

# Seasonal and decadal climate predictions for German state capitals

## Summary

The climate prediction service strengthens the urban resilience to climate variability.

Sponsor	Project	Soluti
 <p>The e-shape project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 82085</p>		

## Taxonomy

- urban development
- smart cities
- local and regional planning
- assess climate change risk
- forecast threats to human health

## User profile

The main users of the climate prediction service for German cities are employees of the city administration working in the urban planning, environmental protection, green space and public health offices. Furthermore, the pilot should support the climate protection and adaptation managers who take on a cross-sectional task within the city administrations.

The service covers the German state capital cities and Aschaffenburg. The number of employees who work with meteorological and climatological data and the service in the city administration, as well as the expertise of the individual employees in handling and interpreting these data varies. Some city administrations have many years of expertise, while other municipalities are dealing with these data for the first time and still need external support.



## Service description

The Deutscher Wetterdienst (DWD), is a public institution with partial legal capacity under the Federal Ministry for Digital and Transport.

DWD is responsible for meeting meteorological requirements arising from all areas of economy and society in Germany.

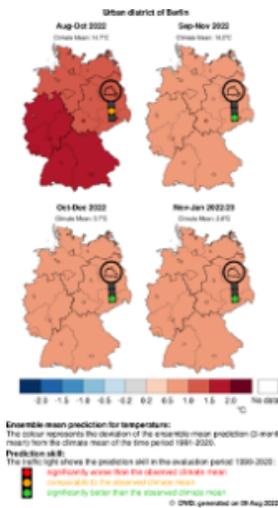
The core tasks are weather forecasting, issuing warnings on weather-related hazards, climate monitoring throughout Germany as well as the assessment of climate change and the provision of advice and guidance on climate change adaptation.

The DWD operates the national climate archive, where long-term data series are stored as a basis for climate change research and monitoring.

DWD's supercomputing centre processes and stores weather bulletins from all over the world, preparing them for further use by e.g. public institutions, the industry and the media.

**Deutscher Wetterdienst**  
**Wetter und Klima aus einer Hand**





Urban district of Aschaffenburg Ensemble Mean Prediction in Comparison to the Climate Mean of the Time Period 1991-2020		
Time Period	Climate Mean	Climate Prediction
Aug-Oct 2022	184 l/m <sup>2</sup>	-55 l/m <sup>2</sup> (+147 l/m <sup>2</sup> - -102 l/m <sup>2</sup> )
Sep-Nov 2022	178 l/m <sup>2</sup>	-21 l/m <sup>2</sup> (+113 l/m <sup>2</sup> - -103 l/m <sup>2</sup> )
Oct-Dec 2022	189 l/m <sup>2</sup>	+5 l/m <sup>2</sup> (+74 l/m <sup>2</sup> - -64 l/m <sup>2</sup> )
Nov-Jan 2022/23	186 l/m <sup>2</sup>	+13 l/m <sup>2</sup> (+74 l/m <sup>2</sup> - -47 l/m <sup>2</sup> )

**Ensemble mean prediction for precipitation:**  
The table represents the deviation of the ensemble mean prediction (3-month sum) from the climate mean of the time period 1991-2020. Maximum and minimum of the ensemble are given in brackets.

**Prediction skill:**  
The traffic light shows the prediction skill in the evaluation period 1990-2020:

- significantly worse than the observed climate mean
- comparable to the observed climate mean
- significantly better than the observed climate mean

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## Customer experience

N/A

## Need

- Easily understandable information on climate variability and change in their own city and comparable regional information for their federal state and the state as a whole
- Meteorological and climatological data and results preferably available on public accessible platforms
- High resolution interactive maps
- Display data in the format of maps/images with possibility of data export

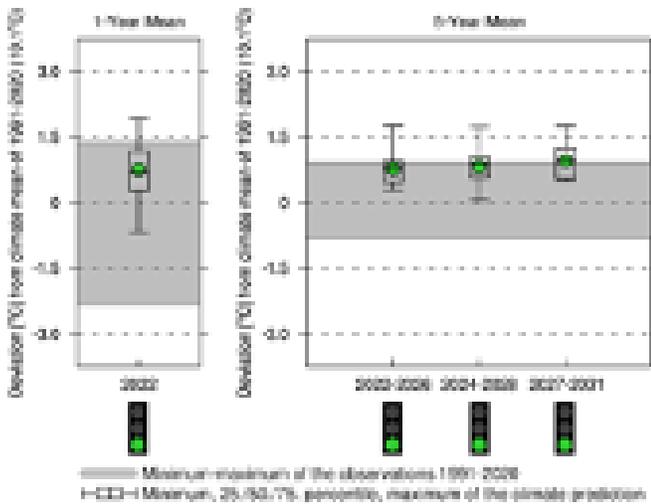
## Challenges

- High computational requirements and expert knowledge needed to provide high-resolution climate prediction information
- Spatial resolution of currently available climate predictions is too low to gain climate information for cities without further post-processing and bias correction etc.
- Assessing and communicating uncertainties of model results
- Low quality for some data products (currently not usable for decision making)

## Results

- maps, tables and time series of temperature and precipitation for seasonal and decadal climate outlooks
- free and easy access via DWD climate prediction website
- Data visualization of results including download function
- extensive explanatory material in German and English

## Urban district of Berlin



### Ensemble mean prediction for temperature:

The coloured dot represents the deviation of the ensemble mean prediction (1-5-year mean) from the climate mean of the time period 1991-2020. The box-whisker represent the distribution of the prediction ensemble. The area in gray shows the spread of the observations in the time period 1991-2020.

### Prediction skill:

The traffic light shows the prediction skill in the evaluation period 1996-2022:

- significantly worse than the observed climate mean
- comparable to the observed climate mean
- significantly better than the observed climate mean

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## References

Learn more about the service: [www.dwd.de/climatepredictions](http://www.dwd.de/climatepredictions)

Learn more about e-shape: [www.e-shape.eu](http://www.e-shape.eu)

A question? Contact the Helpdesk: <https://helpdesk.e-shape.eu>