ECMWF Products for WMO Members

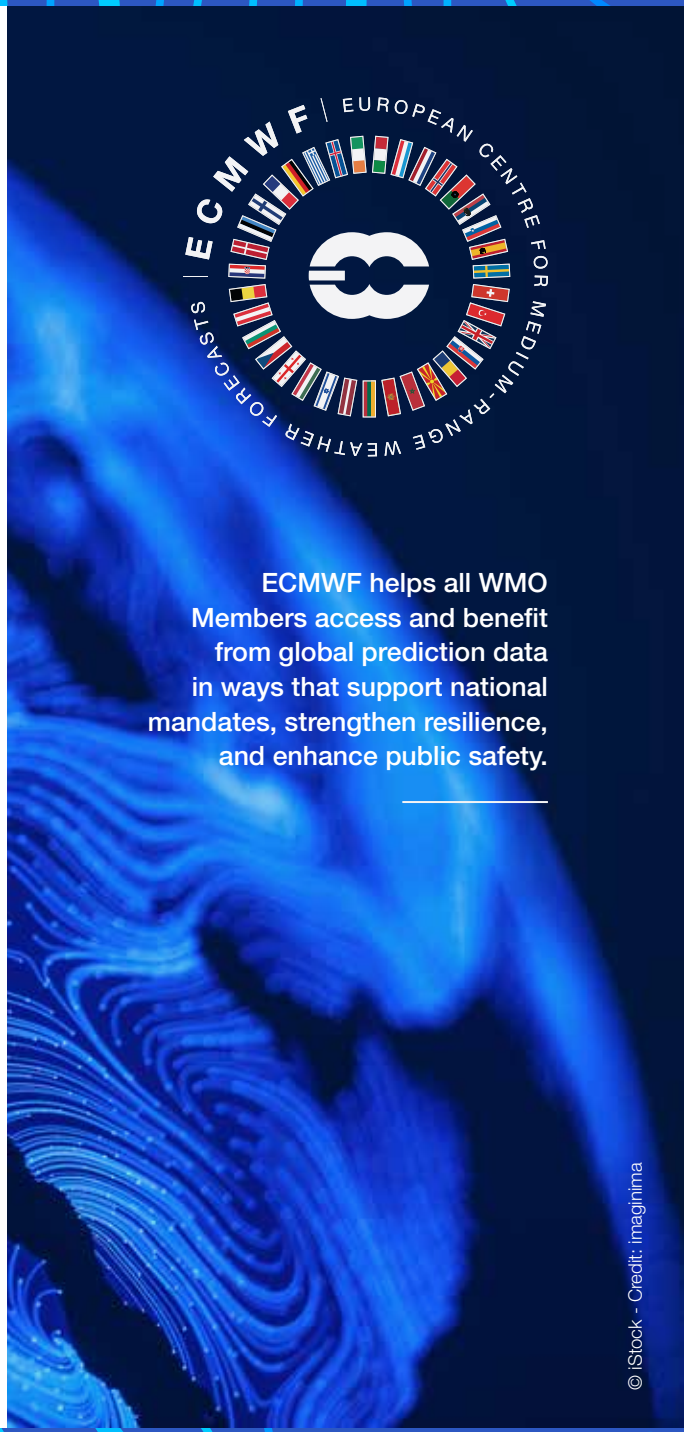
ECMWF

About ECMWF

The European Centre for Medium-Range Weather Forecasts (ECMWF) is an intergovernmental organisation and world-leading in numerical weather prediction. As both a research institution and a 24/7 operational centre, ECMWF develops state-of-the-art forecasting systems and supports its Member and Co-operating States with high-quality data, tools, and services.

ECMWF is a long-standing partner of the World Meteorological Organization (WMO). We contribute to WMO programmes by providing global prediction capability, supporting capacity development, and enabling the operational implementation of the WMO Unified Data Policy, WIS2, and Early Warnings for All (EW4All).

We are an entrusted entity of the European Union implementing Copernicus services on climate and atmospheric composition as well as Global Gateway's Strengthening Early Warning for Africa. Together with ESA and EUMETSAT, we are building the Destination Earth initiative, which pioneers digital twins of the planet.



ECMWF helps all WMO Members access and benefit from global prediction data in ways that support national mandates, strengthen resilience, and enhance public safety.

Director-General's foreword

Weather and climate know no borders. The challenges they present, from extreme events to long-term climate risks, can only be addressed through strong international cooperation and shared scientific foundations.

ECMWF exists to serve this collective effort. In close partnership with the World Meteorological Organization (WMO) and its Members, we provide high-quality global forecasts, reanalyses, and data services that support our Member States and national capabilities and strengthen operational decision-making worldwide.

By making our data openly accessible and working through shared standards and trusted partnerships, we aim to ensure that advances in science translate into real societal benefit: supporting early warnings, protecting lives, and building resilience in a changing climate.

This brochure highlights how ECMWF's products and services contribute to the work of WMO Members, and how, together, we continue to strengthen the global meteorological community for the benefit of all.

Florian Pappenberger

Structured, equitable, and sustainable data offering

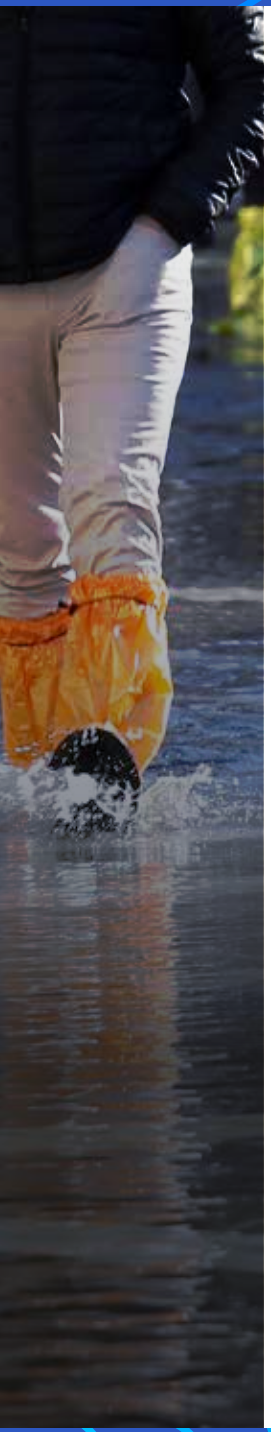
ECMWF provides a tiered set of data and visualisation services designed to meet the diverse needs and technical capacities of WMO Members. From simple web-based chart access to full-resolution model data, the offering ensures that each National Meteorological and Hydrological Service can engage at the level best suited to its operational environment.

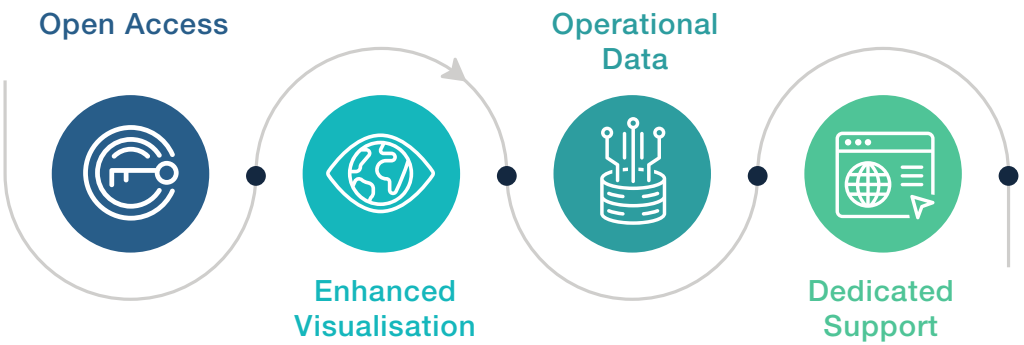
"ECMWF's products complement national capabilities and support WMO Members in strengthening their own forecasting and climate services. Through partnership, shared standards, and open access to high-quality data, ECMWF helps reinforce the collective capacity of the global meteorological community."

Celeste Saulo,
Secretary General, WMO

"Our goal is to make high-quality data as accessible, equitable, and usable as possible."

Umberto Modigliani,
Director of Forecasts and Services Department (Acting)





This approach supports the principles of the WMO Unified Data Policy, which promotes open, equitable, and sustainable access to essential meteorological information. It also aligns with global efforts such as Early Warnings for All (EW4All) and SOFF (Systematic Observations Financing Facility), enabling Members to strengthen forecasting and preparedness regardless of national resources.

The illustration below shows how ECMWF data spans multiple timescales and resolutions, with services ranging from immediate situational awareness to advanced applications requiring local processing or regional modelling.

WMO Members play a central role in ECMWF's equitable data strategy, with dedicated access options and tailored support available depending on national requirements.

ECMWF Open Charts

Licence: CC BY 4.0 | Tech requirement: Low | Access:

ECMWF Open Charts provides easy-to-use, web-based access to a curated selection of ECMWF forecast products, designed for rapid situational awareness and operational insight without the need for specialist infrastructure. The charts are pre-processed, quality-controlled, and presented using standard meteorological conventions, allowing users to focus on interpretation rather than data handling.

The service includes pre-defined geographic regions and areas of interest, enabling WMO Members to quickly assess conditions relevant to their national or regional context. A wide range of parameters is available, alongside verification and skill-monitoring products that support forecast evaluation and training activities.

Open Charts spans multiple prediction timescales — from medium-range weather forecasts through sub-seasonal outlooks and seasonal forecasts — offering a coherent view of atmospheric evolution across days to months within a single interface.

For selected products, Open Charts is linked to example Jupyter Notebooks, allowing users to explore how visualisations are generated and how the underlying data can be accessed and reproduced programmatically. This provides a practical bridge between interactive chart use and the ECMWF Open Data services described later in this brochure.

Open Charts is particularly suited to:

- Rapid situational awareness and briefing preparation
- Forecast interpretation and training
- Outreach and communication activities
- Users wishing to explore ECMWF data before moving to full data access

ecCharts

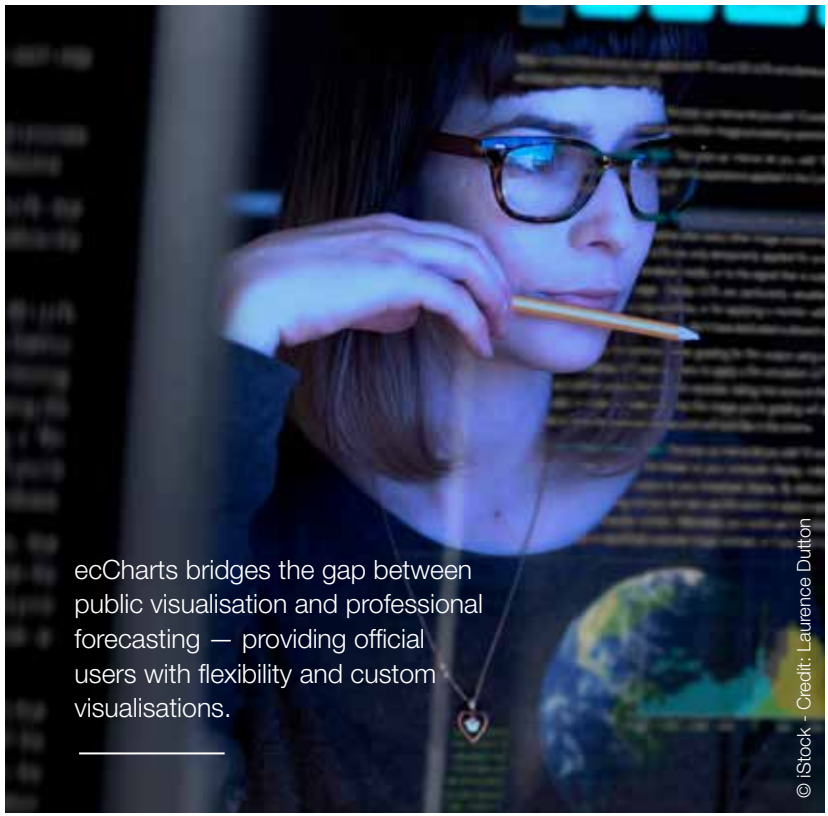
Licence: CC BY 4.0 | Tech requirement: Medium | Access:

For those requiring more customisation, ecCharts offers a more powerful, interactive environment where forecasters can customise views, overlay parameters, compare model runs and download images for operational use.

ecCharts provides operational forecasters in NMHSs with a direct view of ECMWF model outputs, bridging the gap between global prediction and local decision support.

Each WMO Member NMHS is entitled to one free ecCharts account for their Official Duty activities related to the protection of life and property. Additional accounts can be purchased for €1,000 per year, enabling extended access for teams or regional centres.

The platform also supports WMS (Web Map Service) connections, allowing integration of ECMWF layers directly into national visualisation systems for wider use by forecasters.



ecCharts bridges the gap between public visualisation and professional forecasting — providing official users with flexibility and custom visualisations.

ECMWF Open Data

Licence: CC BY 4.0 | Tech requirement: High | Access:

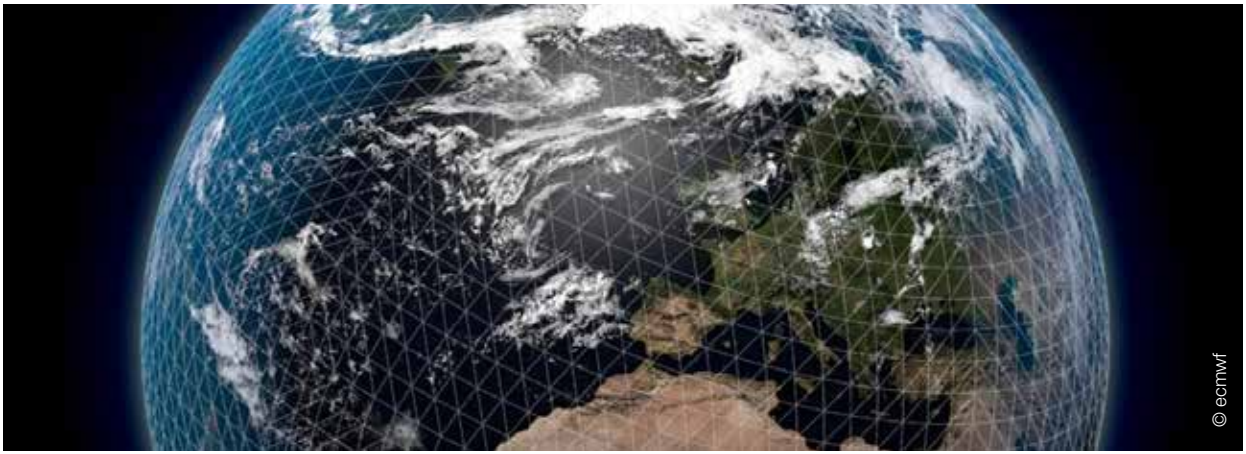
ECMWF Open Data enables Members to access the same data driving our forecasts, supporting national modelling, verification, and early-warning research.

This offer aligns with WMO's move toward open, machine-readable, FAIR data for all Members. Access to model data from both IFS and AIFS is currently available at 25 km resolution with low latency. Products are available in GRIB format; therefore, GRIB decoding software such as ecCodes is required. Data can be ingested into several visualisation software or used in Jupyter notebooks with common Python processing tools. Data are accessible via API, HTTPS, or cloud bucket for automated workflows.

From 2026, ECMWF will offer open data at full native 9 km resolution with a 2-hour latency, allowing users to choose between higher resolution or faster delivery according to their needs.

The dataset is comprised of surface and pressure level fields with parameters designed to facilitate running limited area models such as WRF and ICON.

Full dataset descriptions and parameter lists are available online.



From Data to Insight: Working with ECMWF Data in Jupyter Notebooks

ECMWF provides ready-to-use Jupyter Notebook environments that allow users to explore, analyse, and visualise forecast data without the need for complex local infrastructure.

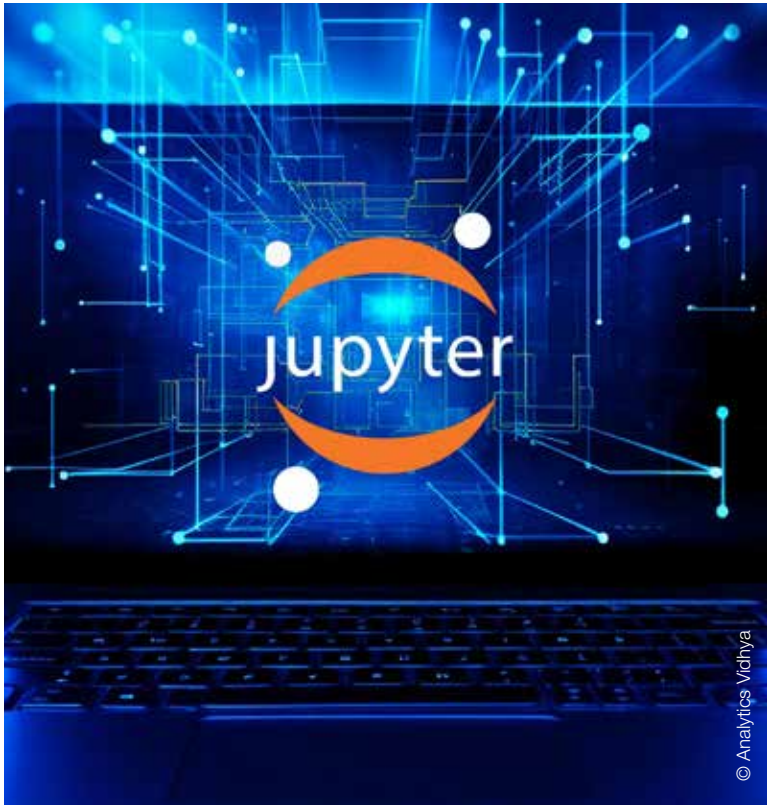
What this enables:

- Rapid prototyping of forecast products
- Training and teaching use cases
- Impact-based analysis and verification
- Reproducible workflows aligned with FAIR principles

Key features:

- Python-based workflows using standard scientific libraries
- Direct access to ECMWF Open Data and Copernicus datasets
- Example notebooks maintained by ECMWF experts

The Jupyter Notebooks are available on ECMWF's training repository.

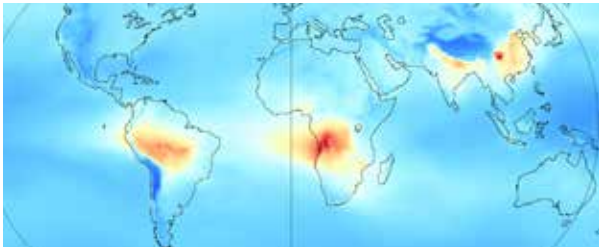


WMO Support Dataset

Licence: CC BY 4.0 | Tech requirement: High | Access:

The WMO Support Dataset provides participating WMO Members with a curated regional subset of ECMWF's highest-resolution model output. It is designed to help NMHSs strengthen foundational forecasting and modelling capability as part of the Systematic Observations Financing Facility (SOFF) and beyond.

The dataset contains the minimum set of fields required to initialise limited area models (such as WRF and ICON), delivered at the highest resolution available from ECMWF in a latitude–longitude grid. This enables Members to focus on developing expertise and workflows without the need to process the full global model output.



Key characteristics:

- High-resolution fields selected for regional model initialisation
- Currently based on IFS; AIFS-based products may follow
- Provided only for Official Duty and not for public redistribution
- Available for specific regional domains

This dataset contributes directly to the objectives of Early Warnings for All, helping emerging NMHSs develop sustained forecasting capability in support of national disaster-risk reduction.

Access to more ECMWF Products

Licence: ECMWF Service Model | Tech requirement: Variable
Discount: 50% for non-commercial Official Duty use

For WMO Members requiring broader access than open services provide—such as tailored data streams, custom products, lower latencies, or extended operational support—ECMWF offers Service Agreements under its Service Model.

These agreements provide:

- Configurable delivery from the ECMWF Real-Time Product Catalogue
- Options for reduced latencies and bespoke parameter selections
- Clearly defined service levels and support arrangements
- Access to additional tools and integration guidance

This pathway is suited to NMHSs that operate advanced forecasting systems or require secure, high-availability data feeds for critical national services.

WMO Members undertaking non-commercial Official Duty activities may benefit from a 50% reduction in service charges, ensuring equitable access while supporting the sustainability of ECMWF's operational infrastructure.

Products can be configured from the ECMWF Real-time Product Catalogue

Summary

This table summarises the ECMWF graphical product and data options for WMO Members.

Access Level	Licence	Typical User	Example Use
Open Charts	CC-BY-4.0	Public / NMHS	Awareness & outreach
ecCharts	CC-BY-4.0	Operational Forecaster	Decision support
Open Data	CC-BY-4.0	Data scientist/modeller	General forecasting & Limited Area Modelling
WMO Support Dataset	Official Duty Only	NMHS	General forecasting & Limited Area Modelling
Service Agreement with 50% discount	Official Duty Only	NMHS	General forecasting & Limited Area Modelling
Commercial Agreement (full cost)*	CC-BY-4.0	Any user	Any

*Indicative pricing can be found at https://products.ecmwf.int/shopping-cart/

Beyond Data: Capacity Building and Partnership

Access to global prediction data is most effective when paired with skills, tools, and sustained collaboration. ECMWF supports WMO Members not only through data provision, but through long-term capacity development and knowledge exchange.

ECMWF support includes:

WMO Fellowship and training opportunities, enabling NMHS staff to work alongside ECMWF experts

Self-paced learning materials, tutorials, and example workflows

This integrated approach ensures that WMO Members can access ECMWF data and translate it into a sustainable national capability.

Getting started and contact

Getting Started with ECMWF Services

ECMWF offers dedicated support channels and documentation to help WMO Members identify appropriate services, understand access options, and integrate ECMWF products into national forecasting and early-warning workflows.

Support & Assistance
ECMWF Support Portal

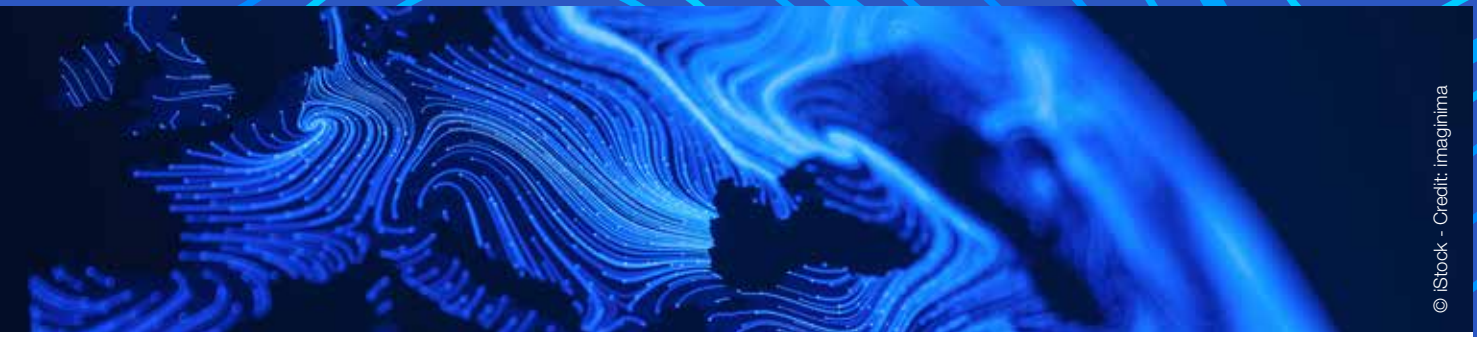
Primary contact point for technical questions, access requests, and service-related enquiries.

- User support and troubleshooting
- Guidance on data access and licensing
- Assistance with operational use cases support

Community & Knowledge Exchange ECMWF Forum

The ECMWF Forum provides a public platform for announcements, technical discussions, and user feedback related to ECMWF forecast products and services.

- Operational updates and planned changes
- User questions and expert responses
- Shared experiences across the global forecasting community



Documentation & User Guidance
ECMWF Forecast User Guide

Authoritative documentation describing ECMWF forecast products, parameters, updates, and known limitations across timescales.

- Product interpretation guidance
- Model characteristics and changes
- Verification and best-practice notes

Product Discovery & Configuration
ECMWF Real-Time Product Catalogue

Explore and configure operational data streams from the ECMWF Real-Time Catalogue, including delivery options, parameters, and latencies.

- Discover available products
- Understand access pathways
- Configure tailored services under ECMWF Service Agreements

Dedicated WMO Contact

For WMO Members seeking guidance on Official Duty data access, training opportunities, or general product guidance

This dedicated contact point ensures enquiries are directed to the appropriate ECMWF teams for timely and coordinated support.

www.ecmwf.int