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Climate Services

Transferring Climate Knowledge to Society

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and
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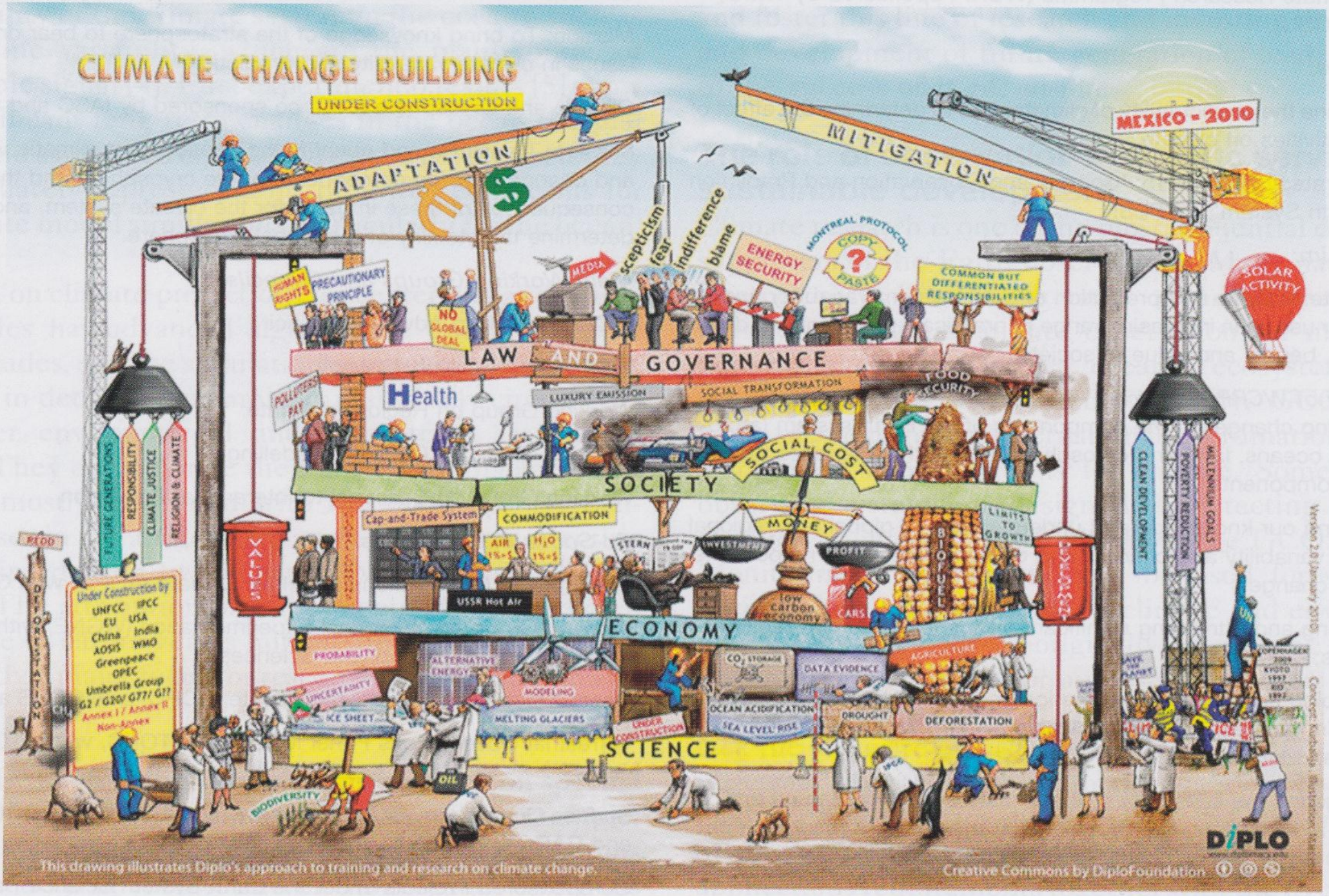
Provide reliable, well documented, authoritative and easily used information and develop the most effective approaches to mitigation and adaptation strategies.

Develop sustained, nationally and regionally-based interactions with users in different economic sectors.



Current Opinion in Environmental Sustainability

Knowledge in support of adaptation

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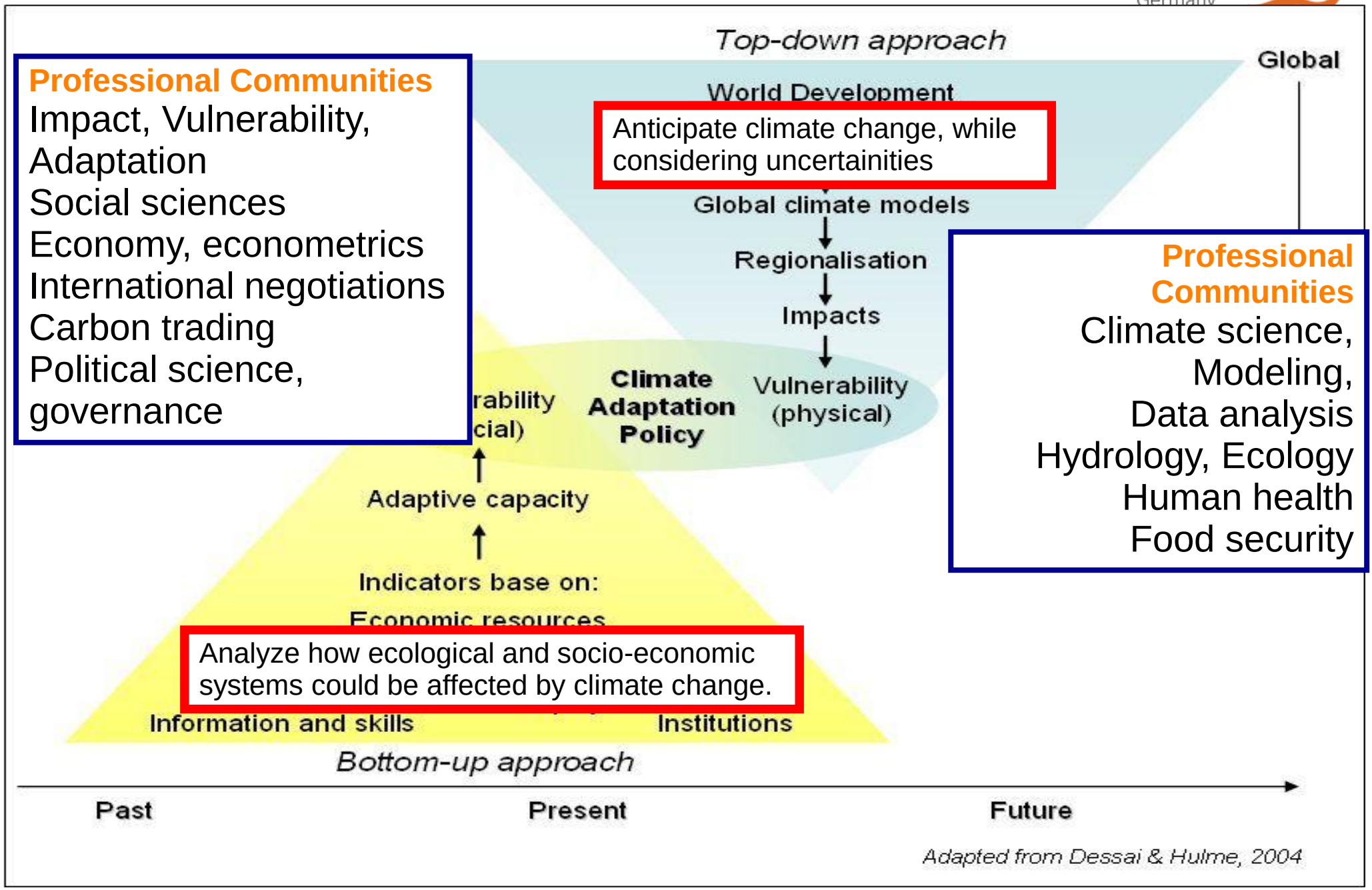


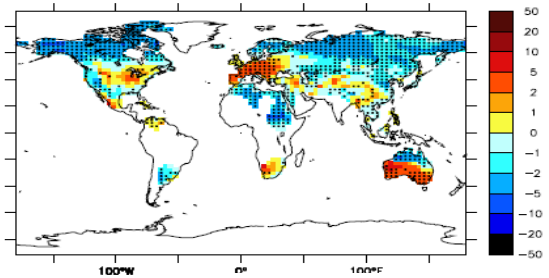
Professional Communities
Impact, Vulnerability, Adaptation
Social sciences
Economy, econometrics
International negotiations
Carbon trading
Political science, governance

Professional Communities
Climate science, Modeling,
Data analysis
Hydrology, Ecology
Human health
Food security

Climate Services : Building an Information System

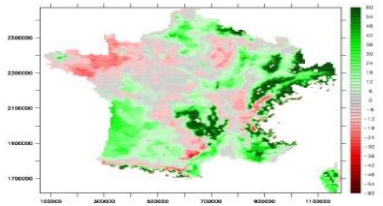
Interactions with users/stakeholders

Decision support tools
Dedicated analyses
Support Innovation



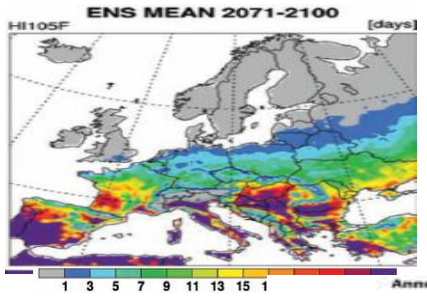
Energy supply
Threshold diurnal amplitude

Impact studies
Socio-economy, Ecosystems, Health
Develop Interdisciplinarity



Maize yield change

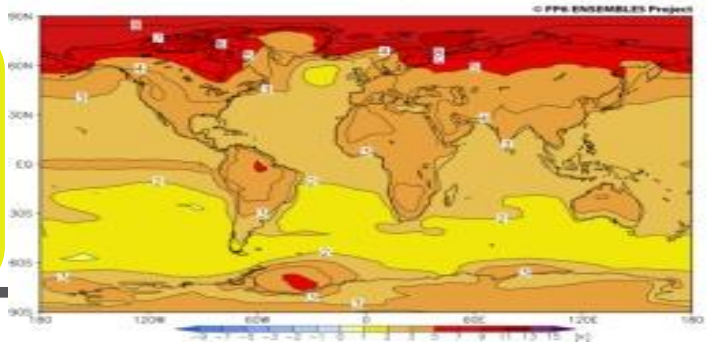
Climate Indicators
Heat waves, drought/floods



Heat index (ENSEMBLES)

Climate projections
Global models
downscaling

Climate Observations



From Climate Research to Earth System Management

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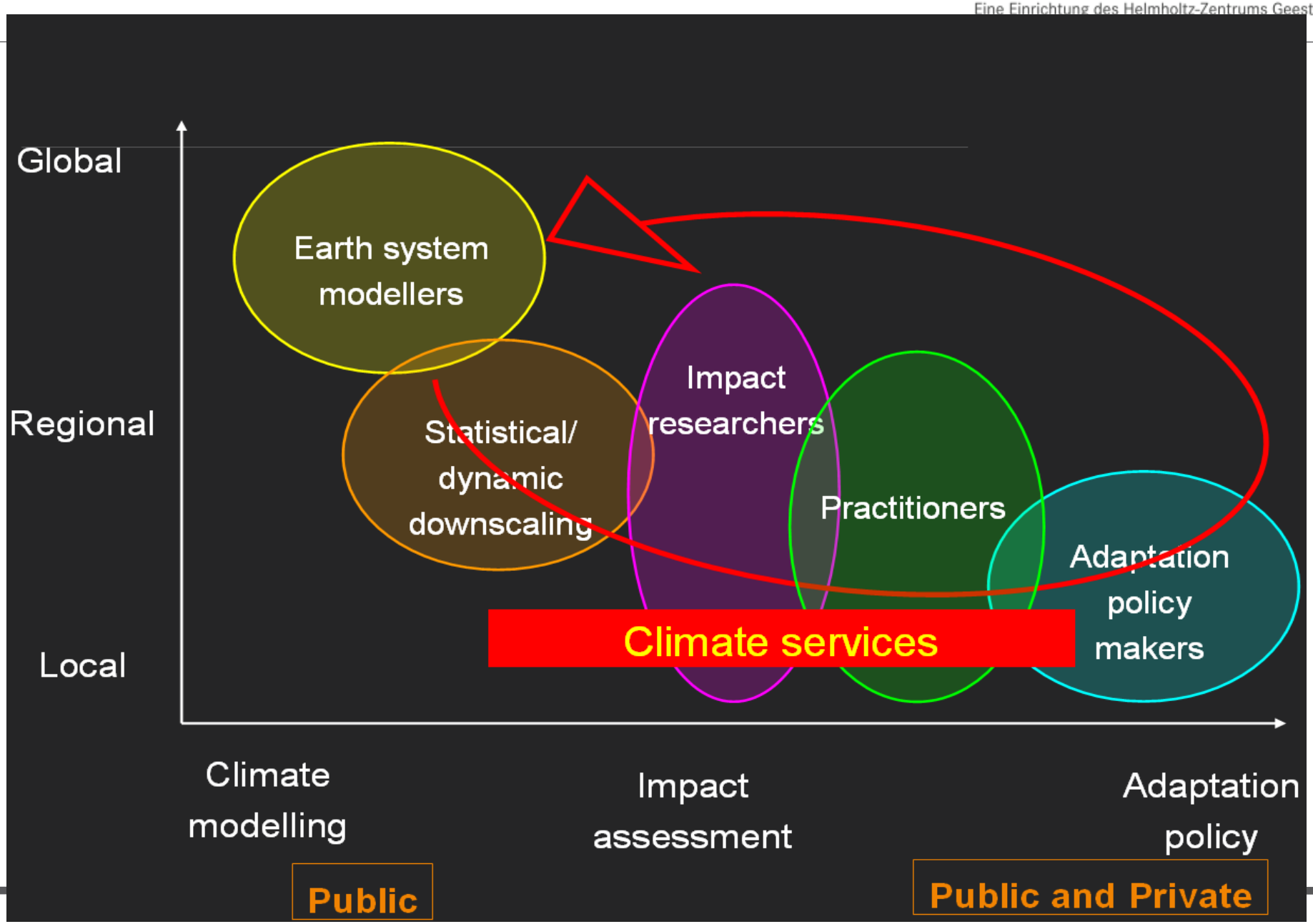

The Stakes on Climate Change (US):
Water and Clean Water Sector Only

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Without Adaptation

Drinking Water Infrastructure Investment

$335 Billion [1]

Clean Water Infrastructure Investment

$298 Billion [2]

Potential Adaptation Costs

Drinking Water + Clean Water Sector:

$448 - 944 Billion [3]

[1] "2009 Drinking Water Infrastructure Needs Survey and Assessment: Third Report to Congress." USEPA Office of Water, 2005.

[2] "Clean Watersheds Needs Survey 2008: Report to Congress." USEPA, May 2010.

[3] "Confronting Climate Change: An Early Analysis of Water and Wastewater Adaptation Costs," Association of Metropolitan Water Agencies, National Association of Clean Water Agencies, 2009.

[4]

Top-Down Approach: Chain of Models

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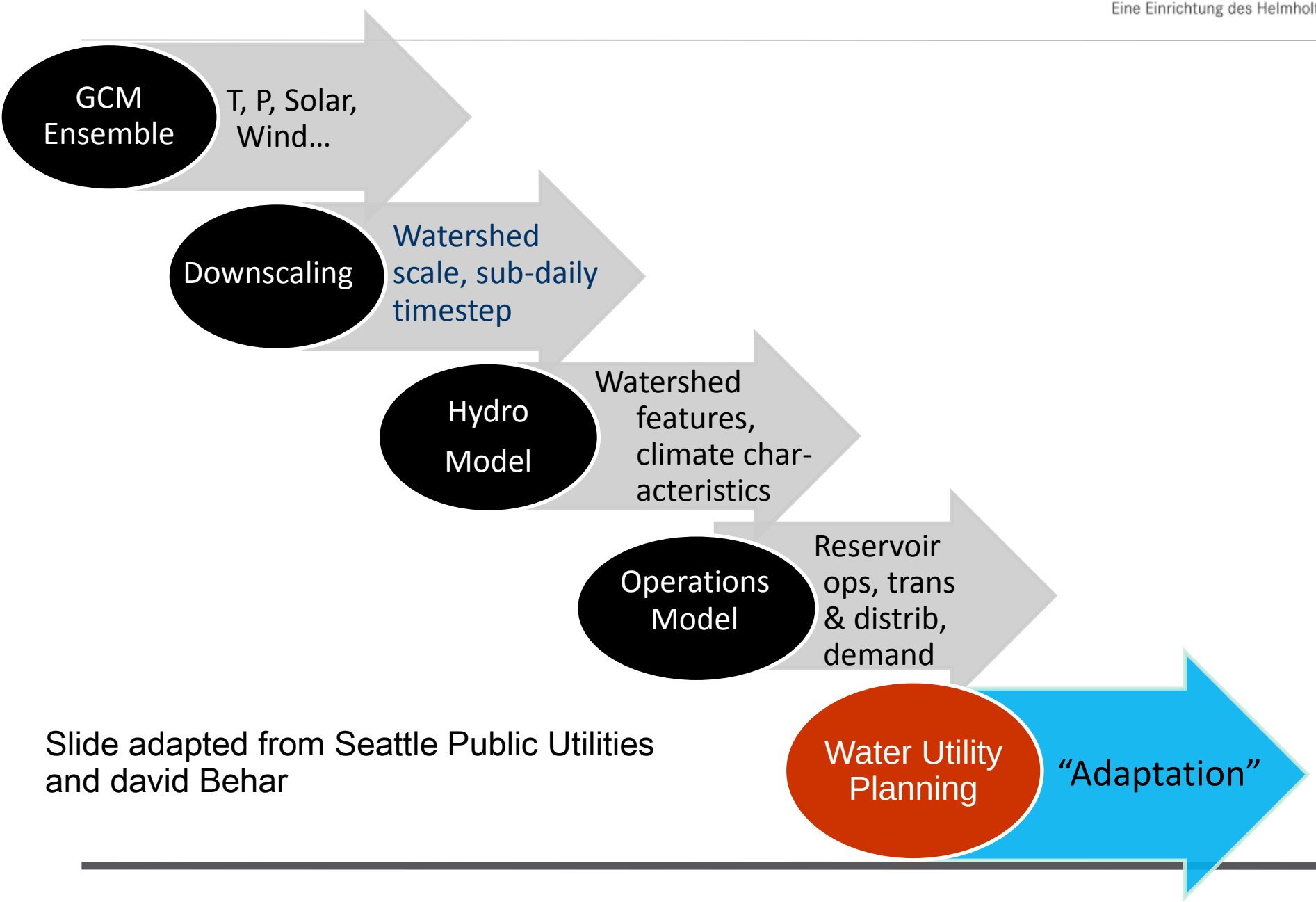

Slide adapted from Seattle Public Utilities and david Behar

Change in Seasonal Precipitation [%] in Northern Europe
(REMO Model A1b_1 scenario)

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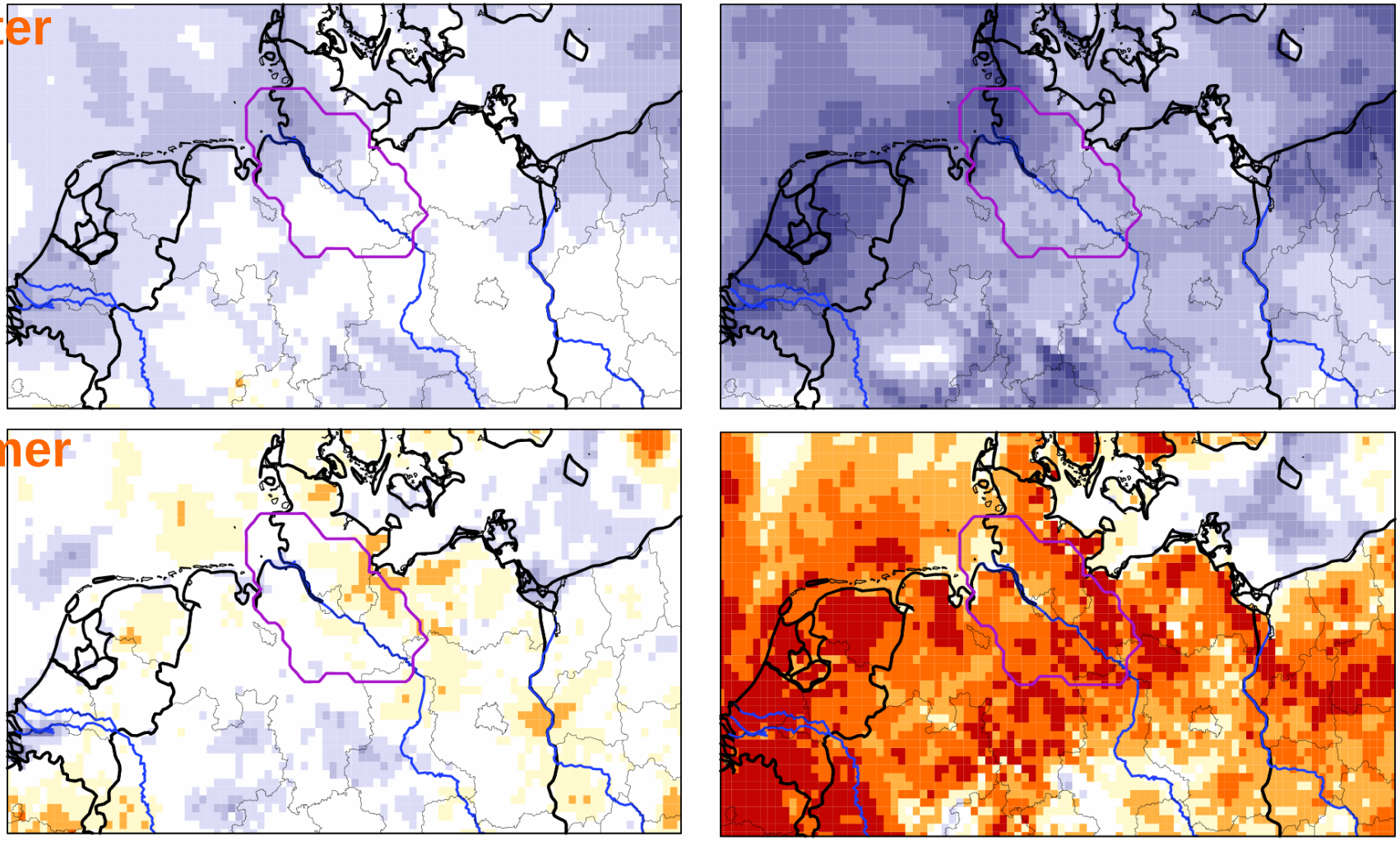
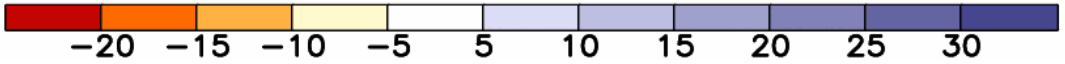
Winter

Summer





REMO
REGIONAL MODEL

Climate Signal Maps for Europe (NUTS2 Regions)

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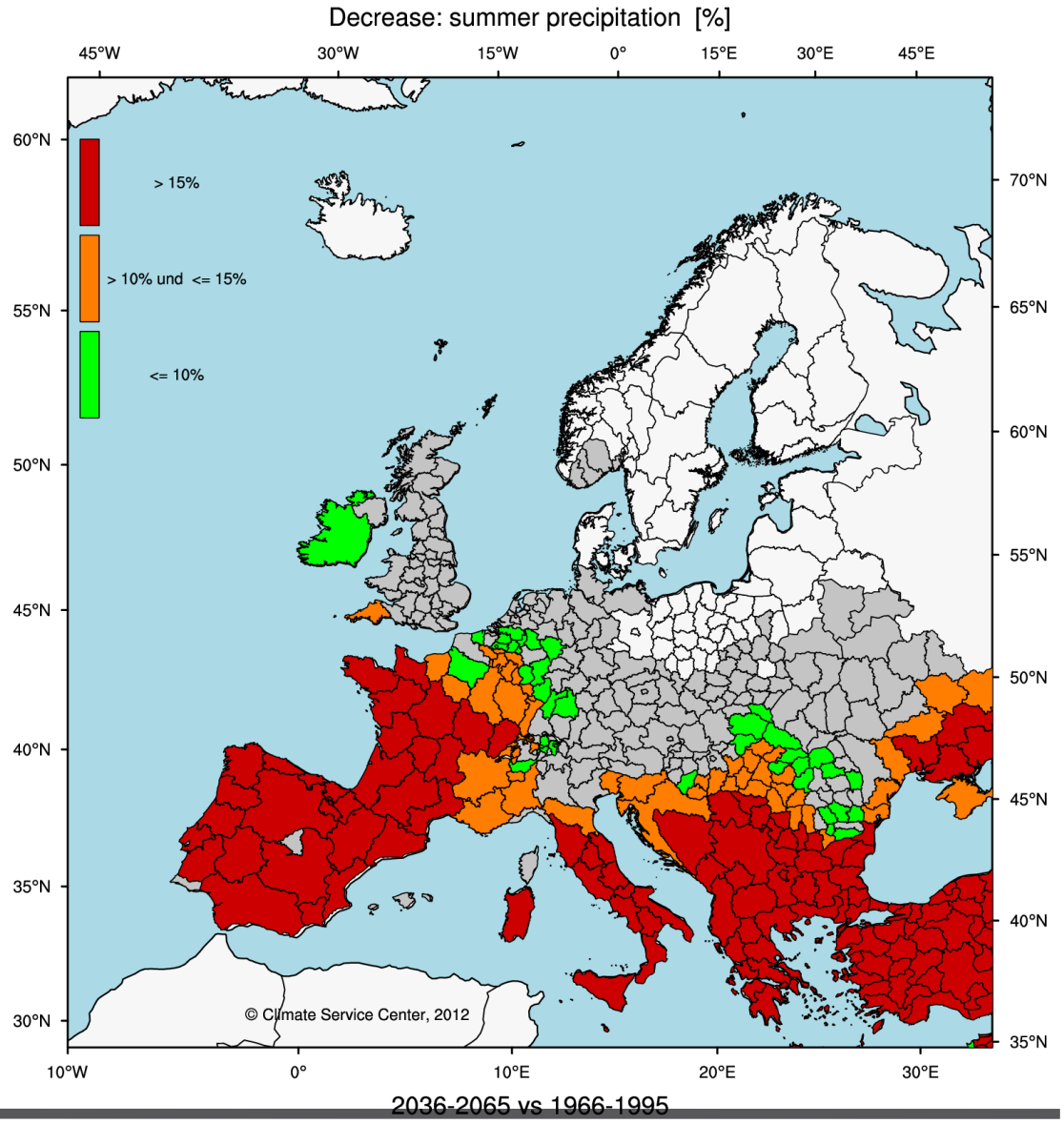
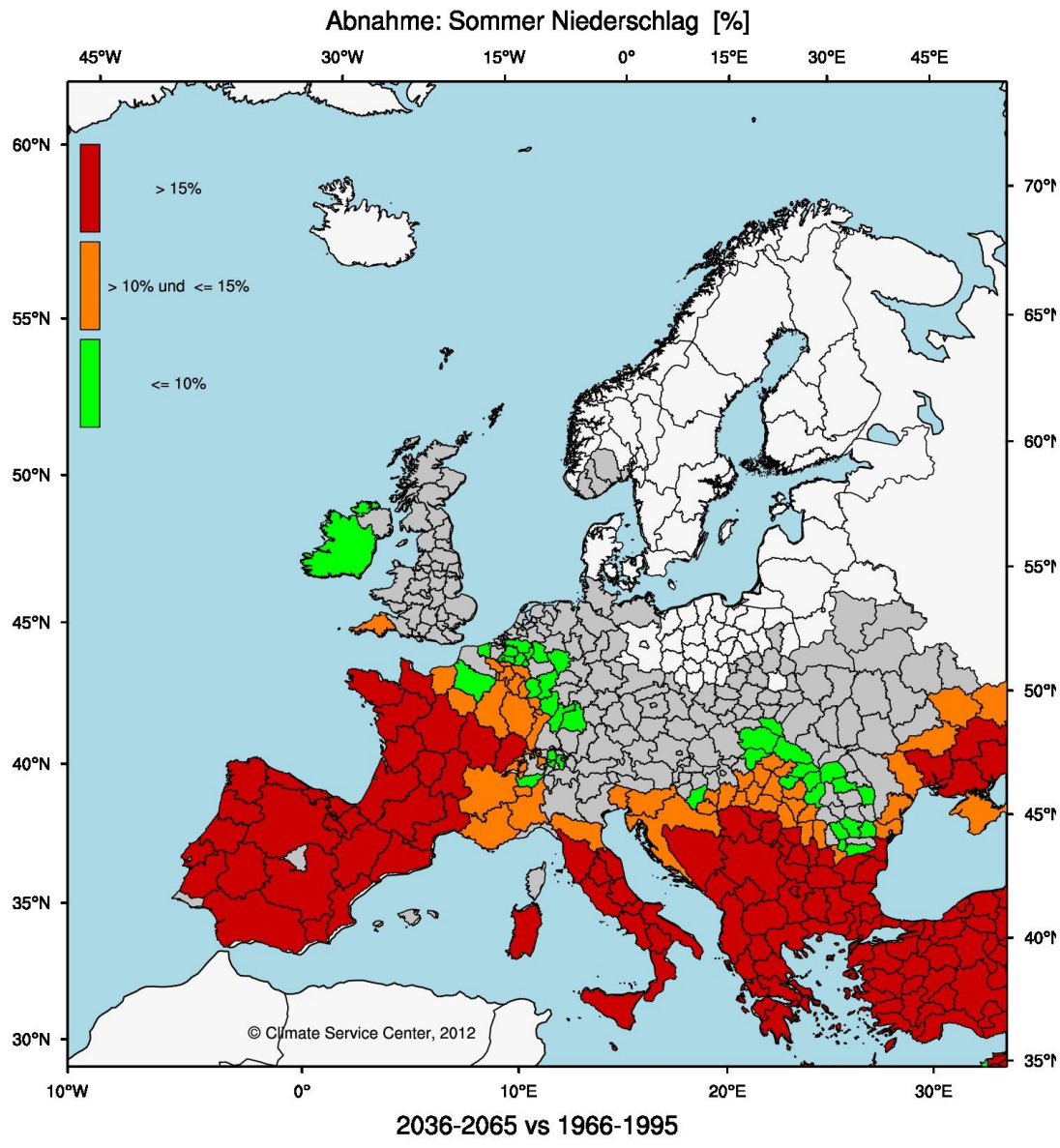
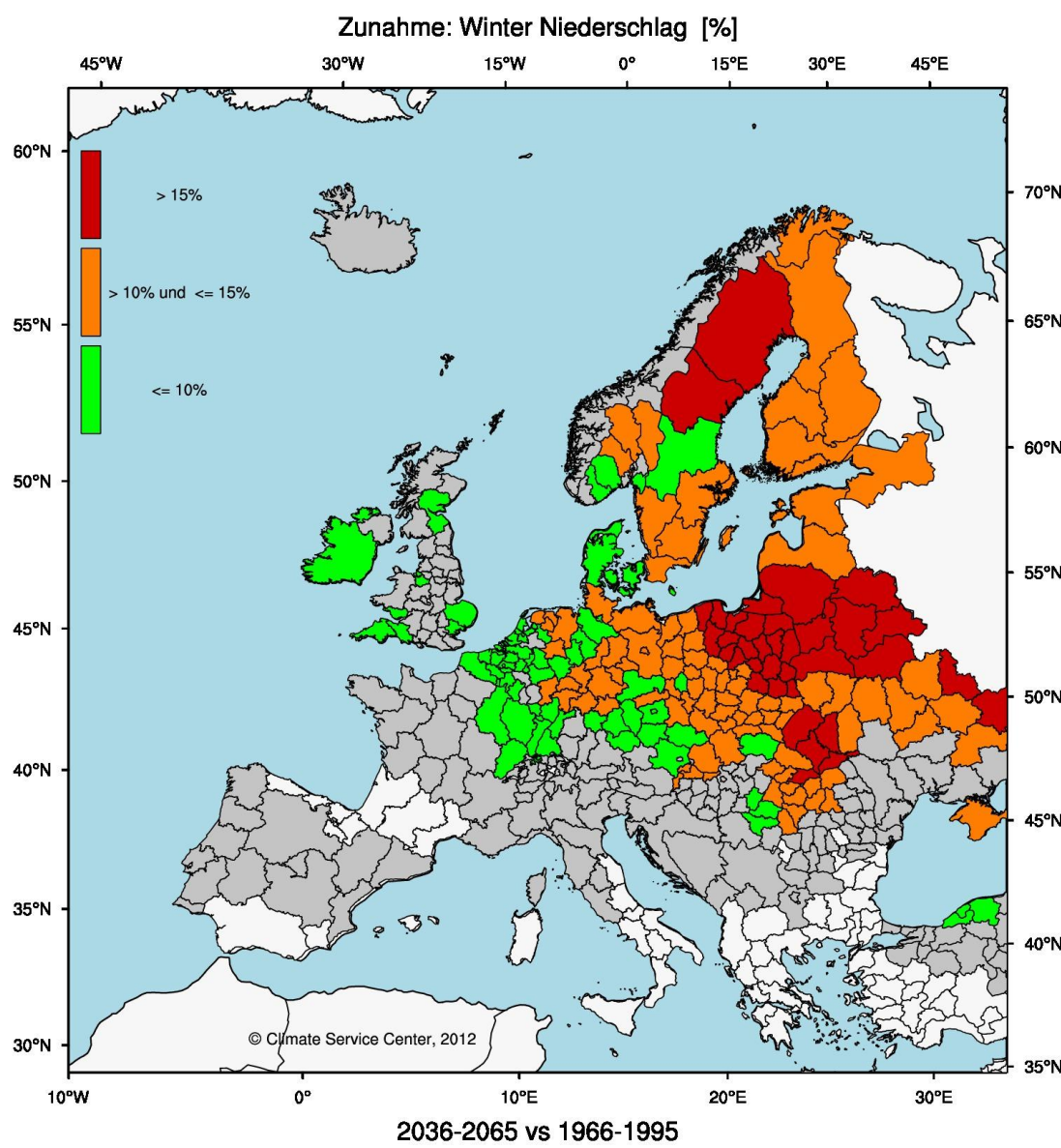
Identification of regions with robust climate change signals from a state-of-the-art ensemble of regional climate change simulations

Threefold test for robustness:
- agreement of the model simulations in the direction of change
- significance of the simulated changes
- sensitivity against small shifts of the time periods

Colors indicate the median change simulated by the model ensemble
Red: decrease > 15%
Orange: decrease >10% and < 15%
Green: decrease < 10%
White: no decrease
Gray: decrease, but one of the robustnes test failed




Abnahme: Sommer Niederschlag [%]
45°W
30°W
15°W
0°
15°E
30°E
45°E
60°N
55°N
50°N
45°N
40°N
35°N
30°N
70°N
65°N
60°N
55°N
50°N
45°N
40°N
35°N
> 15%
> 10% und <= 15%
<= 10%
© Climate Service Center, 2012
10°W
0°
10°E
20°E
30°E
2036-2065 vs 1966-1995


Zunahme: Winter Niederschlag [%]
45°W
30°W
15°W
0°
15°E
30°E
45°E
60°N
55°N
50°N
45°N
40°N
35°N
30°N
70°N
65°N
60°N
55°N
50°N
45°N
40°N
35°N
> 15%
> 10% und <= 15%
<= 10%
© Climate Service Center, 2012
10°W
0°
10°E
20°E
30°E
2036-2065 vs 1966-1995

Signal Maps

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signal maps shows what we can do today
operationally
including significance and robustness, spread ...

Challenges:

Do strengths and occurence of extreme situations change:
heavy rain, land slides, icy roads, fog, storms

from grid scale (approx 10 km) to local scale

Grid values to fine scale structure (eg. Street scale), Sector: infrastructure

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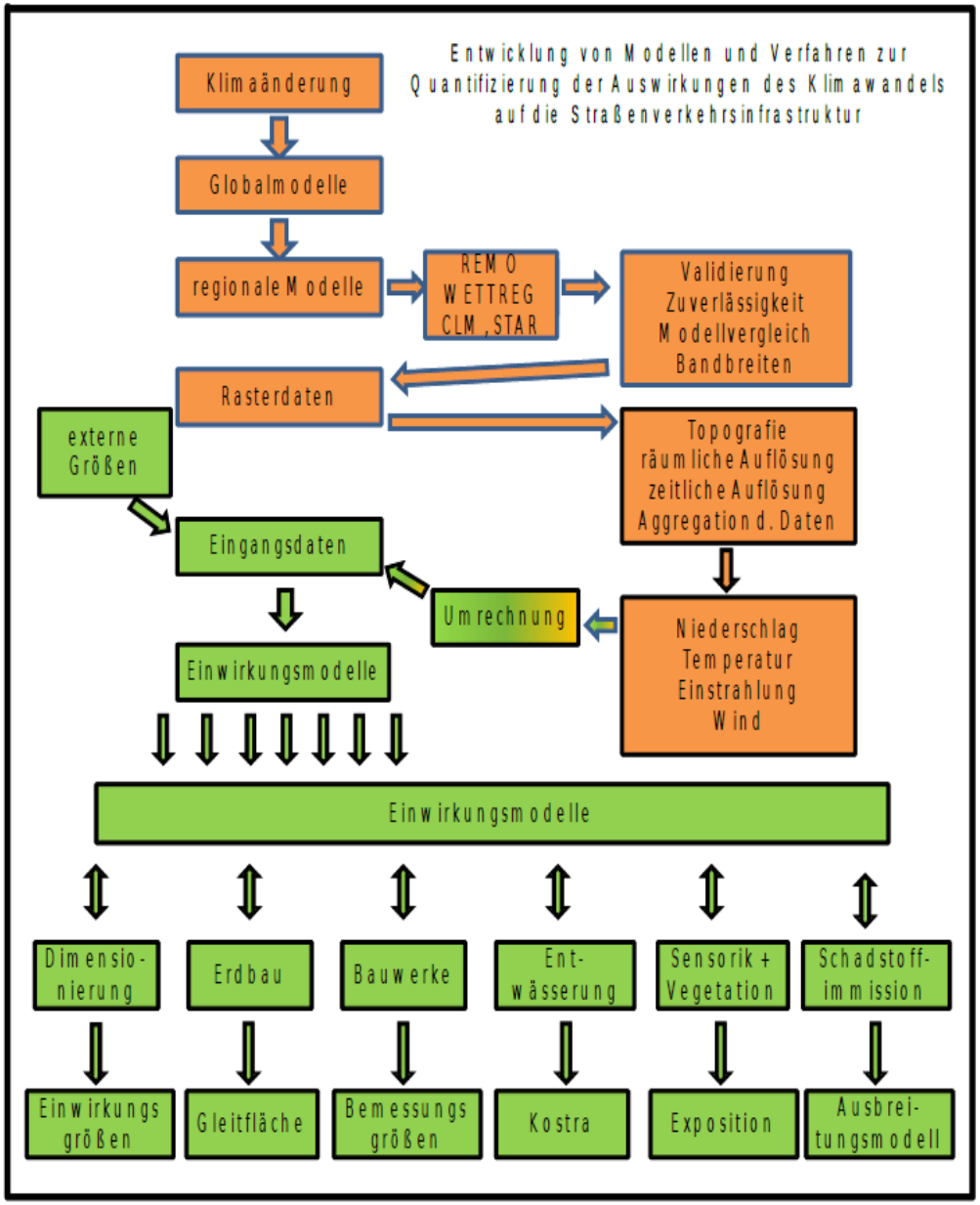
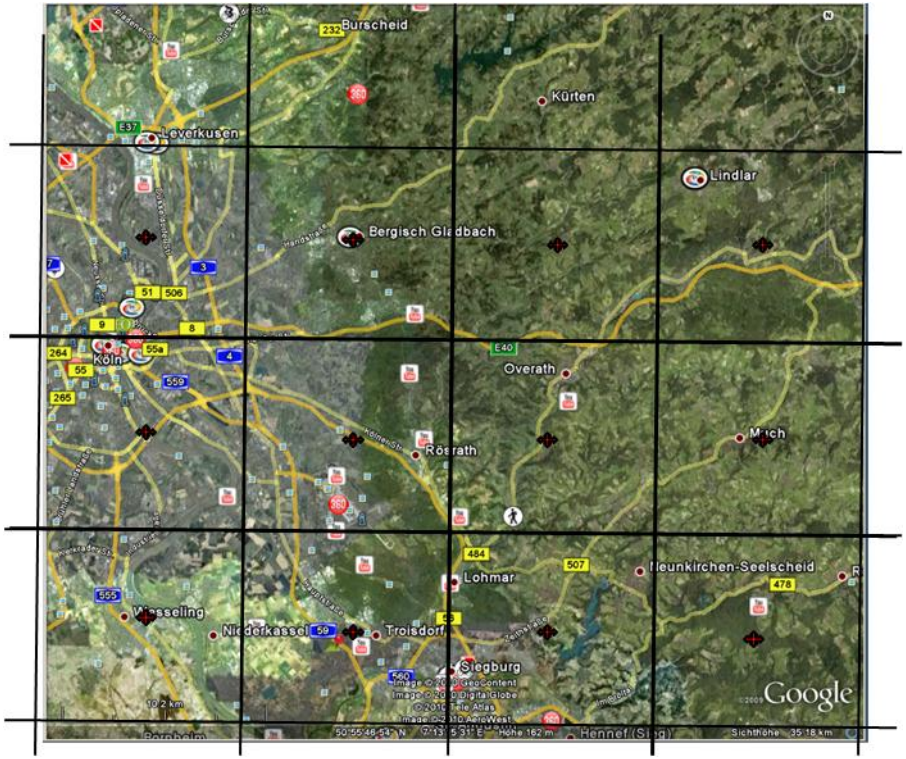
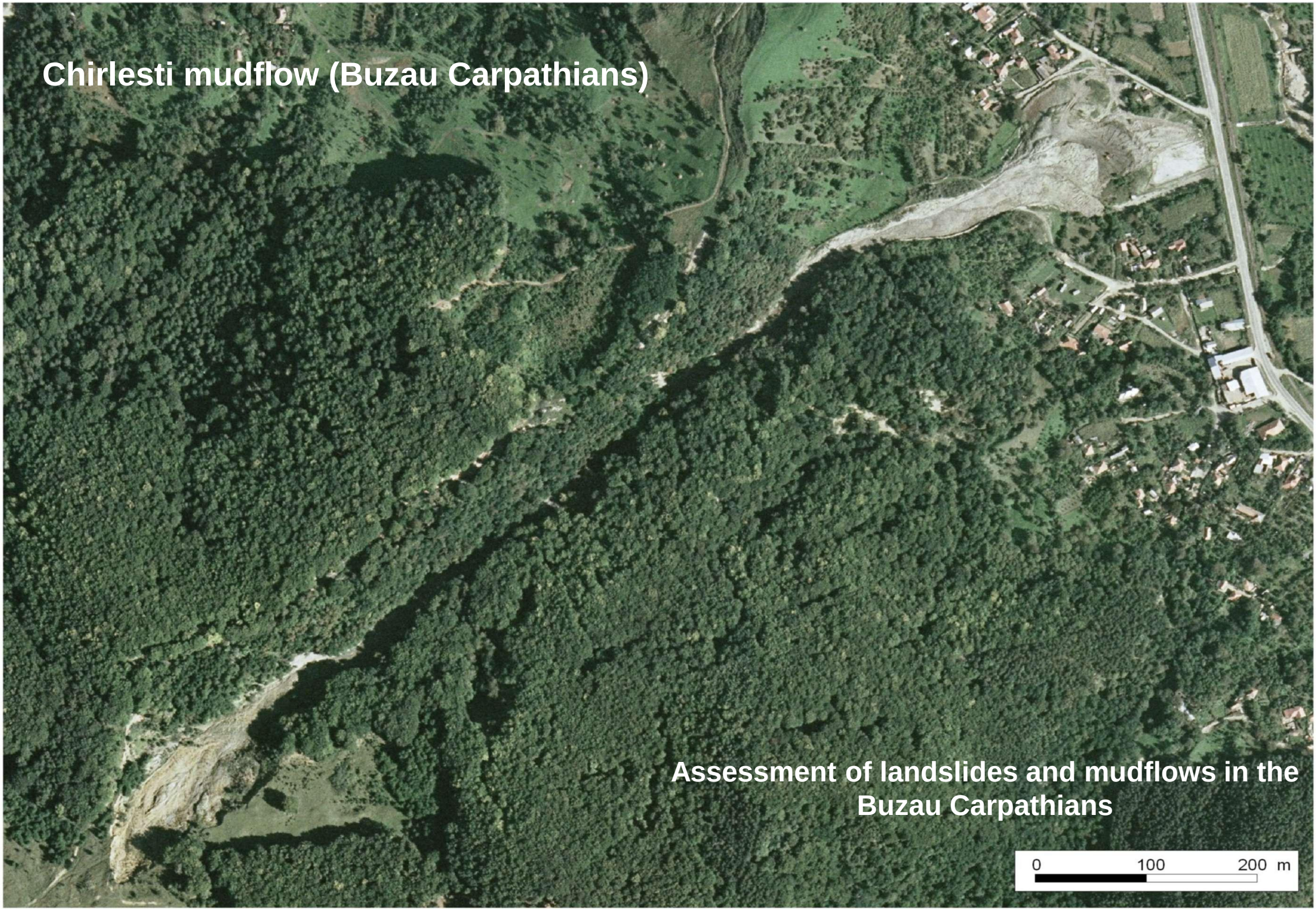


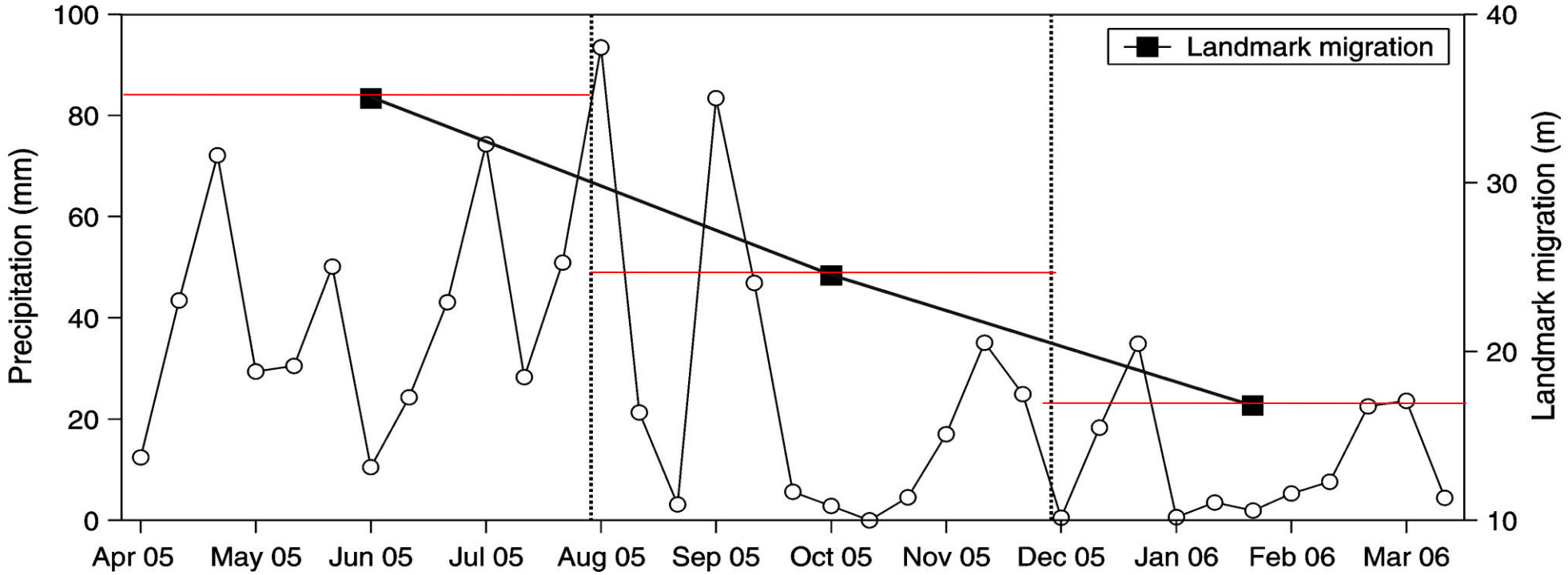
Development of methods in collaboration with BAST (infrastructure, Federal Highway Research Institute)



Nehoiu catchment (Buzau Carpathians)


Chirlesti mudflow (Buzau Carpathians)
Assessment of landslides and mudflows in the Buzau Carpathians
0
100
200 m

Example for mudflow monitoring: Valea Viei Mudflow



The co-evolution of precipitation regime and mudflow dynamics. The landmark migration (black squares) was computed for each monitored interval (delimitated by dot line) (Valea Viei mudflow)

The Way to a de-carbonized Society and Limited Climate Change (2 C)

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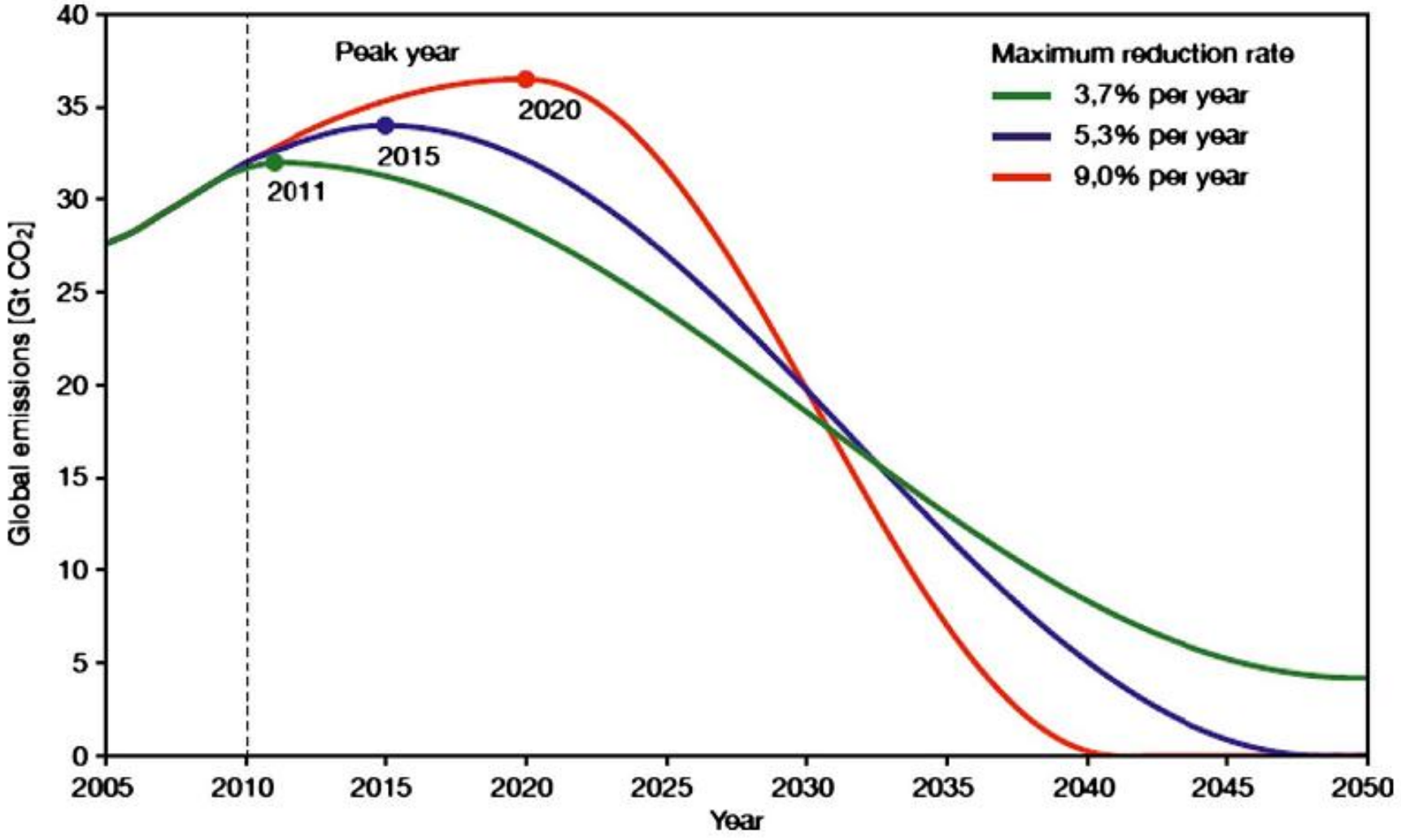

Messner et al. (2010)

Vulnerability and Adaptation

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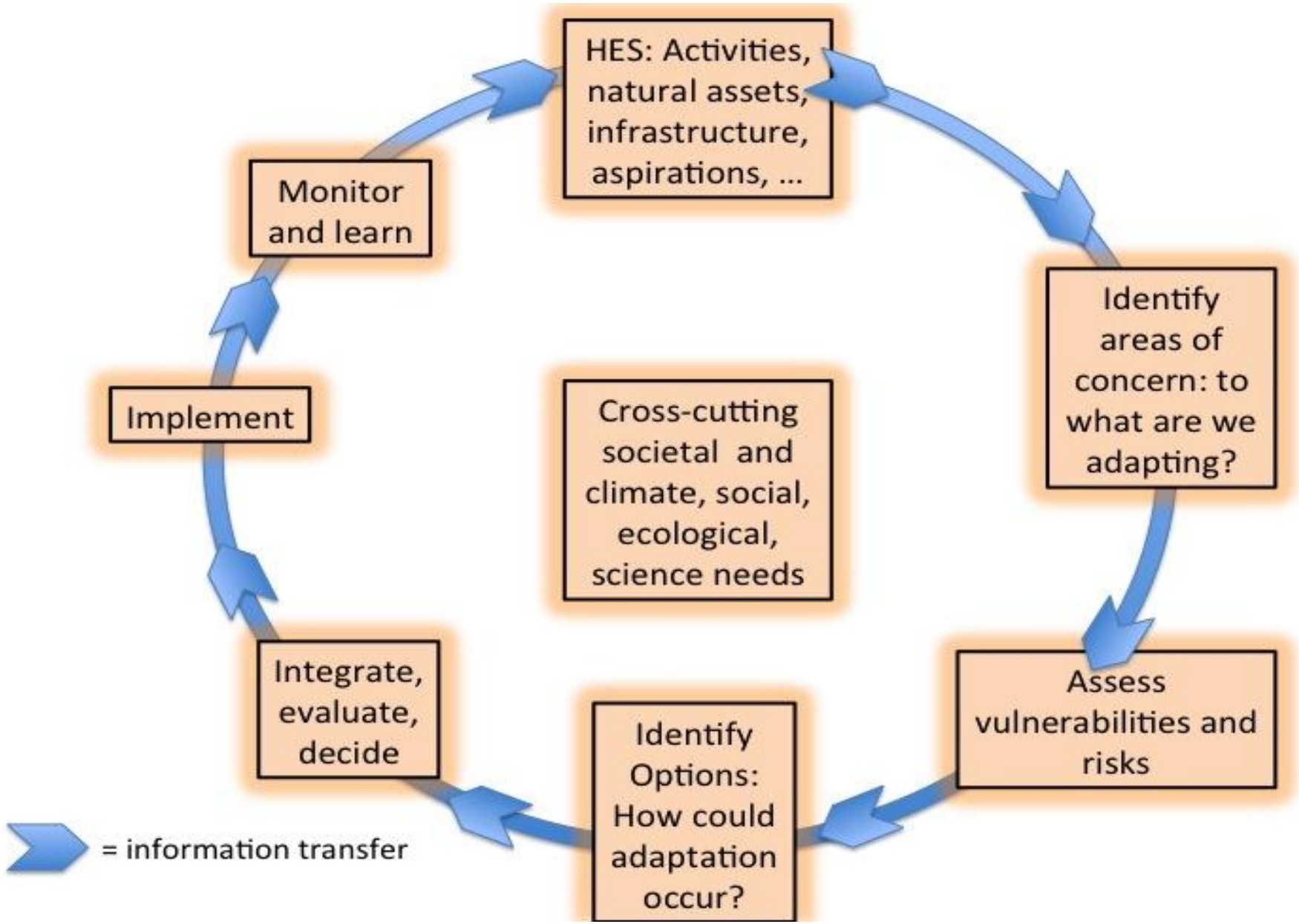
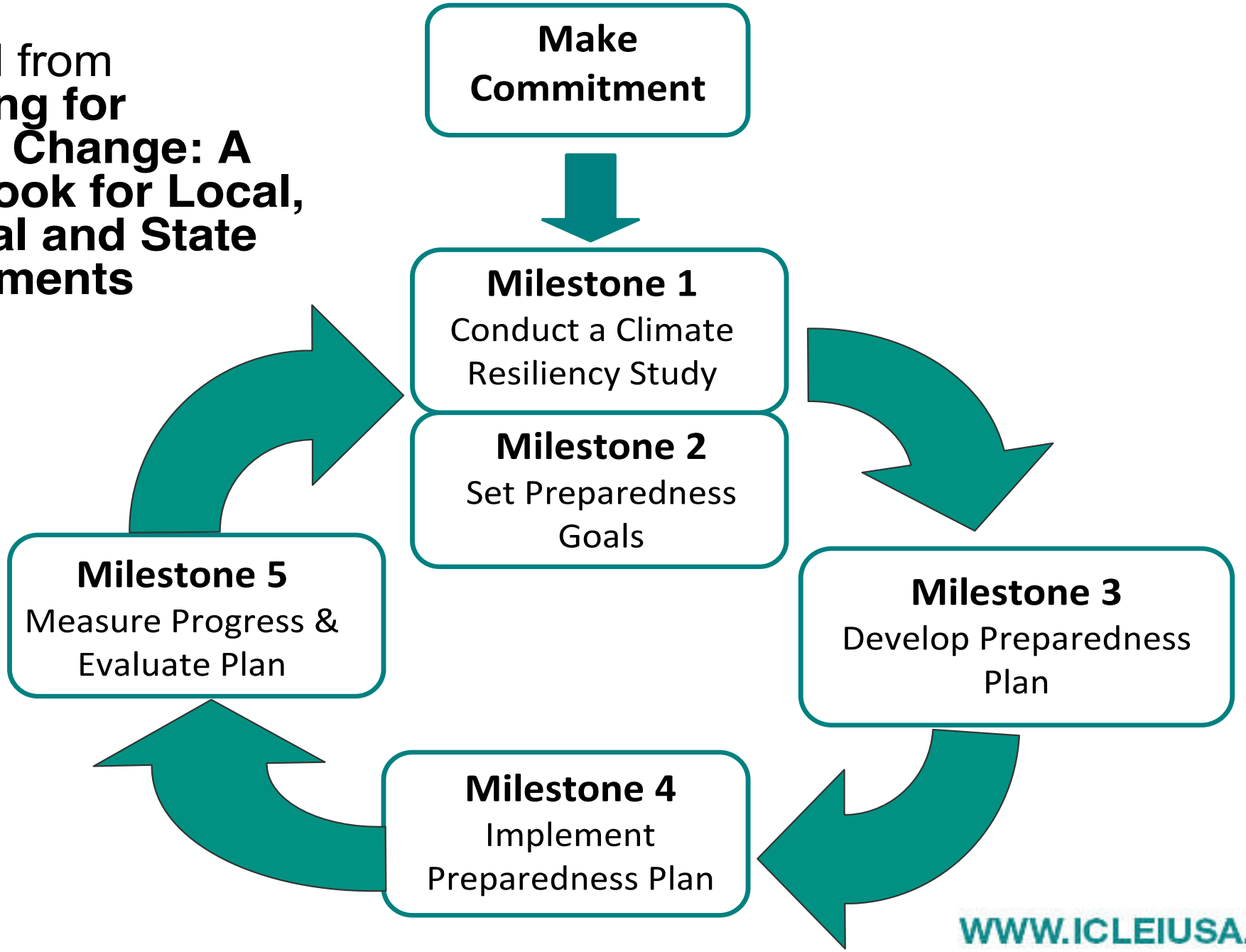


Adapted from
Preparing for Climate Change: A Guidebook for Local, Regional and State Governments



WWW.ICLEIUSA.ORG

Conduct Resiliency Study

- Assess how regional climate is expected to change
- Assess regional/community ***impacts*** predicted from these changes in climate
- Identify systems that could be impacted (+/-) from forecasted changes in climate
- Conduct climate vulnerability assessment (**sensitivity x adaptive capacity**)
- Identify key vulnerabilities

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Establish Preparedness Goals

- Analyze results of vulnerability assessment
- Establish goals for the systems that have the highest vulnerability
- Consider short, medium, and long-term goals
- Consider alignment with existing community goals

Create Preparedness Plan

- Review goals established for vulnerable systems
- Identify actions that capitalize on opportunities and reduce vulnerability to climate change
- Prioritize actions
- Draft Adaptation Plan or integrate into existing plans
  - Framework (roadmap) for approaching adaptation
  - Outlines preparedness goals
  - Actions to achieve goals
  - Timelines and associated costs with actions

Lessons Learned
in Germany

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The concept of Climate Services is new and largely unexplored.

Neutrality, objectivity and integrity are very important aspects of climate services.

Good service requires that the staff in climate services remains closely involved in scientific research. Scientific institutions are not fully engaged to support climate service activities.

Many customers do not know which services and product they need. Education and capacity building are central aspects.

The business model is key for establishing sustained relations with customers: Some functions clearly belong to a public service, others are primarily market-oriented.


Thank You
Enhancing adaptive capacity for society
in the context of changing weather and climate