

23



Yearbook 2023

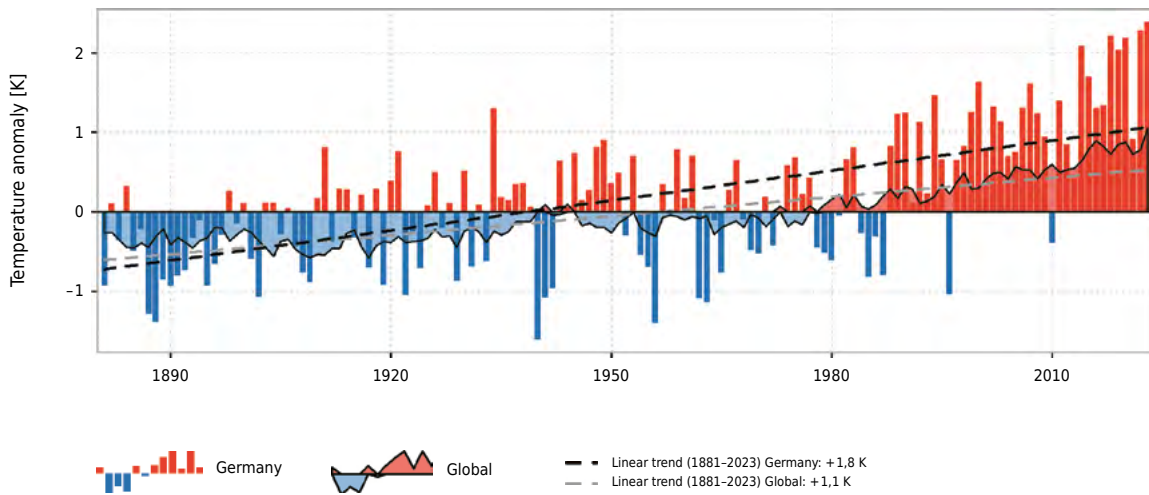
of the Deutscher Wetterdienst



Temperature, sunshine duration and precipitation in Germany in 2023

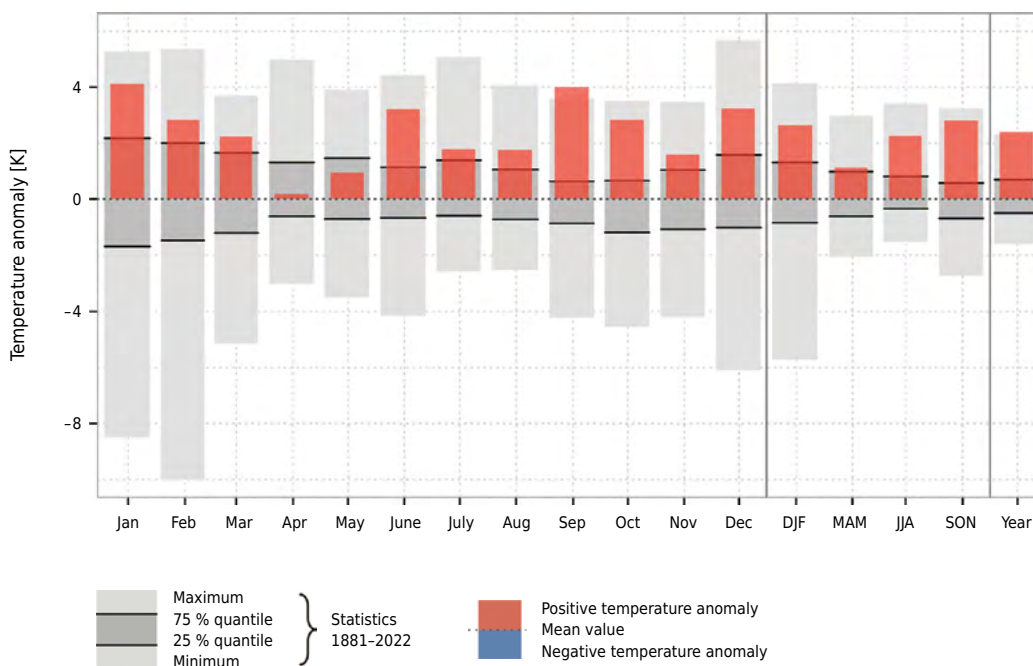
Temperature anomaly: Germany/Global

1881-2023, reference period 1961-1990



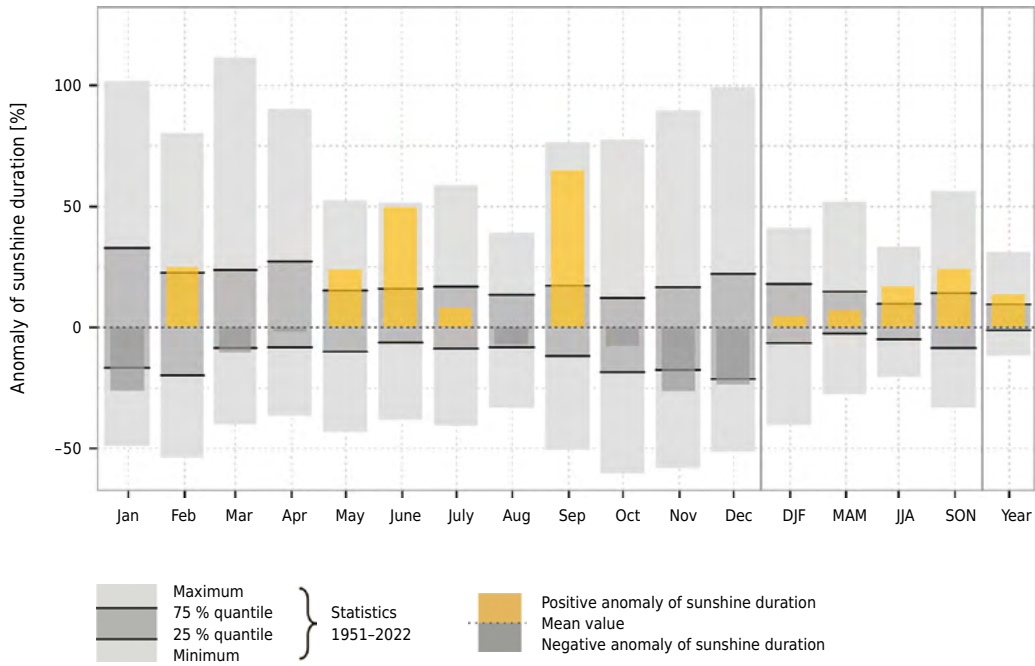
Temperature anomaly

Monthly and seasonal averages for Germany, year 2023, reference period 1961-1990



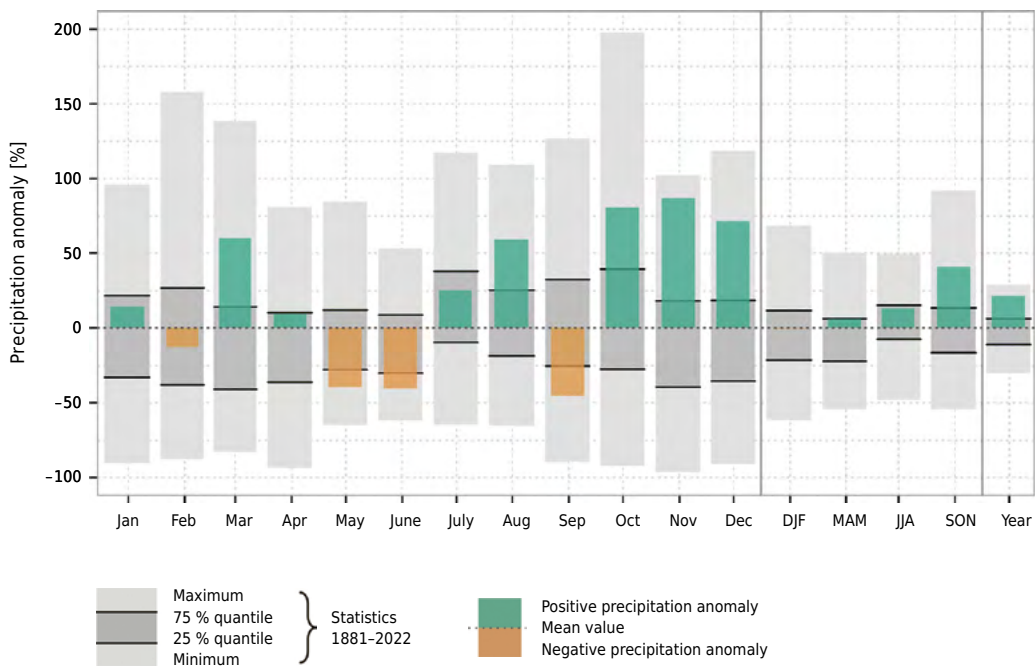
Anomaly of sunshine duration

Monthly and seasonal averages for Germany, year 2023, reference period 1961-1990



Precipitation anomaly

Monthly and seasonal averages for Germany, year 2023, reference period 1961-1990



2023 – the warmest year ever since measurements began

The year 2023 is the warmest year on record since regular measurements began – both in Germany and globally. Even though the summer produced no noticeable heatwaves, the year earned the record-breaking position for its mild winter and warm autumn. After a series of years that were much too dry, 2023 ended with the sixth highest amount of total precipitation, with repeated occurrence of

rainfall especially during the last three months of the year. The soils in widespread areas were already so much saturated that further rain led to extreme flooding, in particular in the northern part of Germany. 2023 was another year in which Germany could enjoy above-average amounts of sunshine.

Some facts and figures¹

After 2022 had brought a repeat of the temperature record of 2018 of 10.5 °C, 2023 ended with a nationwide average temperature of 10.6 °C. The linear trend shows that, in the period from 1881 to 2023, the **temperature** in Germany has risen by **1.8 degrees**.

December 2023 was the **15th successive month** (September 2022 to December 2023) that was **warmer** than normal (compared to the reference period 1961–1990).

The annual number of **summer days** (daily maximum temperatures ≥ 25 °C) was double the normal figure, and there was an increase of **+180 %** for hot days (daily maximum temperatures ≥ 30 °C).

In terms of precipitation, the year 2023 as a whole **was wetter than normal**. At around 958 mm, total precipitation was 21 % above the long-term annual figures for both periods, 1961–1990 and 1991–2020. The largest surplus of precipitation occurred in the north. Widespread areas received around 50 % more, some individual areas even 75 % more than normal. The federal states of North Rhine-Westphalia and Lower Saxony saw their wettest year to date.

Compared to the international climatological reference period 1961–1990, there was an **excess of 210 hours** (or +13.5 %) of **sunshine**. This places the year 2023 at number 11 in the “very sunny” range of the sunshine series since 1951.

Averaged over **Europe**, 2023 was the **second warmest year** since the beginning of the data series of the EU’s Copernicus Climate Change Service. Only 2020 was warmer. In Europe, 2023 was 1.0 degree warmer compared to the normal for 1991–2020.

According to the World Meteorological Organization (WMO), 2023 was **globally** by far **the warmest year** on record since measurements began. Six leading international data sets for monitoring global temperatures, all consolidated by the WMO, show a global average annual temperature in 2023 of around 1.45 ± 0.12 °C above pre-industrial levels (1850–1900).

¹ The complete annual climatological review (“Klimatologischer Rückblick auf 2023: Das bisher wärmste Jahr in Deutschland”, in German only) is available at www.dwd.de/presse, menu item “Hintergrundberichte”.

Foreword



Prof. Dr Sarah C. Jones, President
of the Deutscher Wetterdienst

Dear Reader

At an average temperature of 10.6 degrees Celsius (°C), 2023 was the warmest year in Germany since systematic weather records began. According to the World Meteorological Organization (WMO), 2023 was also the warmest year on record world-wide, confirming that climate change is continuing unabated.

These are just a couple of climatological facts which I would like to mention in the foreword of the first DWD Yearbook published since I took up my new function as President of the Deutscher Wetterdienst (DWD).

A highlight of 2023, and one which has earned a place in the annals of the Deutscher Wetterdienst, was the "70 Years between Nature & Society" exhibition in the Paul Löbe Building of the German Bundestag. In it, we were able to present the full range of our statutory tasks to our mandating body, the German parliament. Numerous Members of the Bundestag, in particular those sitting on the Committee on Transport, took the opportunity to find out more about the work of the DWD. Ensuring that as many people as possible get to see the exhibition, it is now open to the general public and is currently on show in the Flugwerft Schleissheim branch of the Deutsches Museum. It will be on display there until the end of February 2025.

A special thank you goes to Udo Schiefner, Member of the Bundestag and Chairman of Bundestag Committee on Transport, who has given us the opportunity of an interview.

Last year, the DWD supported the energy transition in Germany by reducing the protection zones around its precipitation radars from 15 to five kilometres. This was also made possible by the operational introduction of KONRAD3D, which permits us to make better use of radar data and thus further optimise thunderstorm forecasts. We were only able to take such major steps thanks to the commitment and broad-based creativity of our employees who, for their part, value the DWD as an attractive employer. For this, we owe them our sincerest gratitude.

We have reduced the size of the Yearbook partly with the aim of conserving resources. You will now find concise overviews of important events and the main developments. More detailed information on individual topics, such as last October's storm on the Baltic Sea coast, can be found at www.dwd.de/jahresbericht. I hope you enjoy reading the Yearbook and I look forward to my time working with you.

Yours,

A handwritten signature in blue ink that reads "Sarah C. Jones". The signature is fluid and cursive, matching the printed name below it.

Sarah C. Jones

“Germany’s national meteorological service – an indispensable institution”

Interview with Udo Schiefner, Member of the Bundestag and Chairman of the German Bundestag Committee on Transport

DWD:

The Deutscher Wetterdienst exhibition in the Paul Löbe Building of the German Bundestag received considerable support from the Committee on Transport, and you gave a speech at the opening of the exhibition. In your view, what significance does the DWD hold as the national meteorological service?

Udo Schiefner:

First of all, I would like to thank the DWD for its highly successful exhibition in the Paul Löbe Building. In it, the DWD gave an impressive insight into its work and the fundamentals of weather and climate observation.

In its role as national meteorological service, the DWD is an indispensable institution for our country. It is of outstanding importance – certainly for the transport sector, but also for society as a whole. The quality of weather forecasting has been significantly improved by the use of computers, weather satellites and weather radar systems. But as important as satellites are, we also need a dense network of observation facilities on the ground in order to provide accurate local forecasts. The DWD is indispensable and is particularly important when it comes to issuing reliable severe weather warnings in good time. These warnings are also important for decision-making by those in positions of responsibility in political and administrative bodies.

DWD:

What do you and other politicians expect from the DWD?

Udo Schiefner:

Many people rely on accurate weather forecasts when planning their professional and private lives. I therefore hope that the DWD will continue to improve its weather forecasts, to refine their local accuracy and to extend the time periods over which they remain reliable. The rising prevalence of extreme weather events means that the severe weather warnings issued by the DWD are gaining in importance. Early warnings as well as situation reports and information on prevention of natural hazards need to be issued to the population as early as possible and in an easy-to-understand manner. We will support this by amending the Deutscher Wetterdienst Act. This amendment will also empower the DWD to develop and operate a natural hazard portal. I am convinced that the DWD will do all in its power to realise these objectives.

Policy-makers also value being able to call upon the DWD for advice based on its extensive expertise in climate and climate change.

right

From the left: Udo Schiefner (Member of the Bundestag and Chairperson of the Committee on Transport), Aydan Özoğuz (Vice-President of the Bundestag) and Prof. Dr Gerhard Adrian (the then President of the DWD) shortly before the exhibition's opening ceremony

**DWD:**

As Chairman of the Committee on Transport, mobility is one of your top priorities. What information, advice or support do you need specifically with regard to human-made climate change and mobility issues?

Udo Schiefner:

We have formulated the general political expectations for the DWD regarding climate change in the DWD Act. In the area of transport policy, the focus is on information about the specific effects of the transport sector on climate change and how these can be reduced. Conversely, it is also becoming increasingly important to know how climate change is affecting transport. A good example here is the water levels in our inland waterways. Such information can help us respond to climate change and take appropriate measures.

DWD:

Have you noticed any changes in the communication surrounding climate change? Has the demand for meteorological and climate services changed?

Udo Schiefner:

People can call up weather-related services at any time using today's technology. TV weather reports only provide general information on weather conditions, but users can also have personalised weather information transmitted directly to their mobile devices. An important task is to continue improving the location and time accuracy of the weather information on mobile devices. This applies in particular to warnings for severe weather events. It includes issuing precise and timely information to all those involved in disaster management.

In the context of climate services, it is becoming increasingly important to be able to predict climate-related changes for specific locations and issue accurate information regarding the time horizon. This will allow municipalities to act accordingly when preparing their water management plans, for example. Climate research findings need to be communicated in ways which are easy to understand. The DWD has an important role to play here and is doing a good job, especially on its website.

DWD:

Thank you very much for talking to us.



In brief: Key milestones and developments in 2023

This section of the DWD Yearbook provides short summaries of the key milestones and developments achieved in the past year. For all topics marked with an **+**, further and more detailed information is available at www.dwd.de/jahresbericht, including graphics and links to background information (in German only), just scan the QR code provided here.

The special photo series of this year's edition of the yearbook is dedicated to the Deutscher Wetterdienst exhibition held in the Paul Löbe Building of the German Bundestag in April and May 2023.



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The first station of the exhibition (cabinet on the right) displays historical documents of the DWD from three centuries.



The body which decides on the DWD's mandate: The German Parliament

As part of the “70 years of DWD” celebrations, the DWD presented the full range of its activities in a special exhibition in the Paul Löbe Building of the German Bundestag in April/May 2023. The exhibition showed how the DWD collects, processes and distributes meteorological data from Germany and around the world, how it develops weather and climate models, how meteorologists and climatologists forecast the weather and climate, how the DWD warns the population of hazardous weather events, how it works with the German Armed Forces, disaster management services and numerous clients, and how it advises on climate change.

Aydan Özoğuz, Vice-President of the Bundestag, opened the exhibition. Dr Volker Wissing, Federal Minister for Digital and Transport (BMDV), and Udo Schiefner, Chairman of the Committee on Transport, gave speeches. Numerous Members of the Bundestag, Bundestag employees and external guests were shown around the exhibition and attended the presentations given by the DWD. The Committee on Transport also held a public consultation on the DWD.

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DWD President Prof. Dr Gerhard Adrian being interviewed by the parliamentary television channel of the Bundestag

You can find a detailed report on the exhibition at www.dwd.de/jahresbericht (in German only).

After spending over eight months in the Klimahaus Bremerhaven, the exhibition has now moved to the Flugwerft Schleissheim branch of the Deutsches Museum, where it will be on display until 23 February 2025. +

Four years of service as WMO President

“Professor Adrian, I would like to congratulate you on your outstanding career. You are a person of tremendous integrity who believes passionately in the importance of international cooperation and in ensuring that its benefits can be enjoyed by all. I would like to thank you for accepting this challenge and for leading the WMO as President over the past four years. I wish you all the best for the future.”

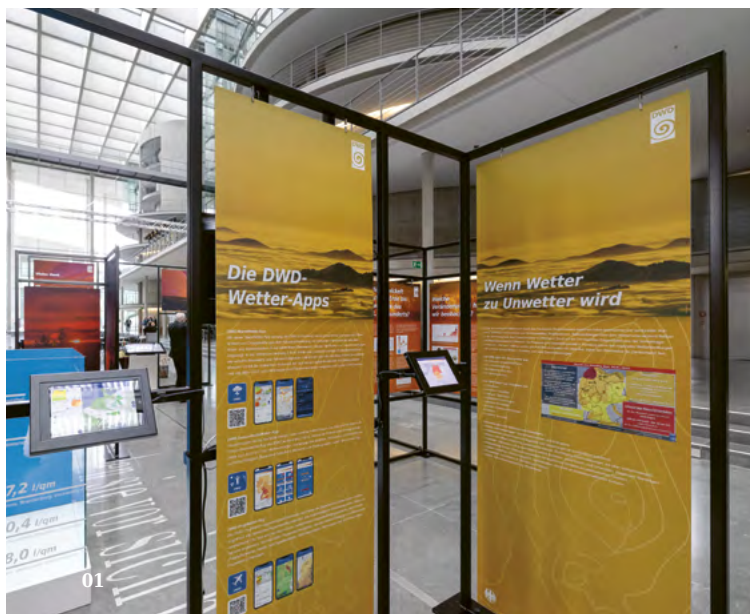
This is how Dr Katharina Stasch, Permanent Representative of the Federal Republic of Germany to the United Nations in Geneva, bid farewell to DWD President Prof. Dr Gerhard Adrian at the end of his four-year term as President of the World Meteorological Organization (WMO) at the WMO Congress in Geneva in June 2023. Improving the meteorological infrastructure and the exchange of data, reforming the WMO – these were just some of the special challenges which Gerhard Adrian successfully dealt with, during a pandemic, no less, in the four years of his WMO presidency. A detailed report on this and the resolutions passed at the WMO Congress 2023 can be found at www.dwd.de/jahresbericht (in German only). [+](#)

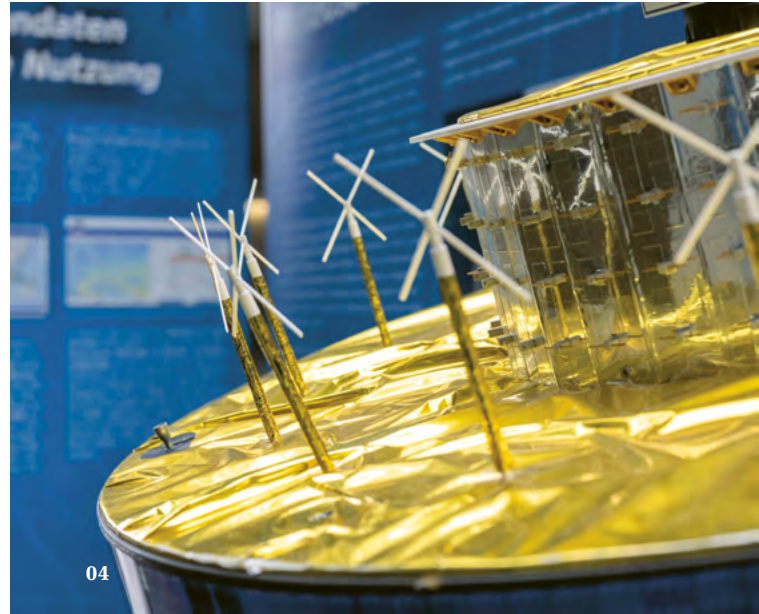
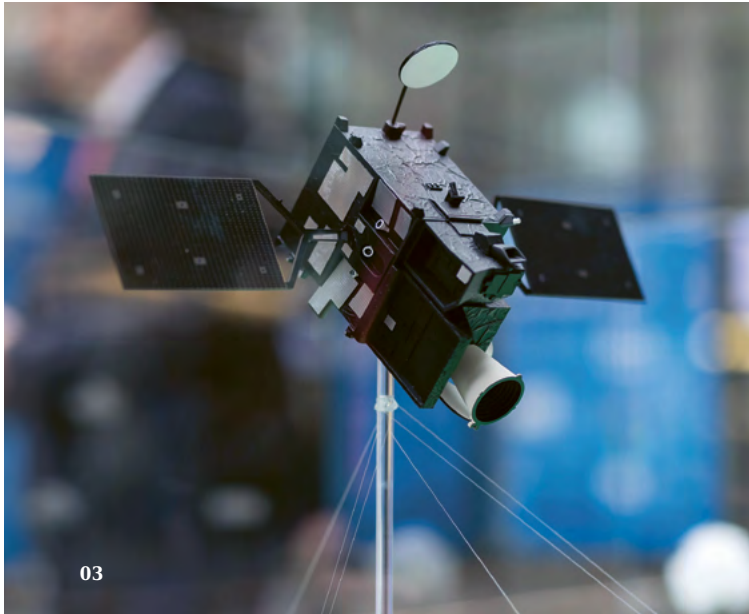
Personnel news

On 1 August 2023, DWD President Prof. Dr Gerhard Adrian passed on the baton to his successor Prof. Dr Sarah C. Jones. This is the first time a woman has headed the Deutscher Wetterdienst as president. Sarah C. Jones has been in charge of the DWD’s Research and Development Business Area since 2011. Dr Renate Hagedorn, who is responsible for the DWD’s Weather Forecasting Services Business Area, was appointed Vice-President of the DWD.

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The exhibition covers one of the DWD’s key statutory tasks very extensively: warning the population about severe weather events (01), with an exhibit specifically dedicated to illustrating the levels of the DWD warning system (02).





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Satellites – nowadays, it is impossible to imagine weather forecasting without them: on the left, a model of a geostationary satellite of the third generation (03); on the right, detail photo of the model of a second-generation satellite (04).

From KONRAD to KONRAD3D

KONRAD stands for “KONvektive Entwicklung in RADarprodukten” (convection development in radar products). This method detects convection cells, for example thunderstorms, and allows their progress to be tracked and predicted. The DWD put the three-dimensional KONRAD3D system into operation in April 2023 after several years of development and testing. The system improves the prediction and warning procedure for thunderstorms in the next two hours (nowcasting). It uses 3D radar reflectivity data from the DWD radar network, a DWD product for differentiating precipitation types (HYMEC), and lightning data from the LINET network.

The KONRAD3D product is available to DWD forecasters in the NinJo meteorological workstation system. It is also provided to customers in the civil defence and disaster relief sectors via the DWD’s FeWIS Weather information system for disaster management.

Deutscher Wetterdienst reduces protection zones around weather radars by almost 90 per cent

Expanding the use of renewable energy strengthens Germany’s security of supply and represents a vital climate protection measure. The Deutscher Wetterdienst (DWD) – a close partner of the energy industry over many decades – is therefore set to release almost 90 per cent of the protection zone area around its weather radar towers and wind profilers from the beginning of 2024 for the construction and operation of wind turbines. This concerns the 5 to 15 km radius around 18 existing weather radar sites (plus four sites currently in the approval process) and four wind profilers.



01

01
Observations at sea: detail photo of a shipborne automatic weather station



02

02
Illustration of precipitation amounts in a cuboid with a base area of 1 square metre

Objective: To improve the forecasting of small-scale weather events

The DWD is currently evaluating a new generation of commercially available remote observation systems in its “Pilot Station” project. The main focus here is on ensuring the usability of these systems in operational observation. The aim is to enable high-resolution quantification of the vertical state of the atmosphere, especially for numerical weather prediction. Above all, this will improve the forecasting of small-scale weather events which hold high damage potential and can therefore have a great impact on society.

The following systems are undergoing testing: Doppler lidar for wind profile measurement, differential absorption lidar for humidity profile measurement, microwave radiometers for the integral recording of temperature and humidity data, a vertical-pointing cloud radar and a Raman lidar for the combined measurement of temperature and humidity profiles. Following a trial phase at the DWD’s Lindenberg Meteorological Observatory, the operational suitability of the devices will be tested in fully autonomous operation at the DWD station in Aachen-Orsbach. [+](#)

Meteosat data improve weather prediction based on the ICON-D2 regional model

In 2023, following intensive development work, the DWD successfully introduced the use of satellite data in the ICON-D2 regional model for the initialisation of the predictions. Data from the visible (VIS) and infrared (IR) spectral ranges of the SEVIRI instrument on board the geostationary Meteosat Second Generation (MSG) satellite are used. The DWD is the first meteorological service in the world to assimilate data in the visible spectral range and to routinely use a so-called all-sky assimilation method for IR data. This guarantees the consistent utilisation of cloudless and cloud-covered pixels and provides valuable information on the distribution of cloud and moisture in the atmosphere. The satellite data are primarily used to improve the forecasting of clouds, but also of solar radiation, temperature and humidity. The VIS assimilation was developed in close cooperation with colleagues from the Munich branch of the Hans Ertel Centre, who made a significant contribution to developing the necessary radiation calculation software. [+](#)

WMO G3W: A global infrastructure for greenhouse gas monitoring

The Member States of the World Meteorological Organization (WMO) adopted the Global Greenhouse Gas Watch (G3W) programme in 2023. This initiative supports implementation of the Paris Agreement by establishing a global infrastructure to close gaps in the data and information needed to assess greenhouse gas-related issues.

Here, the WMO can build on its successful international collaboration in the field of meteorological forecasting, climate analysis and greenhouse gas monitoring. The DWD helped devise the G3W concept. It can contribute its many years of experience in the monitoring of greenhouse gases within the Global Atmosphere Watch (GAW) programme, the European Integrated Carbon Observation System (ICOS) research infrastructure and the Integrated Greenhouse Gas Monitoring System (Integriertes Treibhausgas-Monitoring-system - ITMS) for Germany.

Further information

G3W:
Global Greenhouse Gas Watch (G3W) (wmo.int) and Joint Study Group on WMO Greenhouse Gas Monitoring | World Meteorological Organization

ITMS:
<https://www.itms-germany.de/>

below

More guests arrive.



Energy-related weather elements

Electricity generation from renewable energy sources, such as wind and solar power, is dependent on the current weather conditions. Hydropower and energy consumption are also influenced by the weather. Each year, the DWD updates and publishes reviews of the energy-related meteorological parameters, in particular wind speed and global radiation, in order to improve assessment of the weather conditions. The parameters of temperature, precipitation and sunshine duration are also analysed retrospectively. The reports can be accessed from www.dwd.de/energiewetter (in German only).

Global warming – higher risk of late-spring frost damage?

Plant growth over the course of the year is strongly influenced by the prevailing weather conditions. The annual growth and development phenomena of plants are recorded by the phenological observation network of the Deutscher Wetterdienst. Some of these long-term observations have been carried out in Germany for more than 100 years and show clear changes in phenological development due to climate change.

There is evidence of considerable advancement of plant growth in the first few months of the year: frost-sensitive developmental stages are now starting earlier in the year. Despite global warming, however, it is still typical for cold spells with temperatures below 0 °C to occur in spring. Although such spells have generally become less frequent, they are now affecting and causing frost damage to plants whose growth is already well advanced. In the study, the DWD statistically evaluated meteorological and phenological data from the period 1961–2020. [+](#)

01

Eye-catcher: a weather balloon with a radiosonde attached to it, able to travel up to 35 km in height

02

DWD President Prof. Dr Gerhard Adrian welcomes Dr Volker Wissing (Federal Minister for Digital and Transport).



01



02



Drought risk in forests as result of climate change (TroWaK)

The weather conditions seen in recent years have raised the level of interest in the water balance of forests. Repeated summer droughts have caused severe damage to the forests and increased their susceptibility to insect pests and complex diseases. Climate change could raise the frequency and intensity of catastrophic drought events to a rate which exceeds the natural adaptive capacity of forests.

In the “TroWaK” project of the Forest Climate Fund (Waldklimafonds - WKf), an existing water balance model is being refined to enable daily updates of area-wide calculation of water availability in forests. Based on the results, methods are being developed which facilitate the timely analysis and assessment of the risk of biotic and abiotic damage caused by drought. The aim of the project is to provide area-wide maps of the current forest damage risk via a web portal. [+](#)

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Aydan Özoğuz (Vice-President of the Bundestag) welcomes the guests in her role as representative of the proprietor. The lighting of the Paul Lobe Building is arranged to match the rainbow colour concept of the exhibition.

Using the WarnWetter app to submit plant reports to the DWD

Since March 2023, the full version of the DWD's WarnWetter app has allowed users to submit their observations of both weather and plants. These can be recorded for any location and submitted. The DWD plans to use this additional information from the WarnWetter app to supplement the data from the existing phenological observation network and also to recruit new permanent plant observers from different locations. Such consolidation of phenological data should help to improve the recording of current plant development in Germany and to draw conclusions about changes to the climate. Furthermore, these data provide a valuable basis for the development of models, for example in the field of agricultural meteorology and for improving pollen count forecasts.

Information on the DWD's phenological observation network:

www.dwd.de/pflanzenbeobachter
(in German only)

Information on the DWD's WarnWetter app:

www.dwd.de/app
(in German only)

How plant reports are submitted:

www.dwd.de/pflanzenmeldungen
(in German only)

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From the left: Andreas Krüger (Director, BMDV), Dr Rudolf Gridl (Director-General, BMDV), Prof. Dr Gerhard Adrian, Dr Volker Wissing, Aydan Özoğuz, Udo Schiefner (Member of the Bundestag and Chairperson of the Committee on Transport)

Special urban climate observation network

Climate change is increasing the incidence of heatwaves throughout Germany, with cities being particularly badly affected. The DWD is setting up a special observation network of urban climate stations at selected locations to supplement the existing surface observation network. This will enable the effect of heat stress to be recorded, for example. The observations help to provide a better understanding of climate change in cities and their surroundings, to monitor it over the long term and to develop climate adaptation strategies. Last year, the Regensburg site was added to the urban climate station network, which now comprises eight stations across Germany.

The observations in the field of air temperature, urban heat island and thermal loads over the last 60 days are available at www.dwd.de/waermeinsel. Information on the pairs of stations (urban and sub-urban stations) can be found here. These station data are also available to download free of charge from the Climate Data Center at www.dwd.de/CDC.

A once-in-a-century event

The Baltic Sea storm flood of October 2023 will go down in history as a once-in-a-century event. For Flensburg and several other parts of the western Baltic Sea coast, this was the second-highest water level since the severe storm surge in November 1872. In October 2023, strong westerly winds first pushed water into the Baltic Sea, causing the sea level to rise. The wind then moved round to the east and blew for several days, sometimes with hurricane-force gusts of up to 133 km/h (measured at Cape Arkona), pushing the water masses back into the western Baltic Sea and causing the water levels there to rise sharply.

In the days leading up to the surge, the DWD had already announced the possibility of a storm with violent gusts in its 7-day overview of weather hazards. As the time approached, it was possible to calculate the track of the storm with greater accuracy; the warning level was successively raised as a consequence. The corresponding severe weather warning was issued around 24 hours before the peak surge. +

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Dr Volker Wissing giving his address



Networked disaster management

The DWD has launched a new workshop together with the German Committee for Disaster Risk Reduction (Deutsches Komitee Katastrophenvorsorge e. V. – DKKV). The workshop is intended to strengthen the DWD’s links with disaster management organisations and to serve as an innovative platform for the exchange of information regarding practical needs. A further aim is to foster networking between the different actors.

The kick-off meeting took place at the DWD headquarters in April. It attracted a broad spectrum of stakeholders in disaster management, with over 30 participants attending from institutions such as fire brigades, Germany’s technical relief organisation THW, authorities and research organisations. The main aim of the workshop was to familiarise all participants with the raw materials (data), tools (scientific methods) and operating instructions (training) covered during the event. World Café sessions formed the centrepiece of the event, permitting an intensive exchange of views in a relaxed and creative atmosphere. +

Double the amount of precipitation

The northern part of Germany experienced a period of heavy precipitation from 19 December 2023 to 5 January 2024, which brought double (or more) the average one-month precipitation amounts for December and January (1991–2020) especially in the federal states of Lower Saxony, North Rhine-Westphalia and Saxony-Anhalt. This led to large-scale flooding of the Ems, Weser and Elbe rivers and their tributaries. The prevailing westerly winds carried a continuous stream of low-pressure areas and humid air masses from the Atlantic to central Europe. However, precipitation analyses show that local all-time records were only broken in a few cases. Notable aspects surrounding the event included the relatively large size of the region affected and the long duration of 18 days, with only few interruptions in the rainfall. This event was caused in part by the elevated surface temperatures of the North Atlantic, which climbed to a new record level in 2023. A detailed climatological assessment can be found under “Hintergrundberichte” on www.dwd.de/presse (in German only).

below

Udo Schiefner during his welcome speech





The BMDV Network of Experts - Impact of climate change and adaptation

The climate crisis is undoubtedly one of the greatest challenges of our time. In particular, the increased occurrence of extreme weather events, such as heat, drought and heavy rainfall, is having a variety of effects on transport routes. It is crucial that active measures be taken in response to the consequences of climate change. The DWD is intensively involved in this and is conducting research on “Climate Change Impacts and Adaptation” within a network of experts established by the Federal Ministry for Digital and Transport (Bundesministerium für Digitales und Verkehr - BMDV) and comprising seven higher federal authorities under its remit.

Further milestones were reached in 2023: In addition to developing new high-resolution data sets, the BMDV Network of Experts carried out numerous analyses to determine the future climate risk of the transport sector. One of the DWD’s key contributions here is a high-resolution climate projection which can be used to simulate precipitation and its diurnal cycle more effectively. The aim is to gain a more detailed understanding of how small-scale heavy rainfall events could develop in the future. +

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Prof. Dr Gerhard Adrian presents Aydan Özoğuz (Vice-President of the Bundestag) with a personalized weather map for her birth date.

DWD at the World Climate Conference in Dubai

DWD staff members once again formed part of the German delegation at the World Climate Conference in Dubai (COP 28). The DWD advises the EU and German delegations on research and systematic observation and, as the national meteorological service, updates the conference on the status of climate change research, the latest results of systematic climate observation and the monitoring of greenhouse gas emissions.

In the German pavilion at COP 28, the DWD also presented the German Integrated Greenhouse Gas Monitoring System (Integriertes Treibhaus-Monitoringsystem - ITMS), which it is developing with partners. Once in operation, the ITMS will support observation-based monitoring of the emission reduction targets formulated by the Parties to the United Nations

Framework Convention on Climate Change. The DWD took part in further panels, contributing to discussions and delivering speeches on the increased use of renewable energy and on the establishment of a global warning system for the world population by the World Meteorological Organisation (WMO). [+](#)

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Guided visit of the exhibition: Thomas Endrulat (Head of the DWD's Potsdam Branch Office) explains the current weather situation as well as the NinJo meteorological workstation system.





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On exhibition for the first time: the original text of the Deutscher Wetterdienst Act of 11 November 1952. Peter Webert (Brigadier-

General of the Bundeswehr) admires it (01), Dr Florence Rabier (Director-General of ECMWF) takes a photo (02).

European initiative on using artificial intelligence for weather and climate

The pace of development in artificial intelligence (AI) and machine learning (ML) is increasing rapidly in all areas, including in the field of weather forecasting. Meteorological services and large IT companies alike see opportunities in this new technology for revolutionising weather forecasting.

Machine learning and artificial intelligence methods offer new opportunities for the entire value chain; accordingly, the DWD has recently been devoting a great deal of time and effort to this topic and has become involved in various international activities. It is important that this future technology field is not left exclusively to the big tech companies.

On the sidelines of the WMO Congress 2023, the leaders of several European national meteorological services agreed to launch a European initiative on artificial intelligence for weather forecasting. Under the leadership of the Norwegian Meteorological Institute, a proposal was developed for cooperation between the individual national meteorological services, ECMWF, EUMETNET and EUMETSAT regarding the application of AI in numerical model prediction, data curation, and products and services. The DWD has taken the lead in implementing the concept, which has now been adopted by 31 European meteorological services within the framework of EUMETNET. [+](#)



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Entrance to the exhibition area
“Weather Forecasting”

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Bird's eye view of the exhibition

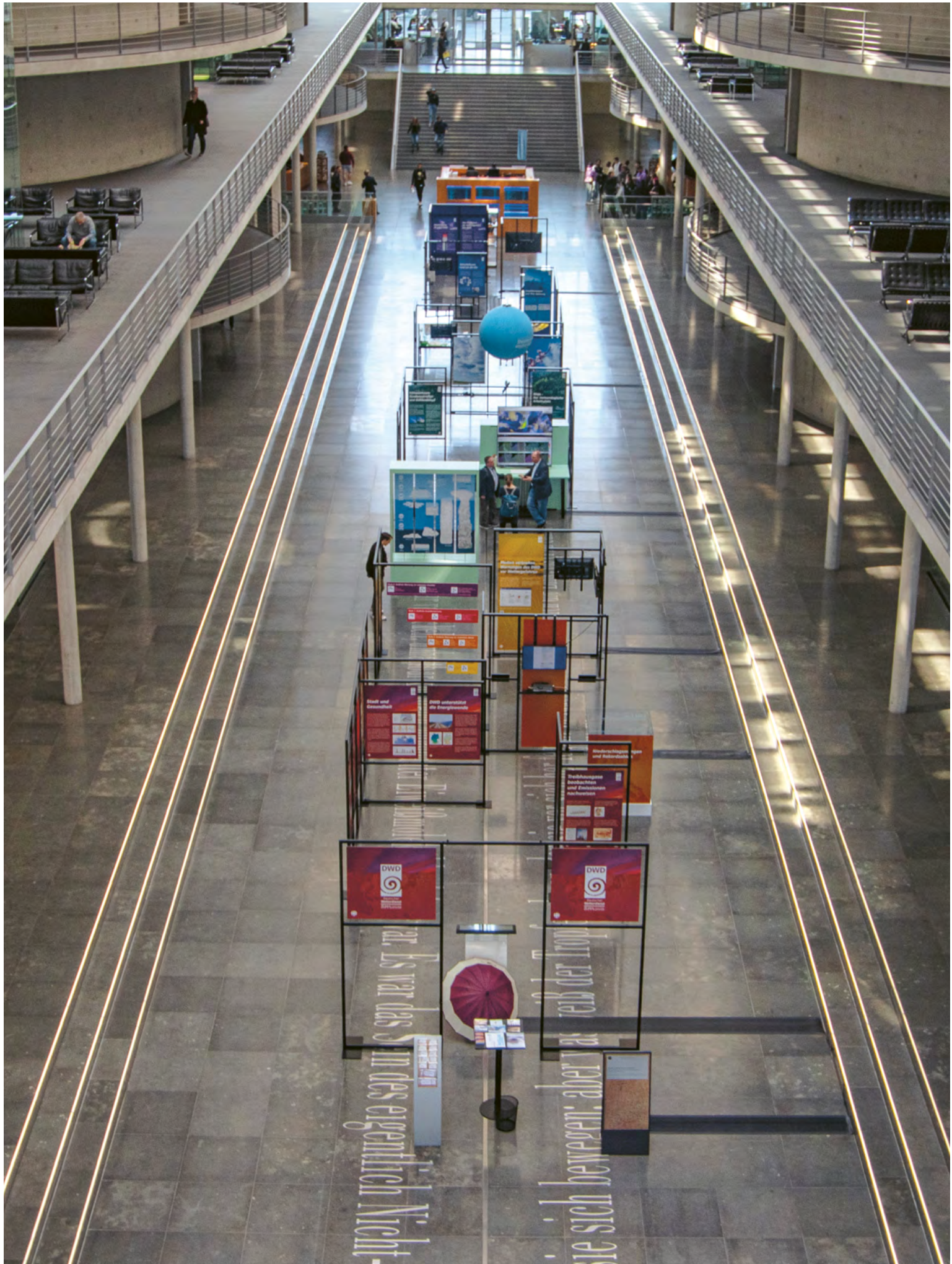
DWD as SOFF peer advisor for Madagascar

The DWD has agreed to act as a peer advisor within the Systematic Observations Financing Facility (SOFF) from 2023. Peer advisors give partner countries the benefit of their expertise and support them in setting up their observation network. SOFF provides long-term technical and financial support for the establishment of a meteorological observation infrastructure in the eligible countries in accordance with the internationally agreed criteria of the Global Basic Observing Network (GBON).

Following many years of highly productive collaboration with Madagascar's national meteorological service (Direction Générale de la Météorologie – DGM), the SOFF partnership between the two parties started at the beginning of 2023. Together with staff members of the DWD, a so-called gap analysis was carried out in Madagascar. The results highlight the discrepancy between the requirements of the GBON criteria and the existing surface observation and radiosonde stations. This analysis was signed by the presidents of the two meteorological services at the end of 2023. +

Dialogue with customers

It is crucial for the DWD to stay in direct contact with its customers to ensure that its products and services are tailored to their needs. To maintain such a dialogue with the customers, the DWD uses various trade fairs dedicated to topics related to the statutory tasks of the DWD. Warnings of hazardous weather events are of particular importance for disaster management, which is why the DWD attends the FLORIAN trade fair for fire brigades in Dresden and Rescue 112 in Dortmund, for example. Provision of meteorological information and services to ensure the safety of aviation is a further statutory task of the DWD. Accordingly, the DWD organises an aviation customer forum and presents its services together with other authorities from the Federal Ministry for Digital and Transport (Bundesministerium für Digitales und Verkehr – BMDV) at the leading aviation trade fair, the AERO, in Friedrichshafen. The same applies in the field of shipping, which is why the DWD takes part in the boot Düsseldorf trade fair, for example. +



Active climate protection – Use of electric vehicles

To date, no DWD staff members have been forced to continue their journey on foot because of a flat battery in their electric car! Nevertheless, purely electric vehicles accounted for only 2.5 per cent of the mileage clocked up by the DWD on official business in 2023. It is currently possible to cover distances of 150 to 250 km without having to recharge. Using an electric vehicle sends a powerful climate protection message, yet long distances are still a challenge for a national organisation like the DWD.

The DWD's goal of converting its entire vehicle fleet to clean vehicles by 2030 is ambitious, but it is ultimately a necessary step for the general good. The procurement process at present is still highly convoluted and bears more than a passing resemblance to the game Top Trumps: for unavoidable journeys, the type of vehicle which best fulfils requirements, such as range, seating capacity and payload, currently "wins". 26 per cent of the DWD fleet consists of "clean" vehicles (with hybrid/electric drives) at present. [+](#)

below

The guests are shown around the exhibition by DWD employees.





top

Vivid exhibits to look at: a shipborne automatic weather station and a diorama illustrating the DWD's observation networks

New location with a long tradition

In June, State Secretary Stefan Schnorr opened the new DWD office on the Michendorfer Chaussee in Potsdam in the presence of the DWD Executive Board of Directors and over 200 staff members. The building complex includes around 11,600 square metres of office and usable space and was built in six years at a cost of 48 million euros. Potsdam has a long tradition in the fields of meteorology and climatology. Weather observations go back almost 180 years. The Meteorological Service of the former German Democratic Republic was headquartered here.

The Potsdam-based DWD employees perform numerous statutory tasks. These include issuing weather forecasts and weather warnings for the federal states of Berlin, Brandenburg and Mecklenburg-Western Pomerania. The office's climate team provides advice to Berlin, Brandenburg, Saxony-Anhalt, Saxony and Thuringia. The DWD observation stations in Berlin, Brandenburg, Mecklenburg-Western Pomerania and Saxony-Anhalt are also serviced from Potsdam.

@DeutscherWetterdienst@
social.bund.de: DWD with its
own Mastodon account

After a trial period lasting just over a year, the DWD expanded its official social media presence in autumn 2023 by opening its own Mastodon channel. This decentralised platform complies with the General Data Protection Regulation (GDPR) and is recommended by the Federal Commissioner for Data Protection and Freedom of Information (Bundesbeauftragte für den Datenschutz und die Informationsfreiheit - BfDI). The short message service, with its maximum 500-character messages, contains no advertising. Users do not need to register to read content. The DWD is thus gradually developing a further channel which it can use, in compliance with its statutory duties, to inform the population and also to warn of severe weather.

Budget figures

The DWD's total expenditure figures are as follows:

2023	2022	2021
around 377 million €	around 361 million €	around 388 million €

Every citizen of Germany thus paid:

2023	2022	2021
4.07 €	3.82 €	4.46 €

In 2023, the DWD's expenditure was distributed as follows:

Appropriations/Subsidies: (external funds not included):	Investments:	Expenditure on material:	Personnel:
141.033 million €	43.053 million €	63.265 million €	129.561 million €

In 2023, appropriations and subsidies went to the following organisations
(including around 12.281 million euros from external funds):

EUMETSAT:	ESA:	EZMW:	EUMETNET, WMO, others:
87.902 million €	33.522 million €	13.820 million €	18.069 million €

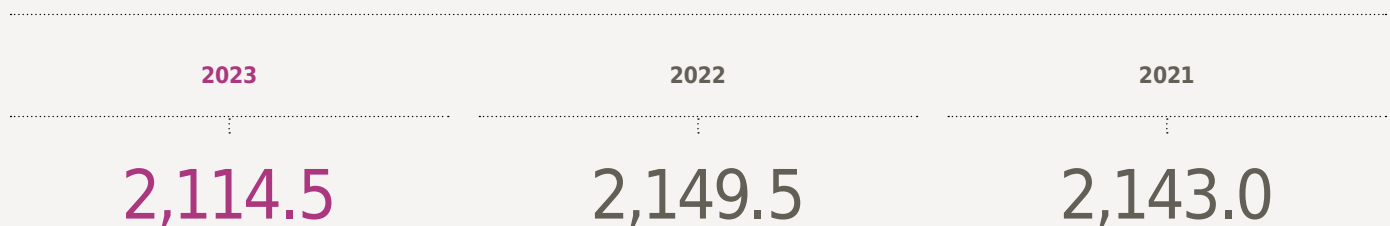
DWD costs each citizen 4.07 euros per year

The DWD's overall budget in 2023 amounted to around 377 million euros in total, which is roughly 15.7 million euros more than in the previous year. However, the amount of funds needed by the DWD from tax money was actually much lower than the budget due to the fact that 8.8 per cent of it were already indirectly covered by revenues. Compared to the previous year, the amount of tax money required by the DWD in 2023 increased by more than 21.4 million euros. This means that every citizen in Germany¹ had to pay 4.07 euros

for public or statutory tasks such as weather forecasting, severe weather warnings and climate monitoring. The higher need in tax money mainly results from a drop in the revenues (by around 5.7 million euros) as opposed to the same or higher overall budget. DWD's expenditure on investment increased by around 4 million euros in total (around 2 million more for information technology, around 2.5 million less for buildings and property and around 4.5 million more for investments for material).

Staffing figures

Number of established posts:



Number of staff members²:



¹ Number of inhabitants: 84.6 million; source: Federal Statistical Office, September 2023

² The difference between the number of established posts and the total number of staff members is partly due to temporary or part-time employment.

DWD sites in Germany

Headquarters

in Offenbach am Main

6

major branch offices (Hamburg, Potsdam, Leipzig, Essen, Stuttgart, Munich), some with more than 100 staff members

5

regional climate offices providing consultancy services in the field of climate and environment

2

meteorological observatories

1

Aeronautical Meteorological Centre (Frankfurt)

4

Aeronautical Meteorological (MET) Advisory Centres

3

agrometeorological advisory offices

1

marine meteorological consultancy centre

181

main automatic weather stations (of which 15 are aeronautical meteorological stations at international airports)

42

Aeronautical meteorological observation at regional airports

1.726

secondary weather and precipitation stations, of which 829 are online stations reporting every half-hour

1.075

phenological observation sites

Around 1.769

road weather stations in partner networks (with automated quality assurance every 15 minutes)

2

staffed main weather stations aboard research ships

458

ships at sea participating in the voluntary observing programme, of which 150 are equipped with automatic shipboard weather stations

8

moored buoys in the North and Baltic Seas

8

automated shipboard aerological stations (ASAP)

18

weather radar sites

10

upper-air stations with around 7,500 radiosonde launches per year

48

stations for measuring radioactivity

3

mobile measuring units for 54 temporary measuring sites

9

automatic greenhouse gas measuring stations at high towers

1

special air mission unit for radioactivity and volcanic ash measurements

Contact

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Weather hotline¹

Telephone +49 18 02 91 39 13

When calling the weather hotline you will automatically be connected with the closest DWD Branch Office.

¹ Availability and costs depending on foreign telephone provider

Further telephone and service numbers

www.dwd.de/kontakt

Important links

Climate information

www.dwd.de/klima

Current weather

www.dwd.de/wetter

App for weather warnings

www.dwd.de/app

Information for journalists

www.dwd.de/presse

Newsletters

www.dwd.de/newsletter

Publications

www.dwd.de/bibliothek



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Cover

The guests to the opening ceremony arrive in the Paul Löbe Building and begin to talk to each other or explore the Deutscher Wetterdienst exhibition "70 Years between Nature & Society".



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