



POTSDAM INSTITUTE FOR  
CLIMATE IMPACT RESEARCH

## ClimateImpactsOnline: A web platform for regional climate impacts (in Germany)



# Goals and challenges

## Motivation:

- effective communication of scientific knowledge on climate change, climate impacts, adaptation and mitigation
- bridge the gap between climate impact research and decision makers / the general public

## Challenges:

- (web-based) communication of climate change is generally non-trivial (e.g., Moser 2010), in particular due to the inherent complexity and to the uncertainties to be communicated (e.g., Patt 2009)
- many separated studies (over federal states in Germany)
- often too low regional resolution to support local climate impact assessment
- easy-to-use graphical user interface, high error tolerance to user inputs, high portability for different software platforms and intuitive visualization metaphors
- provide expressive & effective visualization (e.g. suitable colour mapping)

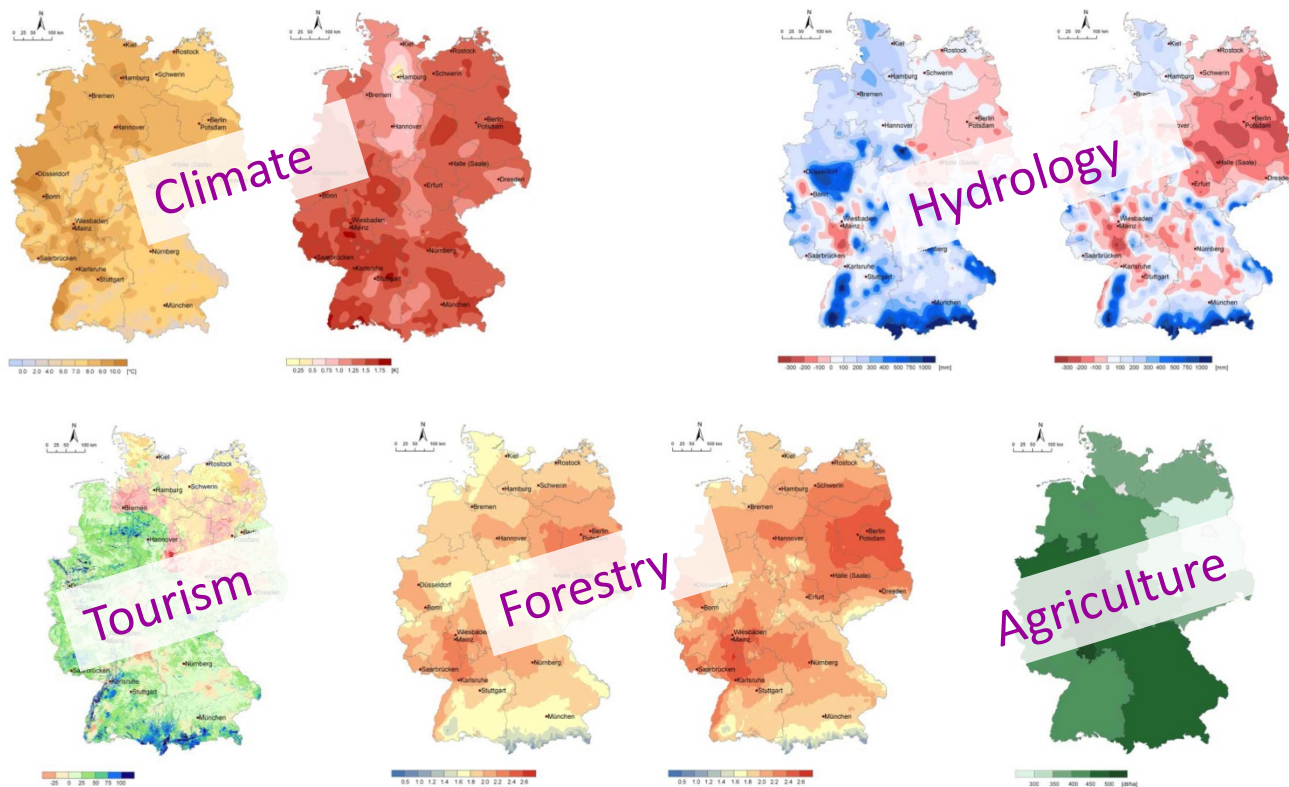
# ClimateImpactsOnline - Approach

## Approach:

- **present detailed regional climate information for local decision making (awareness building and adaptation)**
  - **target audience: public sector decision makers, but as well sectoral experts (e.g. foresters, farmers) and the general public**
  - **no explicit (textual) data interpretation; visualization speaks for itself, with publications linked**
- **integrate regional climate drivers and climate impacts based on an scientifically established model chain**
- **design an easy-to-use interface based on an successful app for weather data presentation (by German weather information Provider WetterOnline)**
- **display both absolute parameter maps and arbitrary selectable difference maps**
- **display both time series plot, textual values and others for administrative units of interest**
- **starting with a base parameter set, intensive user testing and extending further sectors / parameters / scenarios later**

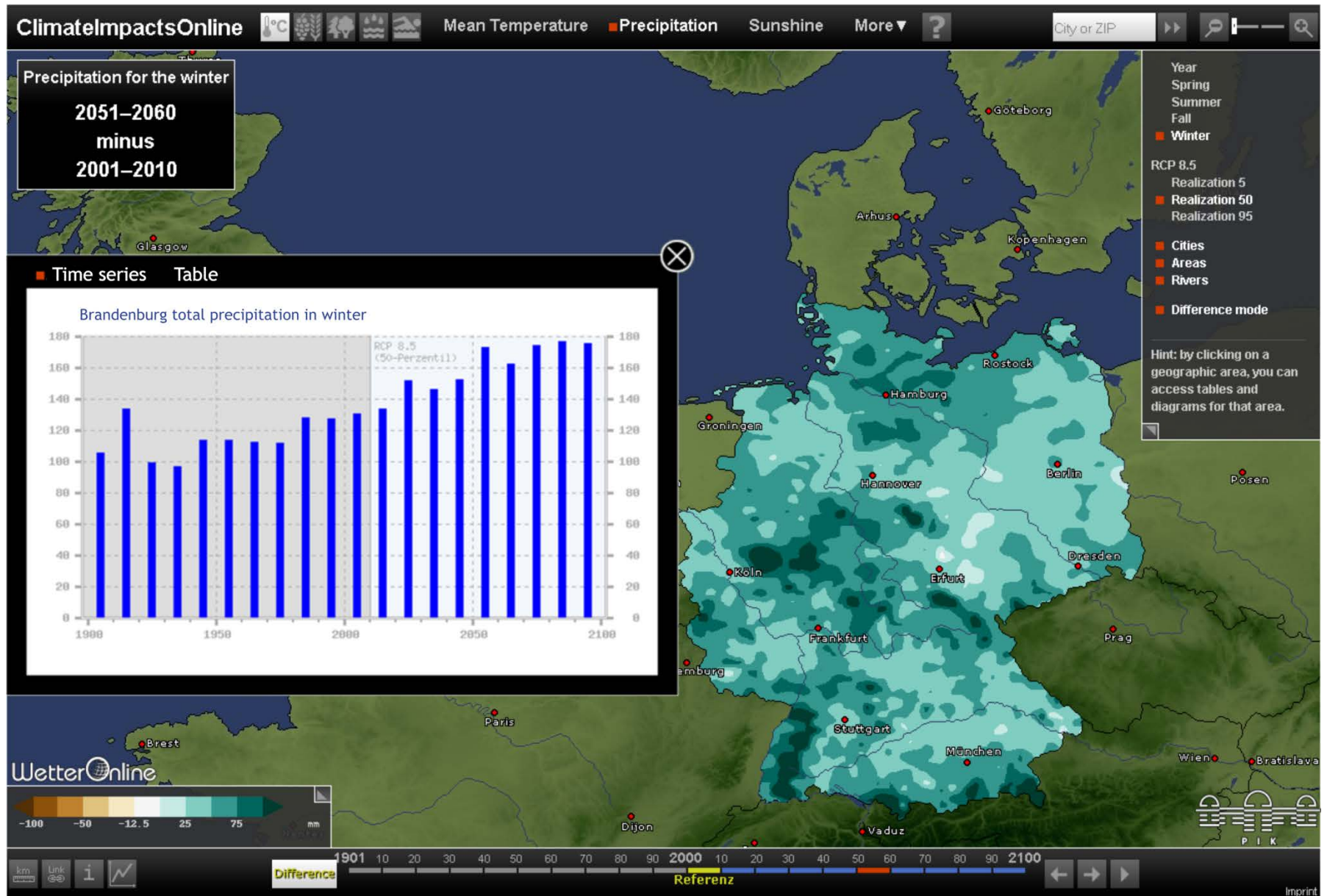
# ClimateImpactsOnline – sector overview

Calculation and visualization of future climate scenarios on a regional scale and main impacts on several sectors



and additional sectors: health, energy and more

# ClimateImpactsOnline – Examples (1)



The screenshot displays the ClimateImpactsOnline website interface. At the top, navigation tabs include 'Mean Temperature', 'Precipitation', 'Sunshine', and 'More'. A search bar is present with a 'City or ZIP' input field. The main content area is divided into several sections:

- Precipitation for the summer 2051–2060 minus 2001–2010:** A map of Europe showing precipitation changes, with a specific callout for Brandenburg.
- Brandenburg total precipitation in winter:** A bar chart showing precipitation levels for the years 1900, 2000, and 2100.
- Germany Mean Values and ranges in the decade 2001–2010:** A table showing various climate parameters and their ranges for different seasons.
- Germany Decadal Mean Temperature [°C] 2001–2010:** A line graph showing temperature trends from 2000 to 2100, labeled 'Realization 50'.
- Model chain:** A text box explaining the regional impact assessment methodology, listing the models used: STARS, SWIM, IRMA, and 4C-FORESEE.
- Reception Imprint:** A map showing the spatial distribution of reception imprints.

The bottom of the page features a 'WetterOnline' logo and a 'PIK' (Potsdam Institute for Climate Impact Research) logo.

Parameter	Year	Spring	Summer	Fall	Winter
Mean Temperature [°C]	9.2 7.9 ... 9.8	8.9 7.5 ... 10.6	17.6 16.7 ... 19.8	9.3 8.0 ... 11.9	0.8 -1.5 ... 4.2
Maximum Temperature [°C]	13.5 12.1 ... 14.5	13.9 12.1 ... 16.3	23.1 21.9 ... 26.1	13.4 11.8 ... 16.5	3.6 1.1 ... 7.0
Minimum Temperature [°C]	5.1 3.8 ... 5.8				
Precipitation [mm]	873.7 634.8 ... 1115				

**Germany Decadal Mean Temperature [°C] 2001–2010**

Realization 50

The line graph shows a steady increase in temperature from approximately 8°C in 2000 to over 12°C by 2100. A vertical dashed line marks the year 2050.

**Model chain**

The regional impact of global climate change is assessed for the hydrology, agriculture, forest, energy, tourism and health sectors in Germany. To do so, we use a "model chain" developed at the Potsdam-Institute for Climate Impact Research (PIK). The simulation models in the chain have been developed in concert and are specifically tuned to each other, having been interconnected in past studies and projects. Examples of model chain applications in a series of regional impact studies of global climate change for Germany are given in the reference section below.

The links of the model chain are:

- STARS - Statistical Analog Resampling Scheme
- SWIM - Soil and Water Intergrated Model
- IRMA - Integrated Regional Model Assessment
- 4C - FORESEE - FOREST Ecosystems in a changing Environment



# **ClimateImpactsOnline – user feedback (1)**

## **Discussion of data details:**

- high spatial resolution legitimate?
- past and future in one time series?
- decadal vs. 30 yearly aggregation?
- if / how to integrate regional dynamical model projections?
- and requirements of further parameters / sectors

## **Discussion of interaction mechanism:**

- Should the currently free selection of two arbitrary difference time series intervals (decades) be restricted?
- How to get to the detailed view(s) for a selected region?

## **Discussion of color maps (most based on ColorBrewer, [www.colorbrewer2.org](http://www.colorbrewer2.org)):**

- Did we find a good compromise between details and identification of singular values (to allow comparability between all seasons and within the long time series, we have a relatively high number of color intervals)?
- established color schemes vs. red-green color blind safe color schemes

## **ClimateImpactsOnline – user feedback (2)**

### **Improve user interface:**

- some details (district data, parameter / sector help texts) were hard to find in the first version

### **Improve documentation :**

- to better find the documentation
- description / data documentations are designed for a medium level experts, so based on the feedback, we decided for a subject index, a education version, a.o.
- relate to other studies

### **Others:**

- Does the black design impose some normative statement?