

ESPON Climate

Climate Change and Territorial Effects on Regions and Local Economies

ESPON 2013 Programme Internal Seminar
Evidence-based Cohesion Policy: Territorial Dimensions
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Objectives

Objectives:

- Provide **pan-European vulnerability assessment**, identifying regional typologies of climate change exposure, sensitivity, impact and vulnerability.
- Provide **guidance for territorial development** through identifying vulnerabilities and capacities for mitigation and adaptation
- Development of an **indicator system** to determine **regional vulnerability** to climate change impacts with sectoral focus
- From results can derive **tailor-made adaptation options** applicable to regional context
- **Policy implications** of regional climate change vulnerability



Policy Questions


Main policy Question:

- How and to which degree will climate change impact on the competitiveness and cohesion of European regions and Europe as a whole?
- In which way can policy contribute to mitigate climate change, and to adapt to and manage those results of climate change that cannot be avoided, while making sure that synergies of mitigation and adaptation policies are being exploited?
- How to address EU Territorial Agenda Priority 5, “Further work is required to develop and intensify territorial cohesion policy, particularly with respect to the consequences of territorially differentiated adaptation strategies.”




Project Partners


Project Coordination:

 Institute of Spatial Planning, TU Dortmund University (IRPUD)

Primary Research Partners:

 Potsdam Institute for Climate Impact Research


 Geological Survey of Finland (GTK)


 Aalto University School of Science and Technology

 Norwegian Institute for Urban and Regional Research

 Newcastle University

Case Study Research Partners:

 Budapest University of Technology and Economics, Department of Environmental Economics

 VÁTI Hungarian Public Nonprofit Company for Regional Development and Town Planning

 National Institute for Territorial and Urban Research Urbanproject

 Agency for the Support of Regional Development Koišce, n.o.

 Autonomous University of Barcelona

 The Netherlands Environmental Assessment Agency

 Swiss Federal Research Institute WSL



Climate Change Exposure

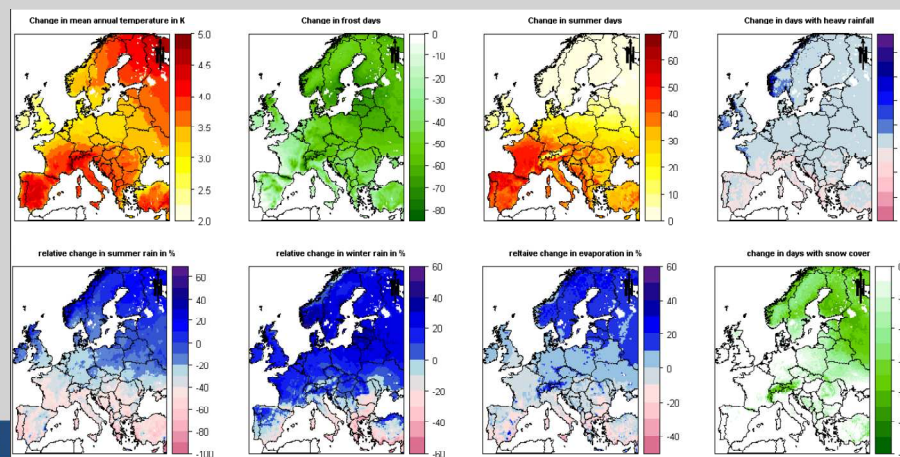
Climate change **exposure**:

refers to the nature and **degree to which a system is exposed to climatic variations**

Projects made use of the IPCC **CCLM model** (e.g. 2071-2100) and the **A1B scenario**

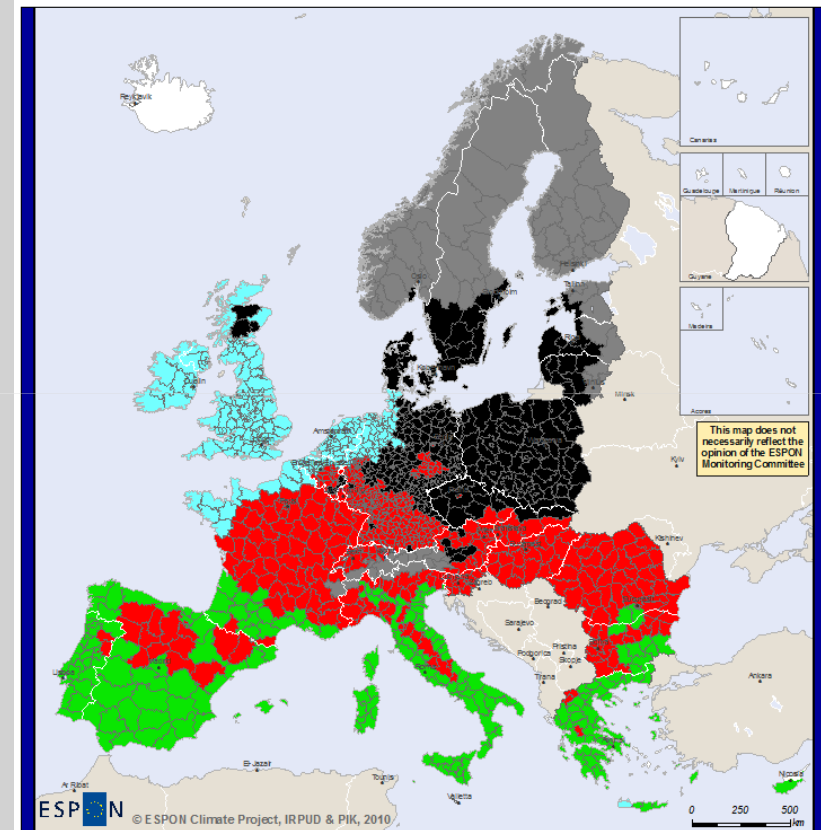
Eight direct stimuli and **two indirect climate change effects** (sea level rise and river flooding) were considered

ESPON Climate project is **not a clear-cut forecast** due to uncertainty generated from the model used, the emissions scenario, and the difficult to estimate socioeconomic trends



Climate Change Regions and Case Studies

Cluster/Stimuli	Northern - central Europe	Northern - western Europe	Northern Europe	Southern - central Europe	Mediterranean region
Change in annual mean temperature	+	+	++	++	++
Decrease in number of frost days	--	-	--	--	-
Change in annual mean number of summer days	+	+	0	++	++
Relative change in annual mean precipitation in winter months	+	+	++	0	-
Relative change in annual mean precipitation in summer months	-	-	0	--	--
Change in annual mean number of days with heavy rainfall	0	+	+	0	-
Relative change in annual mean evaporation	+	0	+	0	-
Change in annual mean number of days with snow cover CDSC	-	0	--	0	0



Origin of data: own calculations based on Lautenschlager et al. 2009

European climate change regions

- Southern-central Europe
- Northern Europe
- Northern-central Europe
- Mediterranean region
- Northern-western Europe
- no data

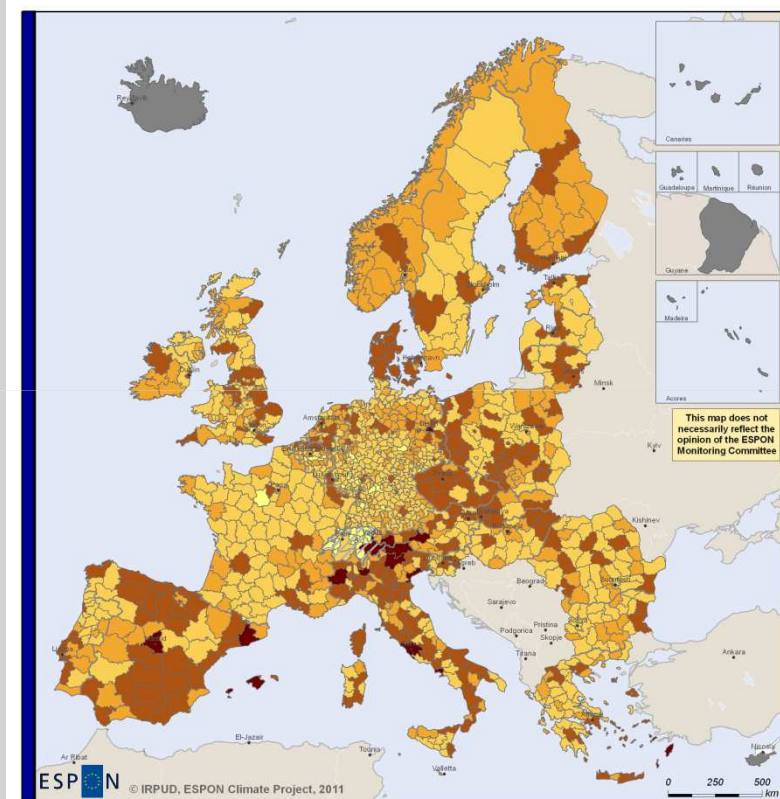
Europe's Regions and Their Different Sensitivities to Climatic Changes

Sensitivity: “the degree to which a system is affected, either adversely or beneficially, by climate-related stimuli” (IPCC 2007)

E.g. economic sensitivities include: agriculture, forestry, tourism, energy sector (see map)

Local economies which depend on tourism are highly sensitive: Mediterranean, the Alps, large parts of Eastern Europe

ESPON Climate provides a disaster risk assessment with the combination of both absolute and relative sensitivities



Origin of data: own calculations based on CORINE Land Cover 2000/2006, E-PRTR 2010, CCLM A1B Lautenschläger et al. 2009, DIVA 2004, LISFLOOD A1B CCLM 2010, USGS Hydro1K, Eurostat 2010, Gallego et al. 2009/2011

Economic sensitivity to climate change

- very high (>0.8 - 1.0)
- high (>0.6 - 0.8)
- medium (>0.4 - 0.6)
- low (>0.2 - 0.4)
- very low (0.02 - 0.2)
- no data*
- reduced data*

Combined sensitivity of agriculture, forestry, summer and winter tourism, energy supply and demand.

*For details on reduced or no data availability see Annex 9.



Adaptive Capacity: Dimensions, Indicators and Results

Adaptive capacity: “the ability or potential of a system to respond successfully to climate variability and changes” (IPCC 2007c)

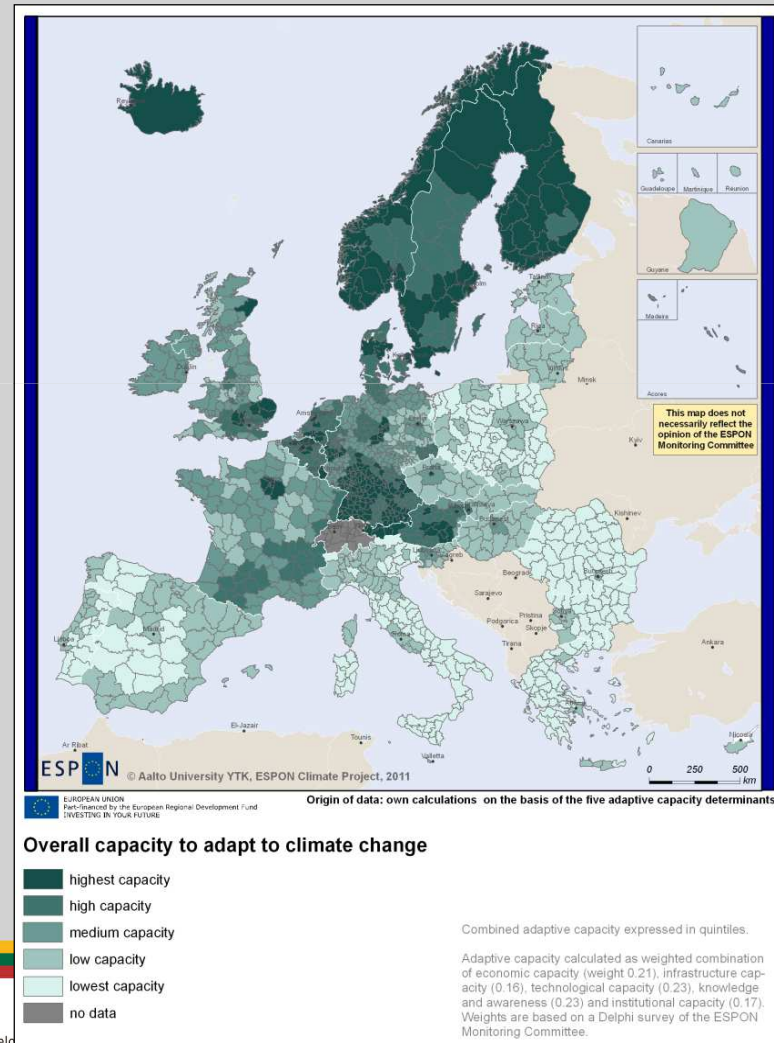
Awareness: identification of vulnerabilities and adaptation measures

Ability: technology and infrastructure to permit movement from awareness toward action

Action: economic resources and institutions enable implementation of defined adaptation measures

Results: Nordic have higher capacity than Southern, Eastern European in general lower capacity than North or West, Mediterranean lower capacity than Baltic Sea region

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Climate Change Mitigation

Mitigative capacity: “a country’s ability to reduce anthropogenic greenhouse gas emissions or enhance natural sinks” (Winkler et al 2007).

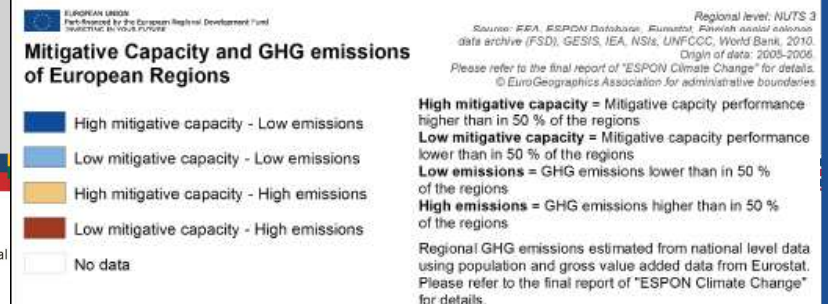
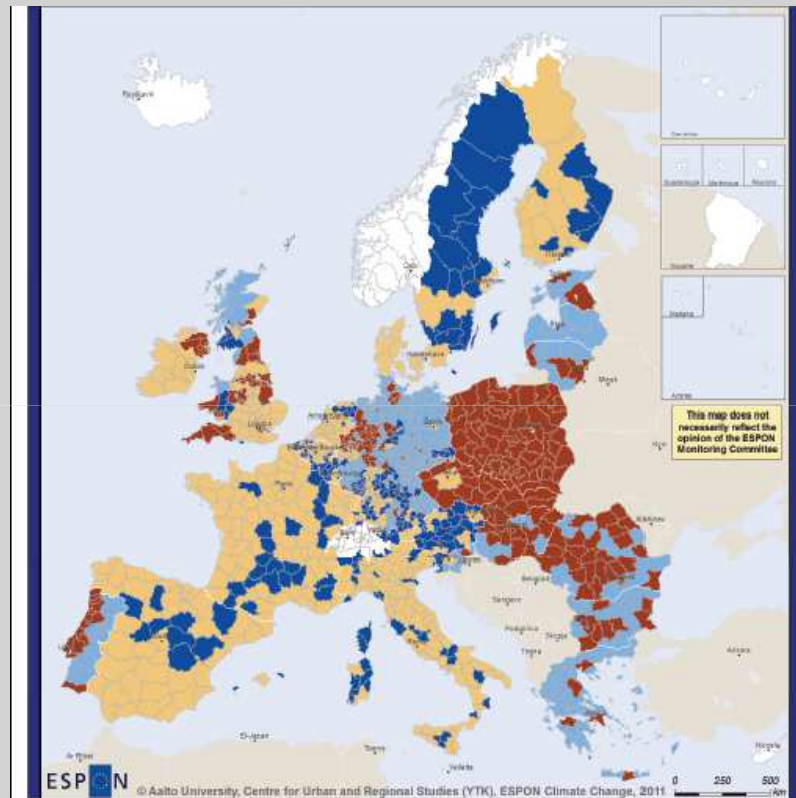
Same dimensions as for adaptive capacity (awareness, ability, action)

Four types of regions:

- Regions with high mitigative capacity and low greenhouse gas emissions
- regions with both high mitigative capacity and high levels of greenhouse gas emissions
- regions with low mitigative capacity and low greenhouse gas emissions
- regions with high emissions and low mitigative capacity

Results: Regions with high emissions and high mitigative capacity can be found in Western Europe as well as in parts of Scandinavia. Regions with high emissions and low mitigative capacity can be found in Eastern Europe in the UK and Ireland.

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Impact and Vulnerability of European Regions to Climate Change

Impact: “[c]onsequences of climate change on natural and human systems” (IPCC 2007)

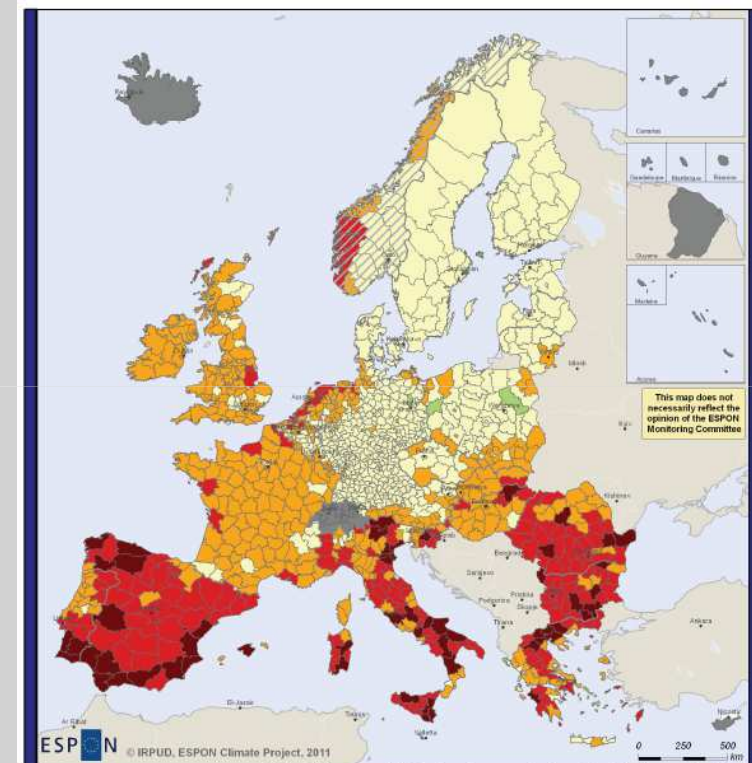
Hot spots: coastal areas, mountain areas, and particularly areas in which tourism is a significant economic contributor

Vulnerability: “a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity” (IPCC 2007)

Countries most highly effected have lower adaptive capacity

This is contradictory to current and future aims of territorial cohesion

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Potential vulnerability to climate change

- highest vulnerability (0.5 - 1.0)
- medium vulnerability (0.3 - <0.5)
- low vulnerability (0.1 - <0.3)
- no/marginal effects (>-0.1 - <-0.1)
- low positive effects (-0.1 - -0.25)
- no data*
- reduced data*

Vulnerability calculated as the combination of regional potential impacts of climate change and regional capacity to adapt to climate change.

The potential impacts were calculated as a combination of regional exposure to climate change (difference between 1981-1999 and 2071-2100 climate projections of eight climatic variables of the CCLM model as well as inundation height changes according to the LIFLOOD river flooding model, both for the IPCC-BRECS A1B scenario, and projections of the DIVA model regarding coastal storm surge heights of a 100 year return event adjusted by one meter of sea level rise) and most recent data on the weighted dimensions of physical, economic, social, environmental and cultural sensitivity to climate change. Adaptive capacity was calculated as a weighted combination of most recent data on economic, infrastructural, technological and institutional capacity as well as knowledge and awareness of climate change.

* For details on reduced or no data availability see Annex 9.

Policy Implications

Importance of tailor-made adaptation strategies (e.g. for Southern Europe and for areas where tourism will be effected such as the Alps and the Mediterranean)

Eastern Europe is also particularly affected by demographic changes

Measures enacted can target different objectives: adaptation capacity, capitalisation, coping capacity to extreme events, reduction or risk and sensitivity

Main focus of dialogue thus far: identifying impacts and management of extreme events

Challenge to spatial planning: existing structures

Legitimacy of actions taken: must include involvement of all societal groups (esp. with regard to working with inevitable uncertainties)

Importance of establishing a broad mandate from all social groups (e.g. justification of quantitative goals which are normative in character)



Thank you for your attention!

