction between the physical-biological-chemical Earth system[2] and global societies. This opportunity arises from the notable progress in our ability to monitor and predict short-term weather hazards and climate variability and change, and the utilization of this information by disaster-risk-reduction managers and environmental policy makers. For example, short-term regional forecasts (hours to three-day periods), prepared on spatial scales of a few kilometres, are currently capable of predicting the occurrence of flooding rainstorms, air-quality emergencies, coastal storm surges, severe wind events, hurricane track and land fall, with reasonable skill. Global weather

Partnerships with stakeholders will have to be developed.

Service and Products:
2 examples

Significance und Robustness

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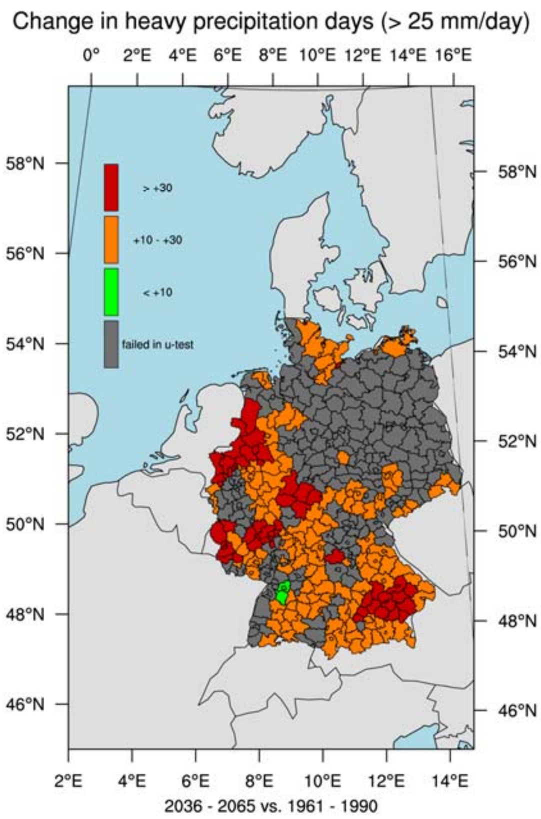
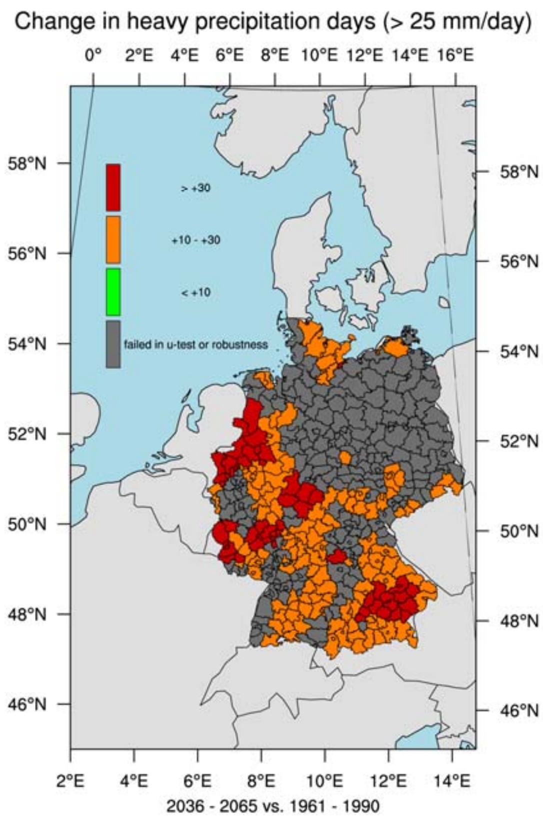
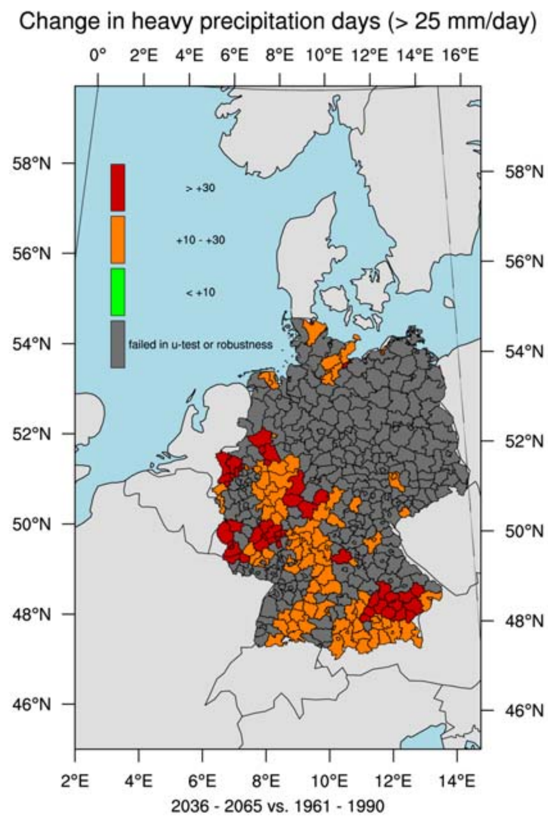


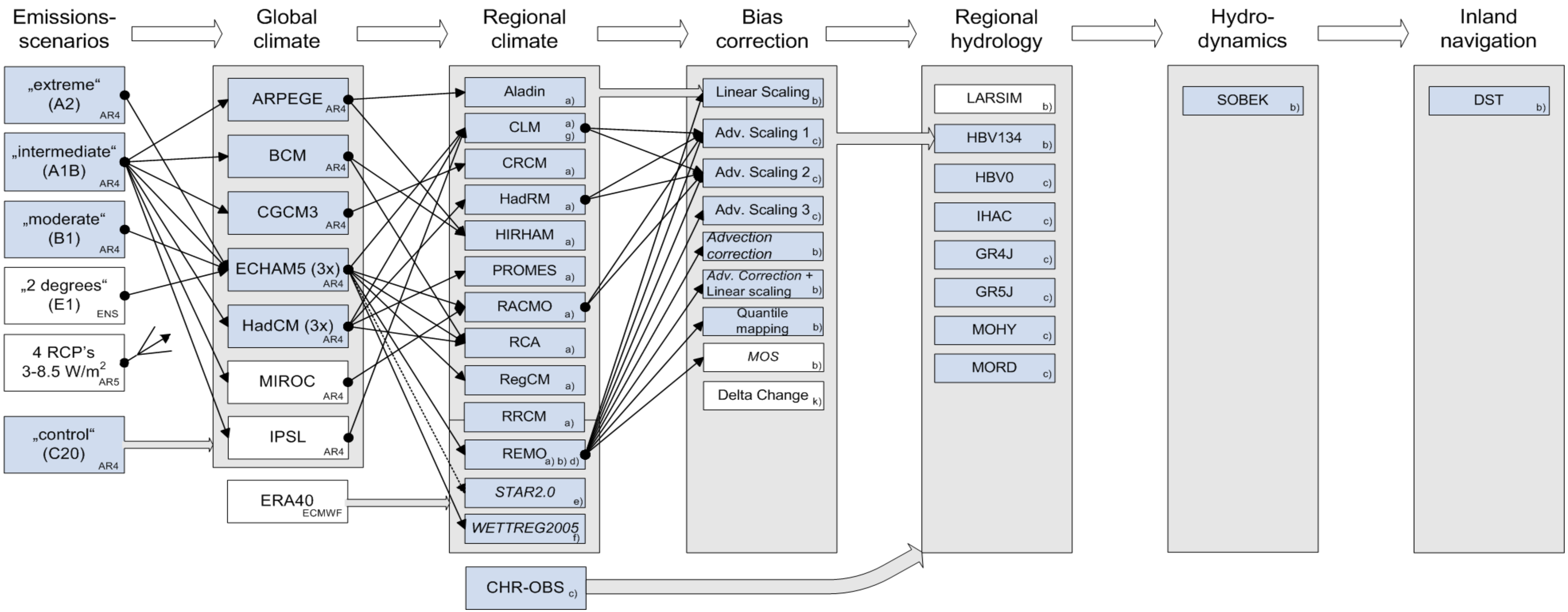




66 % of all models

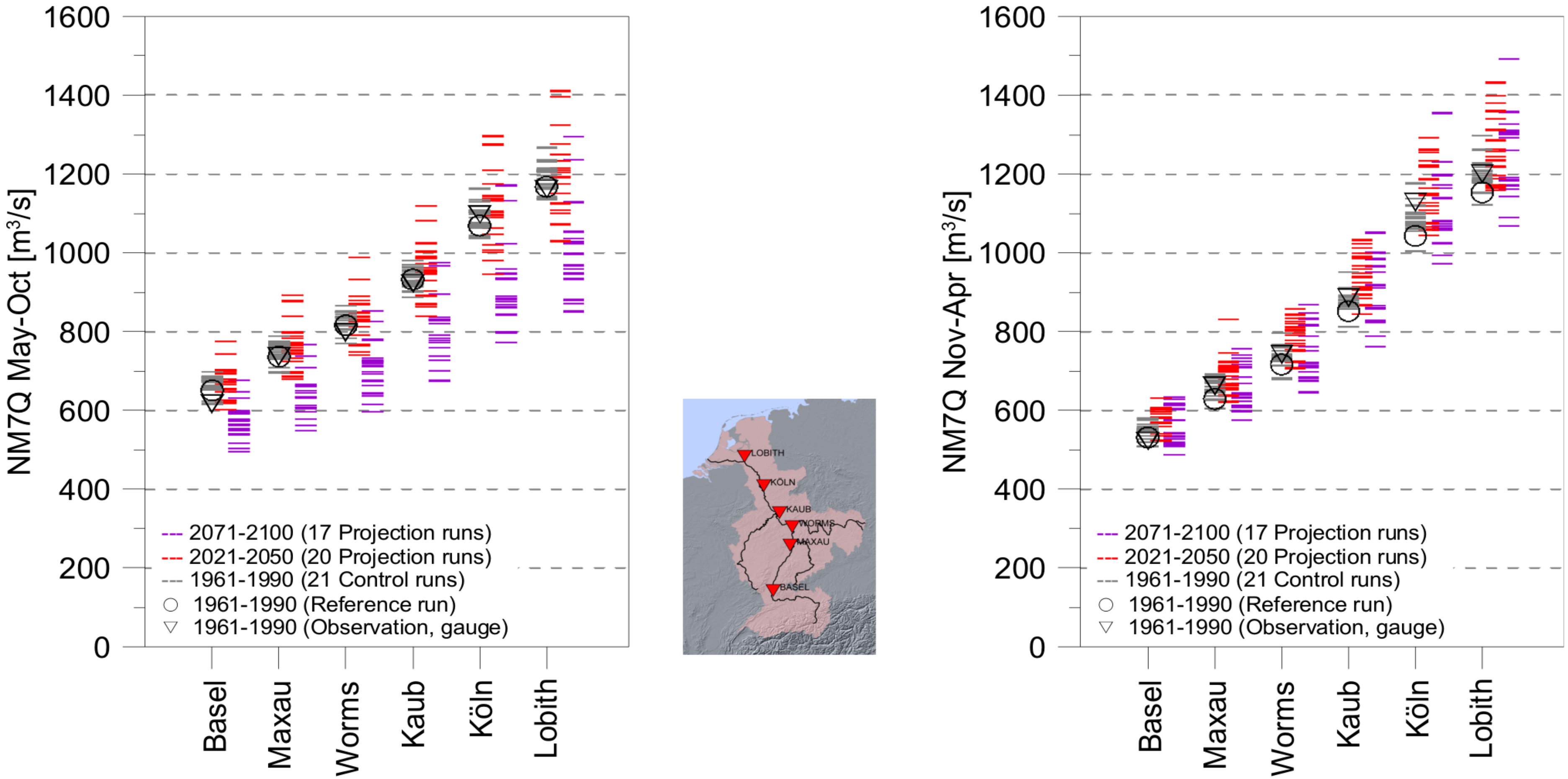
90 % of all models

Multi-model chain to assess navigation conditions in the Rhine River



Nilson et al. (2010)

Change in water flow of the Rhine River



Nilson et al. (2010): CHR report

European and international context

The European Context

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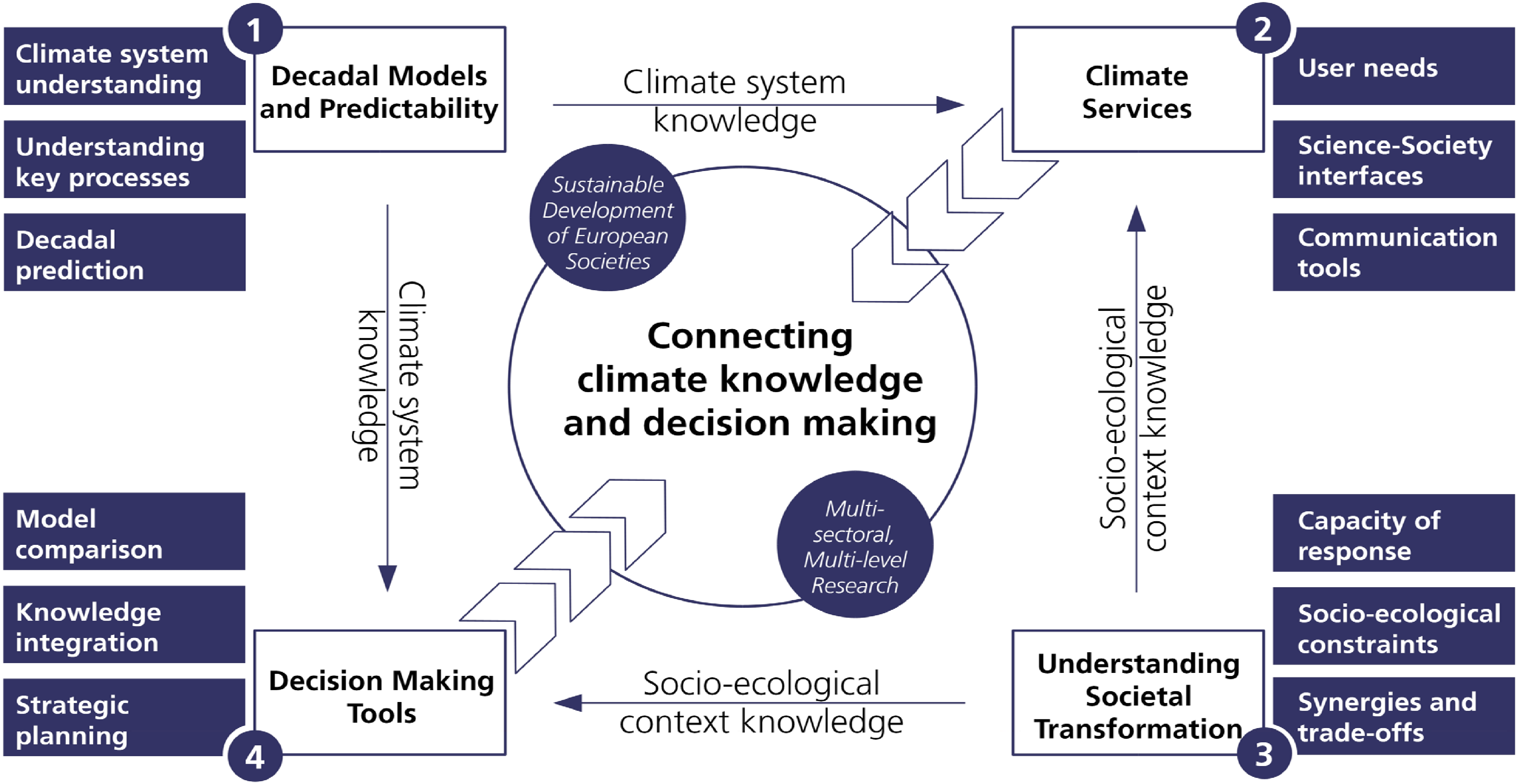
- The EU Global Monitoring for the Environment and Security (GMES) is developing atmospheric, ocean and land services, and is considering the development of a European Climate Service.

- The FP7-ECLISE project attempts to define what a European Climate Service should be, building on lessons learned from several EU projects (eg ENSEMBLES, COMBINE, STARDEX, MICE, CLAVIER, NeWater, ACQWA, SAFELAND, FP6 and FP7)

- Other EU-FP7 projects and EU initiatives are developing concrete approaches towards the transfer of information to society (eg CLIMRUN, CLIMSAVE, IMPACT2C, ClimateforCulture, Mediation, ERA Circle, IS-ENES)

- The Climate Service Center in Germany sees itself as part of a broader European Climate Service initiative

JOINT PROGRAMMING INITIATIVE
“Connecting Climate Knowledge for Europe”
Clik'EU



The International Context

USA

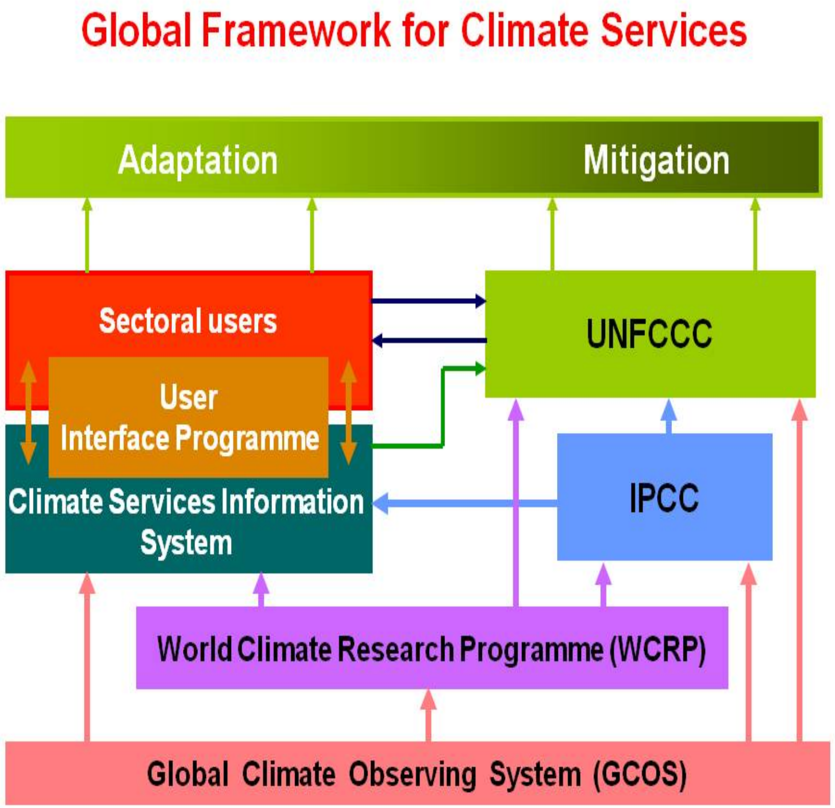
- National Climate Service (NOAA)
- Climate Central, Princeton
- International Research Institute for Climate and Society at Columbia Univ.

Canada

- OURANOS, Montreal
- Pacific Institute for Climate Solutions (PICS), Victoria

UK

- Hadley Centre
- Walker Institute
- Acclimatise and Willis



At the World Climate Conference-3 Geneva, 2009, WMO proposed to organize a Global Framework for Climate Services

First lessons learned

First Lessons Learned

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1. There is a tremendous research potential distributed among research centers as well as in universities.

2. The Community is somewhat fragmented and strong interdisciplinary partnerships with strong links with economic sectors need to be developed.

3. The market for *mitigation* (climate protection, carbon neutrality, legal aspects) is large; it is smaller, although growing in the case of *adaptation.*

First Lessons Learned

4. The scientific community is not sufficiently committed to address the needs of the stakeholders. (Curiosity vs demand driven research)

5. The public sector is not sufficiently flexible and agile to respond rapidly to the needs of the private sector

6. The private sector prefers to support small private companies

7. The information has to be given in the local/national languages in an understandable and usable way. (for day to day operations and decisions on long term investments)

Thank you for your attention!