

Use of climate data and information for EEA climate change assessment

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(Air and climate change programme - EEA)

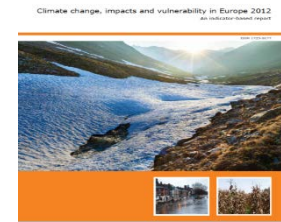
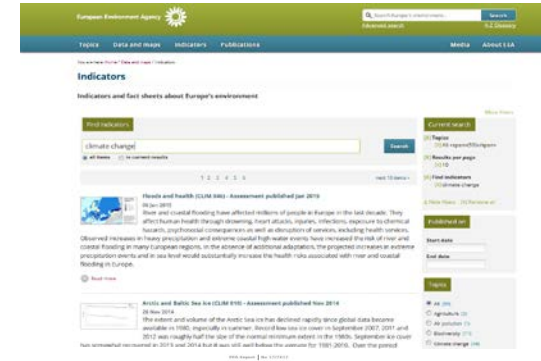


2016: EEA content priorities

- Circular economy
- Climate and Energy
- Sustainable Development Goals
- Refit Monitoring and Reporting
- Natural Capital
- Copernicus
 - land monitoring service and in-situ coordination
 - climate change service (important European user)
- SOER2020

Climate change, impacts, vulnerabilities, and adaptations

- Climate change impacts indicators
- Climate change impacts report
- Climate – ADAPT
- Report on Extreme weather and climate in Europe



Extreme weather and climate in Europe

Released: 2015/12/03. See [the full report](#)

Summary

This report, written for climate scientists, researchers and experts, describes the current scientific knowledge of extreme weather and climate events in Europe for the following variables: temperature, precipitation, hail, and drought (with the following types of drought: meteorological, hydrological and soil moisture) based on a review of key literature, indices and datasets. The report presents recorded observations and modelled projections for extreme events. Furthermore four case studies provide an analysis of recent European extreme weather/climate events including meteorological impacts and synoptic context.

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Presenting Uncertainty

- **Uncertainty guidance** included in the Climate-ADAPT,
- Section on **uncertainty in observation and projections** in Climate change impacts report,
- **Uncertainty section** in climate impacts indicators ,
- **Uncertainty** in assessing trends and projections of **extreme climate**.



The screenshot shows the Climate-ADAPT website interface. The header includes the European Union flag, the text 'Climate-ADAPT European Climate Adaptation Platform', a search bar, and navigation links for 'About', 'Search the database', 'EU policy', 'Countries, regions, cities', 'Knowledge', 'Network', and 'Help'. The main content area is titled 'Uncertainty Guidance' and contains several paragraphs of text explaining the nature of uncertainty in climate information and the purpose of the guidance. To the right of the text is a 3D illustration of a white figure standing on a white base, surrounded by seven colorful arrows pointing outwards in different directions. Below the main text are three columns of frequently asked questions, each with a list of questions and a link to go to the guidance for that topic.

Climate-ADAPT
European Climate Adaptation Platform

Search the website Search...

About Search the database EU policy Countries, regions, cities Knowledge Network Help

Knowledge / Tools / Uncertainty guidance

Uncertainty Guidance

When confronted with assembling data and information to support the decision-making process there is a need to understand its nature and how it can and should not be used. One aspect of particular interest is that for all data and information there are associated uncertainties. The nature and extent of these uncertainties should be considered when deciding how to use any data and information, and the types of decision that can be drawn.

A natural reaction when confronted with such uncertainties (e.g., uncertainties in climate information) is to ask those providing the information to improve knowledge and understanding, and to provide, as soon as possible, more accurate forecasts of future conditions. Unfortunately, even though knowledge will improve, uncertainty will remain inherent and therefore needs to be considered in adaptation decision making.

This guidance aims to help decision makers in understanding the sources of uncertainty in climate information that are most relevant for adaptation planning. It also provides suggestions for dealing with uncertainty in adaptation planning and for the communication of uncertainty. The guidance is organised around three main topics that are listed below. For each of these topics the guidance first provides basic background reading and next addresses a list of 'Frequently asked questions' related to uncertainty in adaptation planning. The guidance borrows from existing guidelines for modelling, interpreting, and communicating uncertainty. These sources are listed as background reading.

Notwithstanding the advice in this guidance, dealing with uncertainty can never be reduced to a simple cookbook. In the end each adaptation planning process will have its own characteristics. The debate among decision makers and other involved parties about how to deal with uncertainty in the planning process is a crucial element of policy making. The authors of this guidance hope that the answers and examples provided in the guidance can stimulate this debate.

What is meant by uncertainty?

- » What are sources of uncertainty in adaptation planning?
- » Why is there uncertainty in climate information?
- » What emission scenarios are the basis of most climate projections?

» [Go to uncertainty guidance for this topic](#)

How to factor uncertainty into adaptation decision-making?

- » What are ways to account for uncertainty in decision-making?
- » What are different types of adaptation options?
- » What are no-regret adaptation measures?
- » How are uncertainties quantified?
- » What scenario to use for adaptation planning?

» [Go to uncertainty guidance for this topic](#)

How to communicate uncertainty?

- » What are lessons in communicating uncertainty?
- » How can uncertainty be presented?
- » How are uncertainties communicated in European national portals?

» [Go to uncertainty guidance for this topic](#)

Climate indicators – Temperature

- An indicator on **Global and European temperature**
- Answering the policy question on **2 C target**
- Updated and improved **annually**
- Various global and European **datasets** used
- **Uncertainty** information presented in different ways



2015 the warmest year since pre-industrial...

... globally and in Europe

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WMO: 2015 likely to be Warmest on Record, 2011-2015 Warmest Five Year Period

INDEPENDENT News Voices Culture Lifestyle Tech Sport Appeal

Environment > Climate Change

Climate change: 2015 will



EUROPEAN REANALYSIS AND OBSERVATIONS FOR MONITORING
Tracking changes in European climate

2015: joint warmest year on record in Europe

(Redirected from [2015: second warmest year on record in Europe](#))

2015: second warmest year on record in Europe

Climate Indicator Bulletin

Climate Indicator Bulletins (CIBs) are user-driven climate information products which provide simple, effective and timely knowledge abstractions from the large amount of observation and reanalyses data available in [UERRA](#). The bulletins focus on user groups in sectors such as disaster prevention, health, energy, water resources, ecosystems, forestry, agriculture, transport, tourism and biodiversity at European, national and local levels.

This bulletin presents an overview of the 2015 temperature evolution in Europe based on a large number of measurements.

Last update: 25 January 2016.

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Climate change

2015 smashes record for hottest year, final figures confirm

Experts warn that global warming is tipping climate into 'uncharted territory', as Met Office, Nasa and Noaa data all confirm record global temperatures for second year running

Damian Carrington
@dpcarrington

Wednesday 20 January 2016 15:30 GMT

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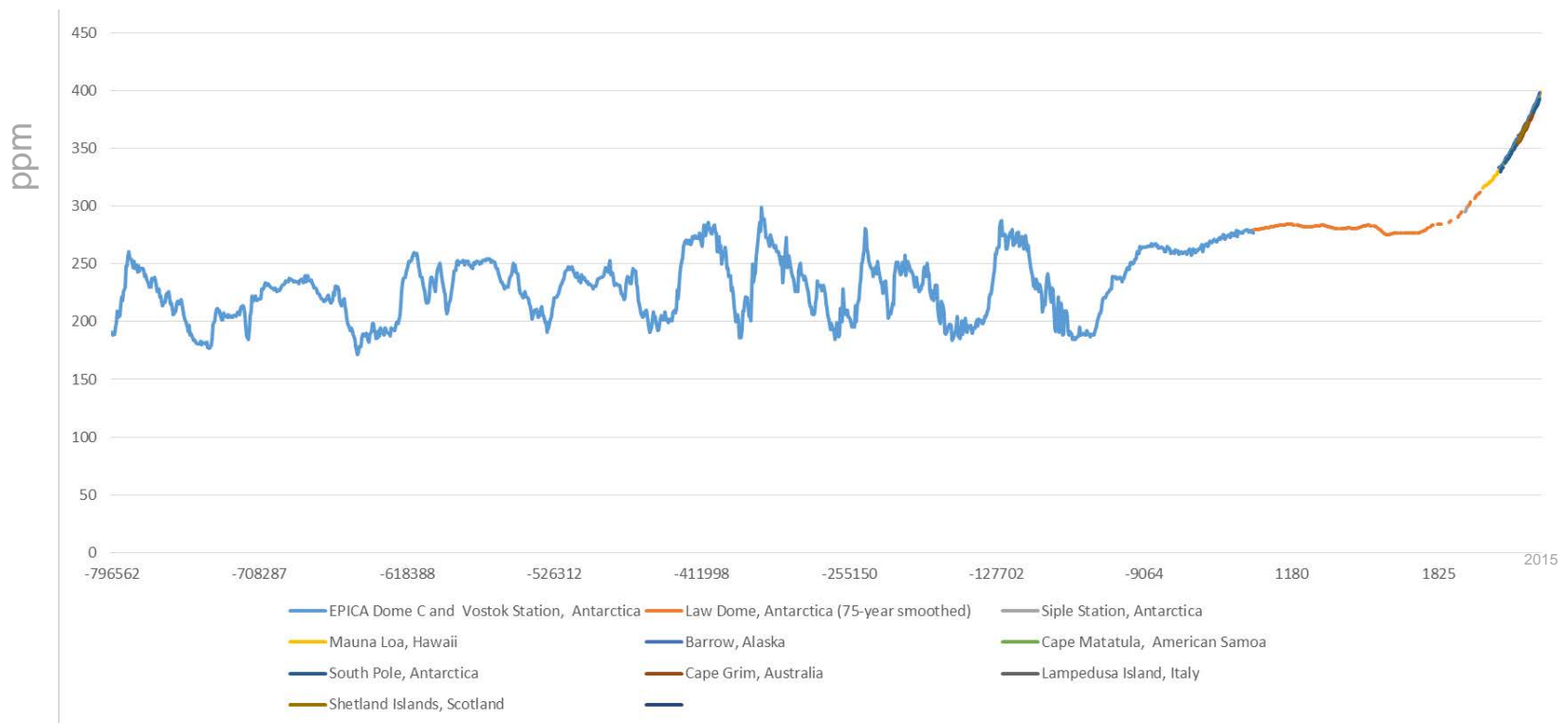
Waiting for avatar.nium.cn.uk... 3 the warmest year on record by 'quite a big lump'

Most popular in US

- 2015 the warmest year on record, according to **different** near-surface temperature observational analyses with anomalies close to 1°C.
- the decade 2006-2015 was between **0.83 and 0.89 °C** warmer than the period 1850-1899 (**pre-industrial**)

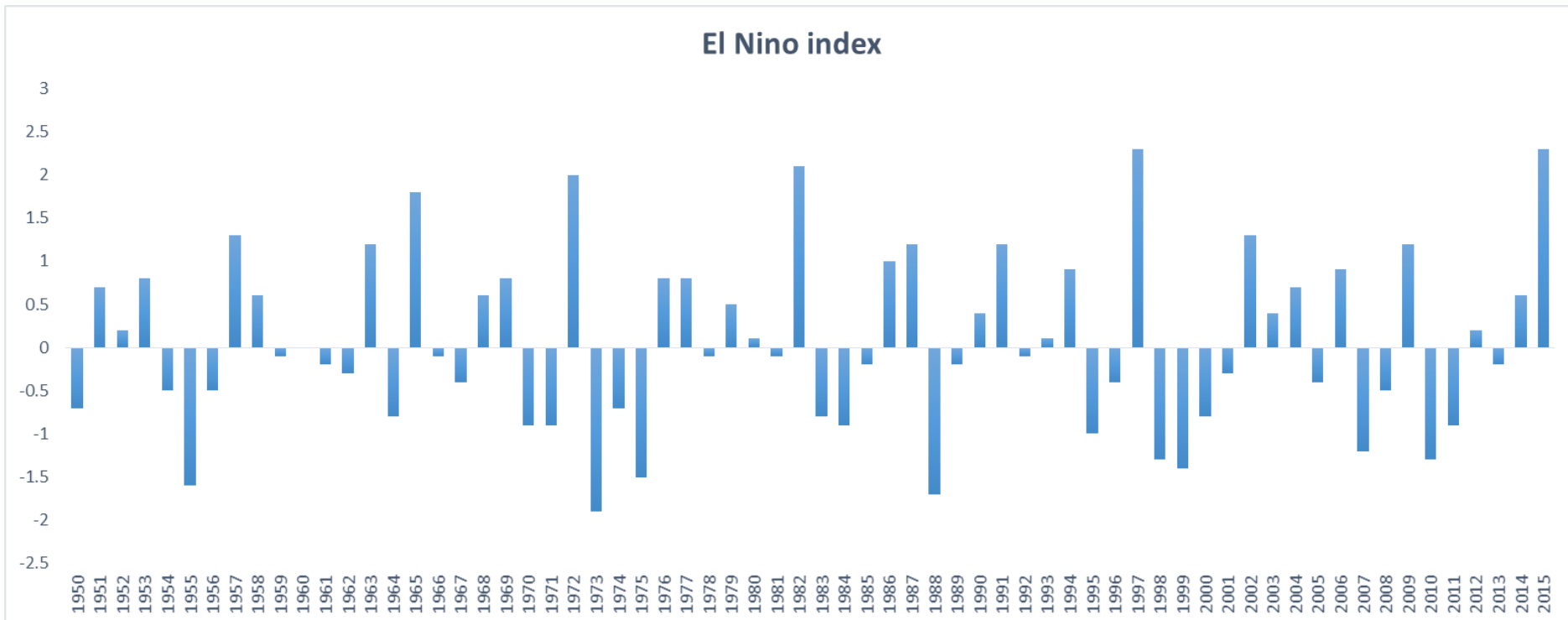
Reasons

- Anthropogenic influence – CO₂ concentration close to 400 ppm (highest in last 800 000 years)



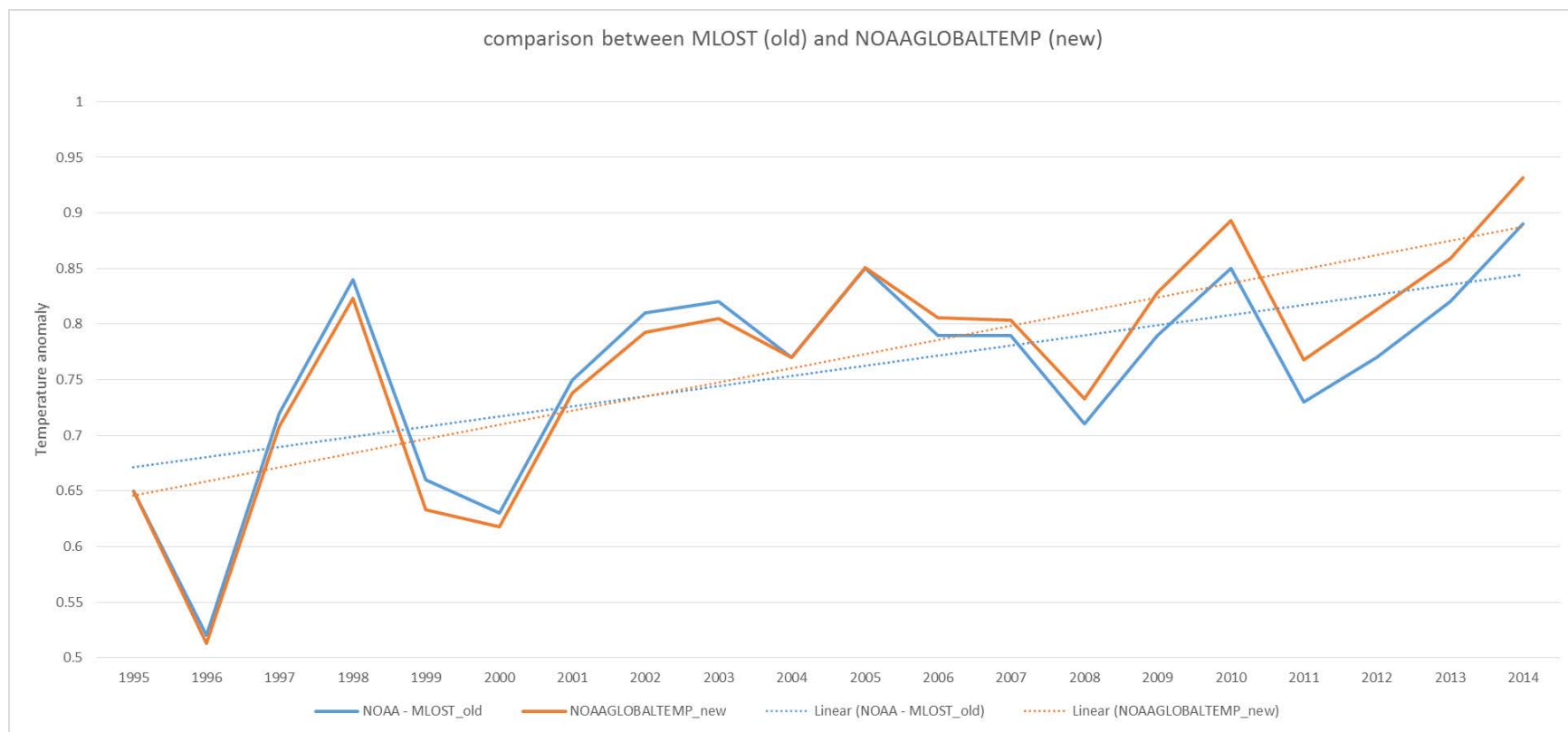
Reasons

- ENSO (strong positive phase after 1998)

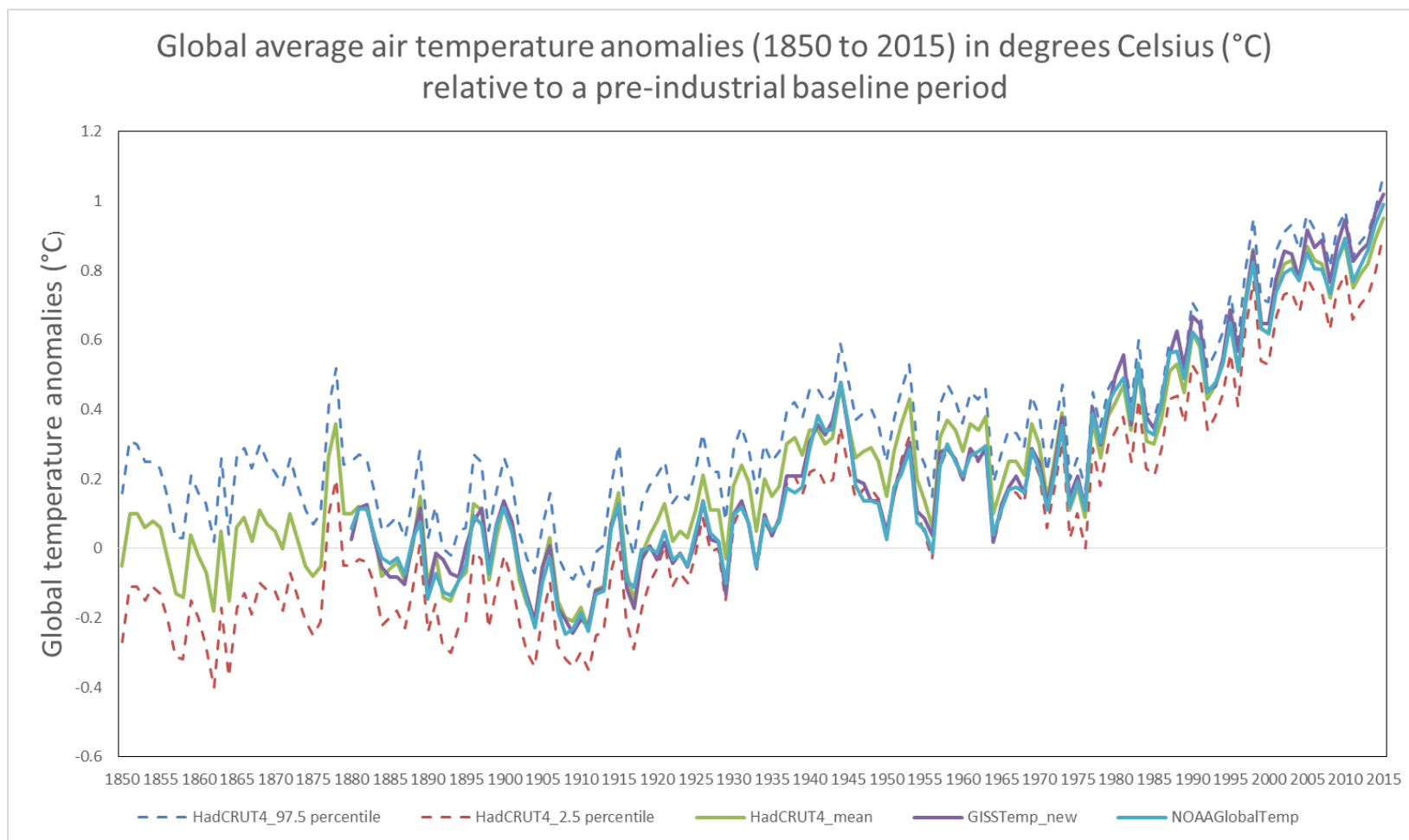


Timeseries of global temperature

New data with more stations available



Uncertainties in observations



Uncertainties in past trends

- **Measurement errors** resulting from imperfect observational instruments (e.g. rain gauges, satellite sensors calibrations, station displacement, ...)
- Errors in digitalising **old data** records
- **Aggregation errors** resulting from incomplete temporal and/or spatial data coverage (e.g. interpolation, filling missing data, homogenisations, ...).
- In case of reanalysis **imperfect models** with limits in spatial resolution, descriptions of physical processes, boundary conditions, etc.
- In case of analysing trends: **selection of indices** and statistical trends analysis

Report on climate extremes

Assessing trends and projections in extreme events

Observations and projections of extreme events

**Extreme temperature
(Heat waves)**

**Droughts
(meteorological, soil moisture
and hydrological droughts)**

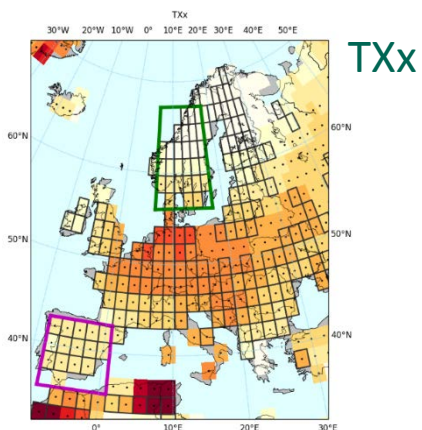
Hail

Heavy precipitation

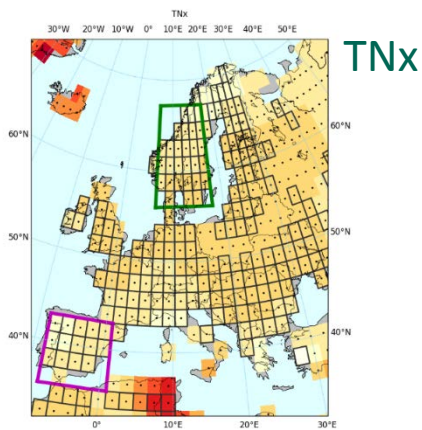


Temperature extremes – use different thresholds

Trends in daily maximum and minimum temperature

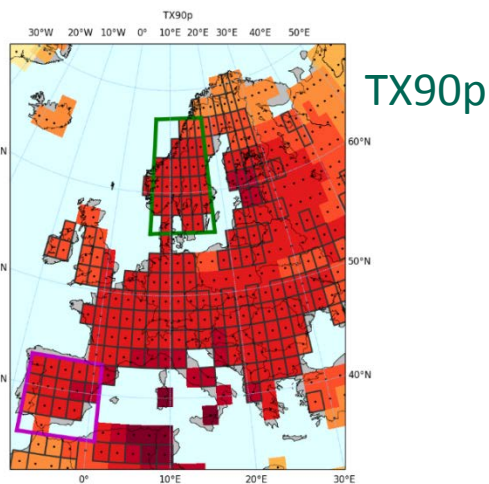


TXx

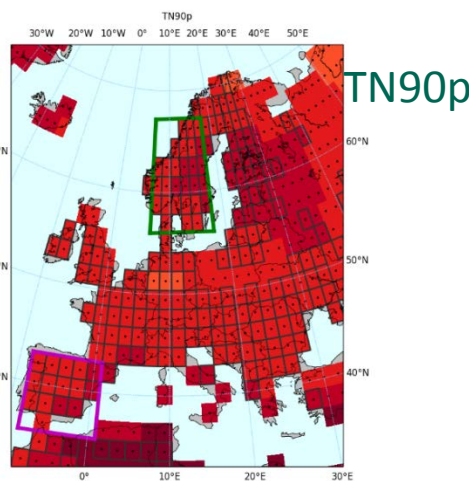


TNx

Absolute threshold

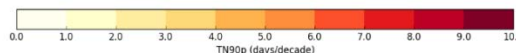
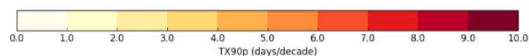


TX90p

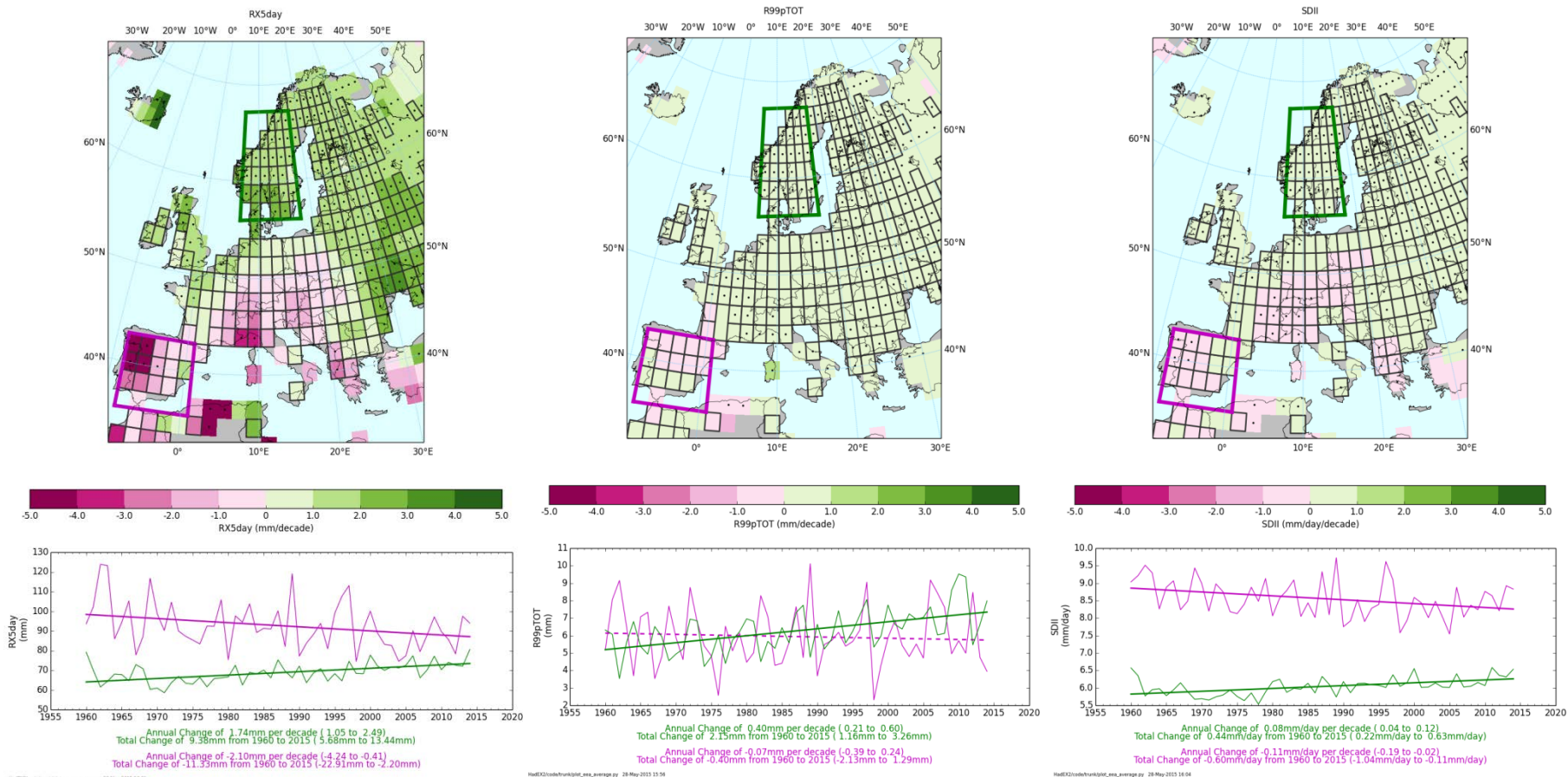


TN90p

Relative threshold



Precipitation extremes – use of different indices



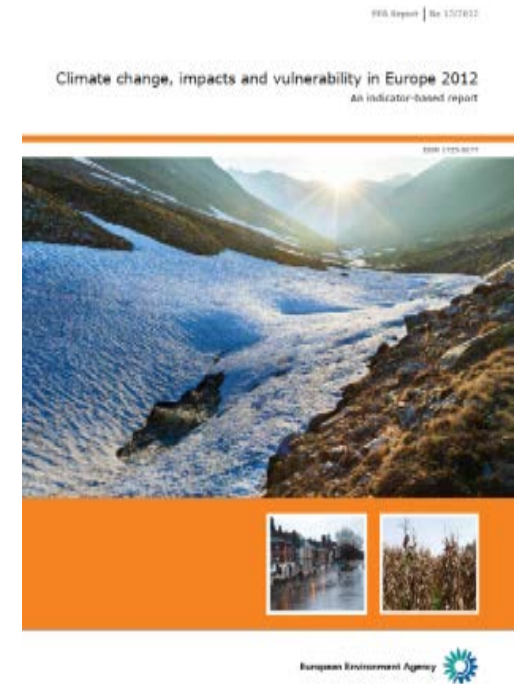
Key messages from the report

- Since 2003 Europe has experienced several extreme summer heatwaves (2003, 2006, 2007, 2010, 2014 and 2015). ***Heat waves are projected to become the norm in the second half of the 21st century under a high forcing scenario (RCP8.5).***
- The length of wet spells as well as the intensity of heavy precipitation events have decreased in southwestern Europe but increased in northern and northeastern Europe since 1960s. ***High resolution precipitation dataset not available.***
- Since 1951 increasing hail trends have been noted in southern France parts of Spain and Austria, and decreasing (but not significant) trends in parts of eastern Europe. ***Missing reliable data***



Climate Change impact report – under preparation

- Assessing impacts of past and future climate change
- Chapters on climate system, climate impacts on socio-economic sectors, ecosystems, and health
- Uncertainties addressed in separate section and under different indicators

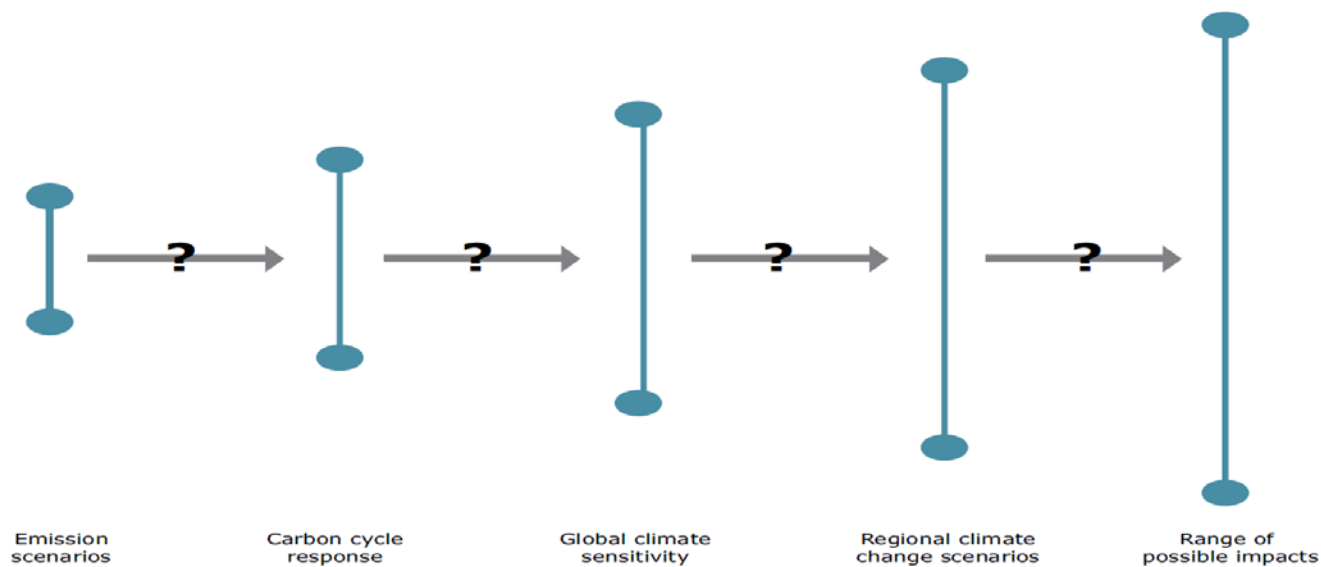
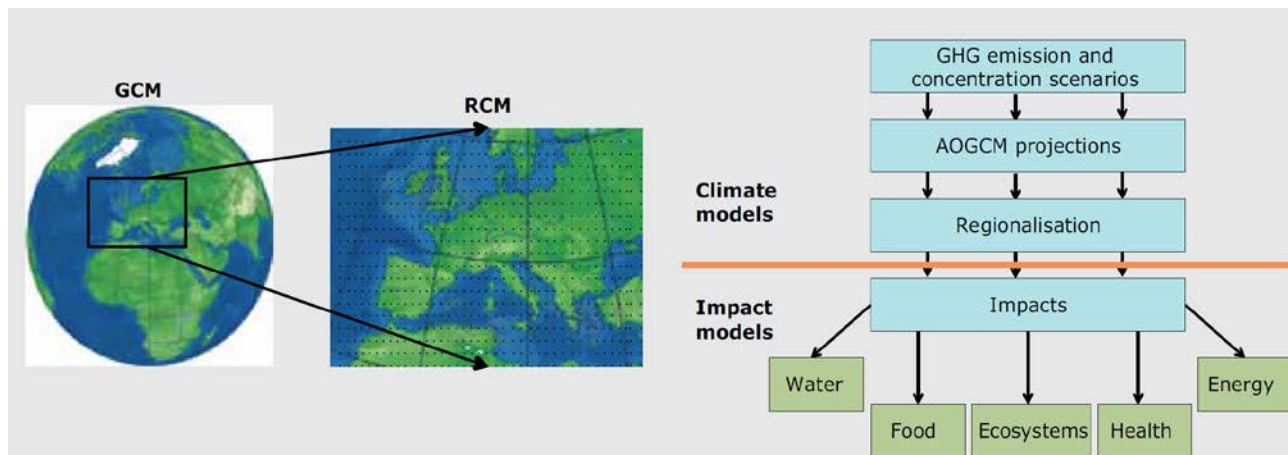


Uncertainties in future climate impacts

- **Model limitations** (of climate and climate impact models)
 - the limited resolution of models
 - an incomplete understanding of individual Earth system components
 - incomplete understanding of the environmental or social system under consideration
- **Future emissions trajectories** (of greenhouse gases and aerosols) determine the magnitude and rate of future climate change.
- **Future development of non-climatic** (socio-economic, demographic, technological and environmental)
- **Future changes in societal preferences and political priorities** determine the importance attached to a given climate impact (e.g. a local or regional loss of biodiversity).

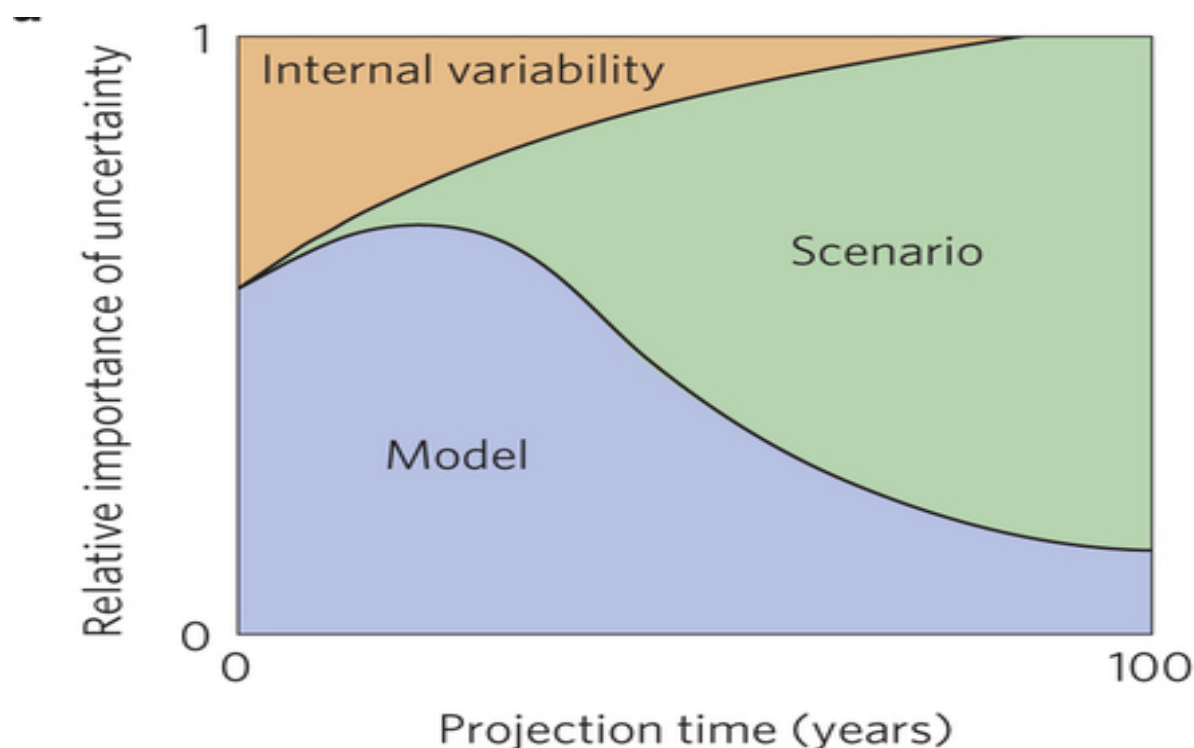


Cascade of uncertainty



Uncertainties in projections

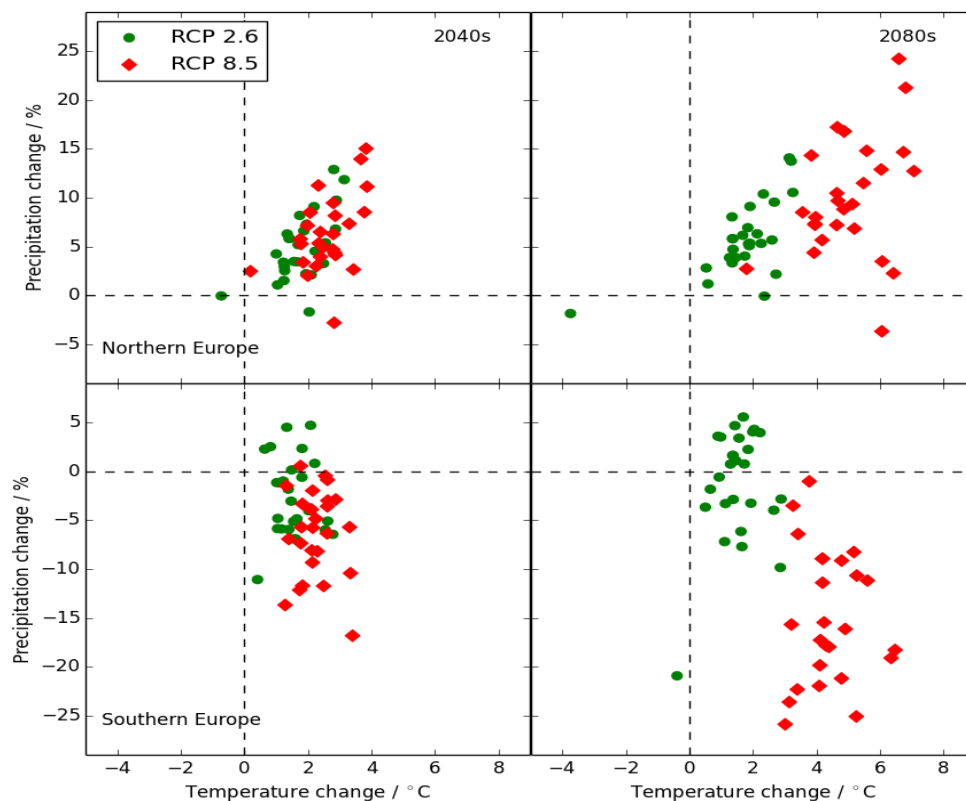
- **Relative contributions** of three sources of uncertainty in model-based climate projections of global decadal mean surface temperature



(Hawkins and Sutton, 2009)

Presenting models' results to policy makers

- Annual projected changes in temperature and precipitation for northern Europe and southern Europe and for two time periods



Forthcoming EEA reports on climate change

- Climate change, impacts, and vulnerability report 2016 – indicator report (currently in under review with member states)
- Climate change adaptation and disaster risk reduction in Europe - Synergies for the knowledge base and policies – 2017 report (drafting has started)