

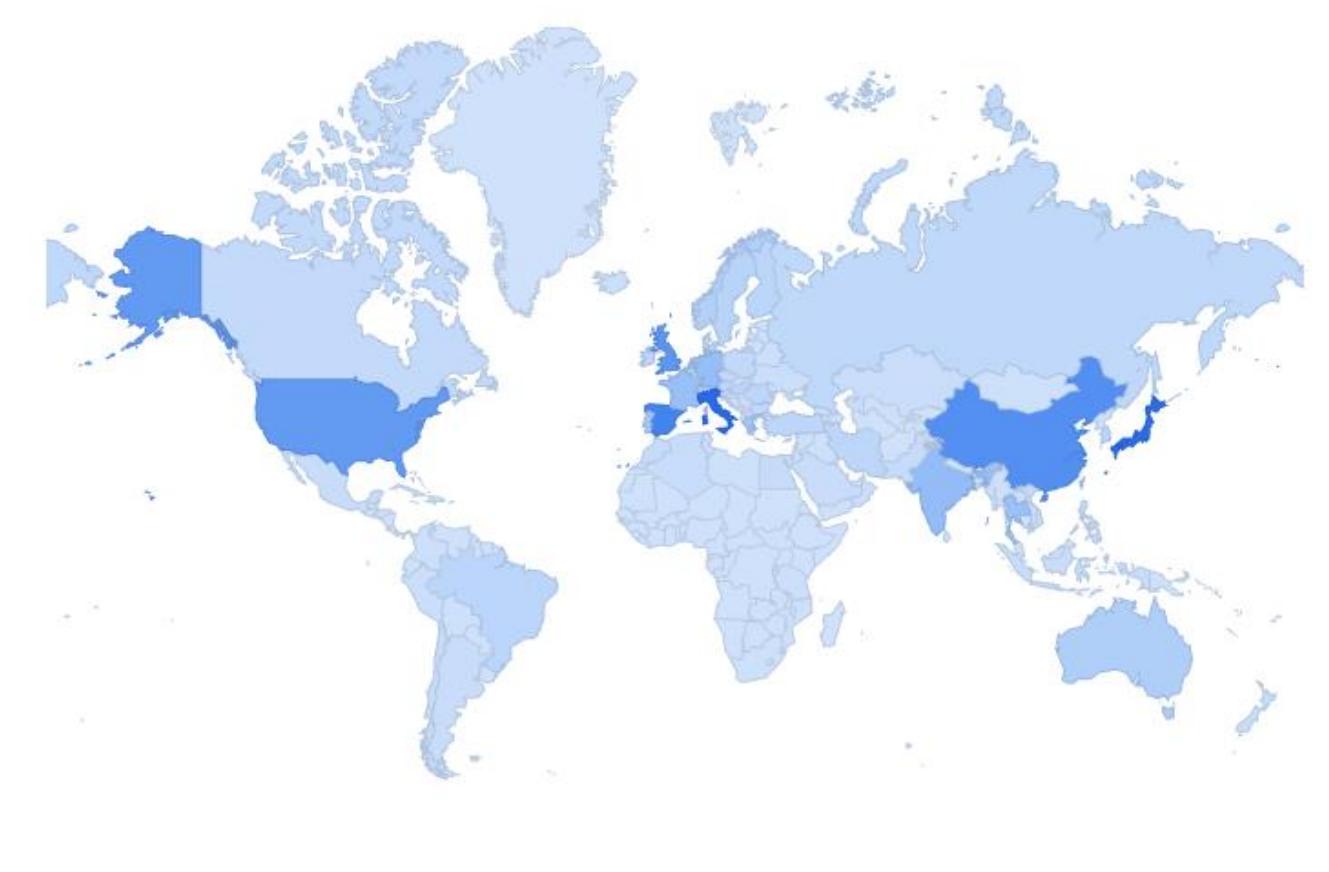
# Progress on the implementation of the ECMWF open data

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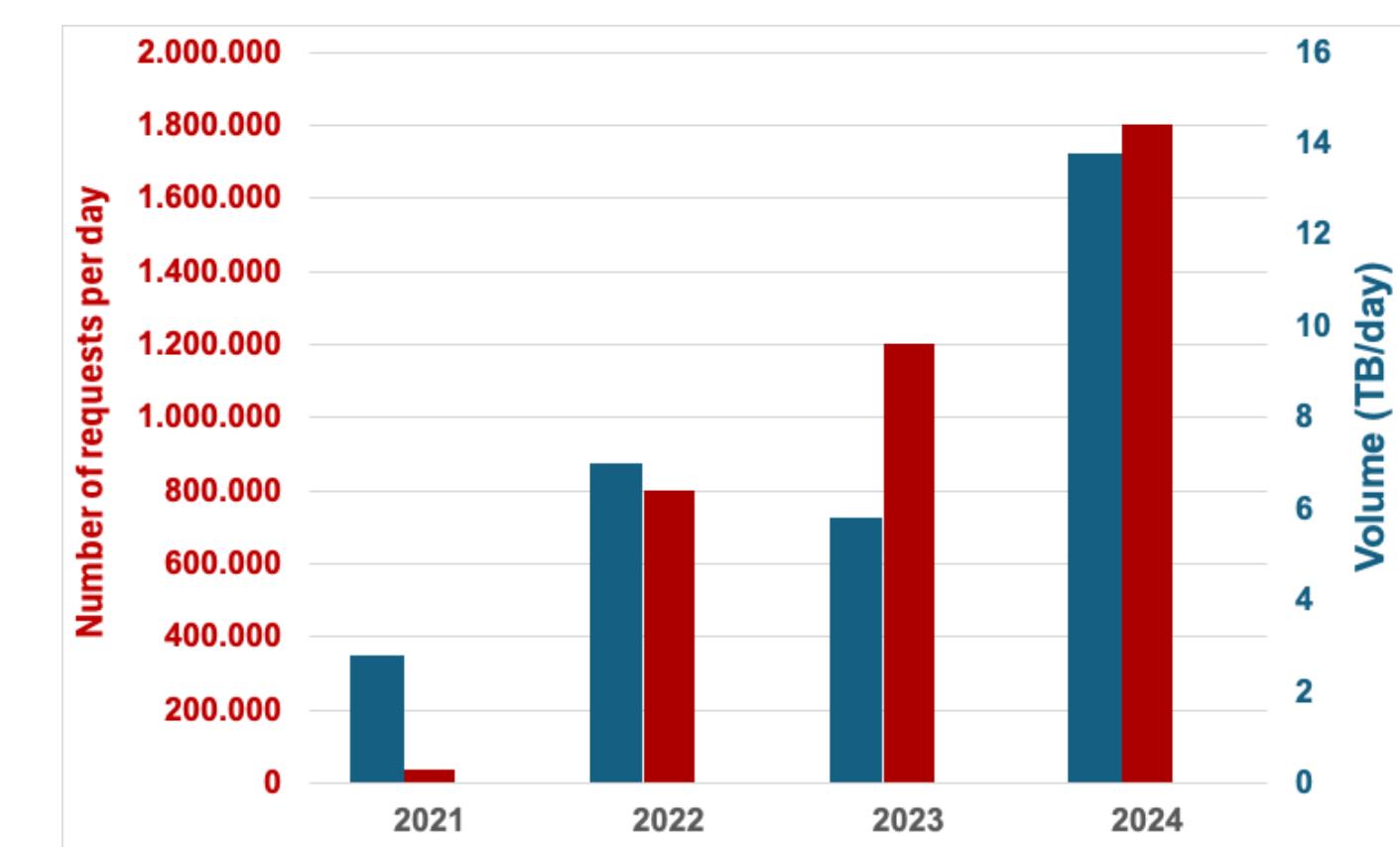
## Current open data at ECMWF

Open data is an essential tool to maximise socio-economic benefits of investments in weather and climate data production and is a key part of ECMWF Strategy between now and 2030. Many steps have already been taken:

- Applied the Creative Commons CC BY 4.0 licence to all non-valid (historical) data in the Archive Catalogue
- Made free and applied the CC BY 4.0 licence to all static charts in the open charts catalogue.
- Reduced the information cost for data and maximum charge fee.
- Released a subset of the real-time catalogue with open data policy (resolution = 0.25 degrees).
- Released all parameters at resolution  $\geq 0.4$  degrees of the real-time catalogue with open data policy.
- Release of AIFS data from real-time catalogue with open data policy.



Distribution of Open Charts views in 2024



Open data usage since 2021

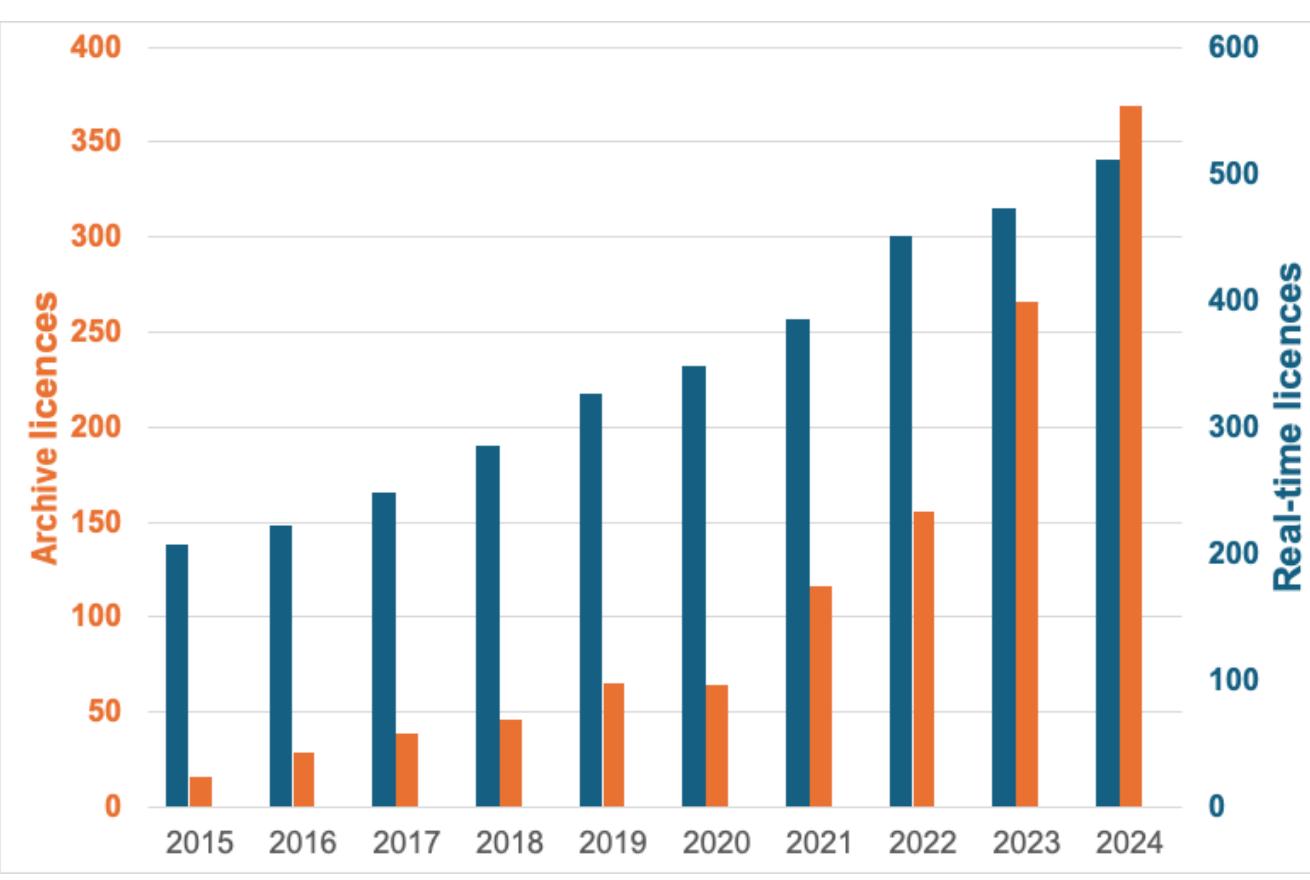
### ECMWF WMO Additional and Essential Data Statistics 2024

	Number of requests/day	Volume downloaded/day
WMO Additional	~ 71,000	~ 9 GB/day
WMO Essential	~ 31,000	~ 2 GB/day

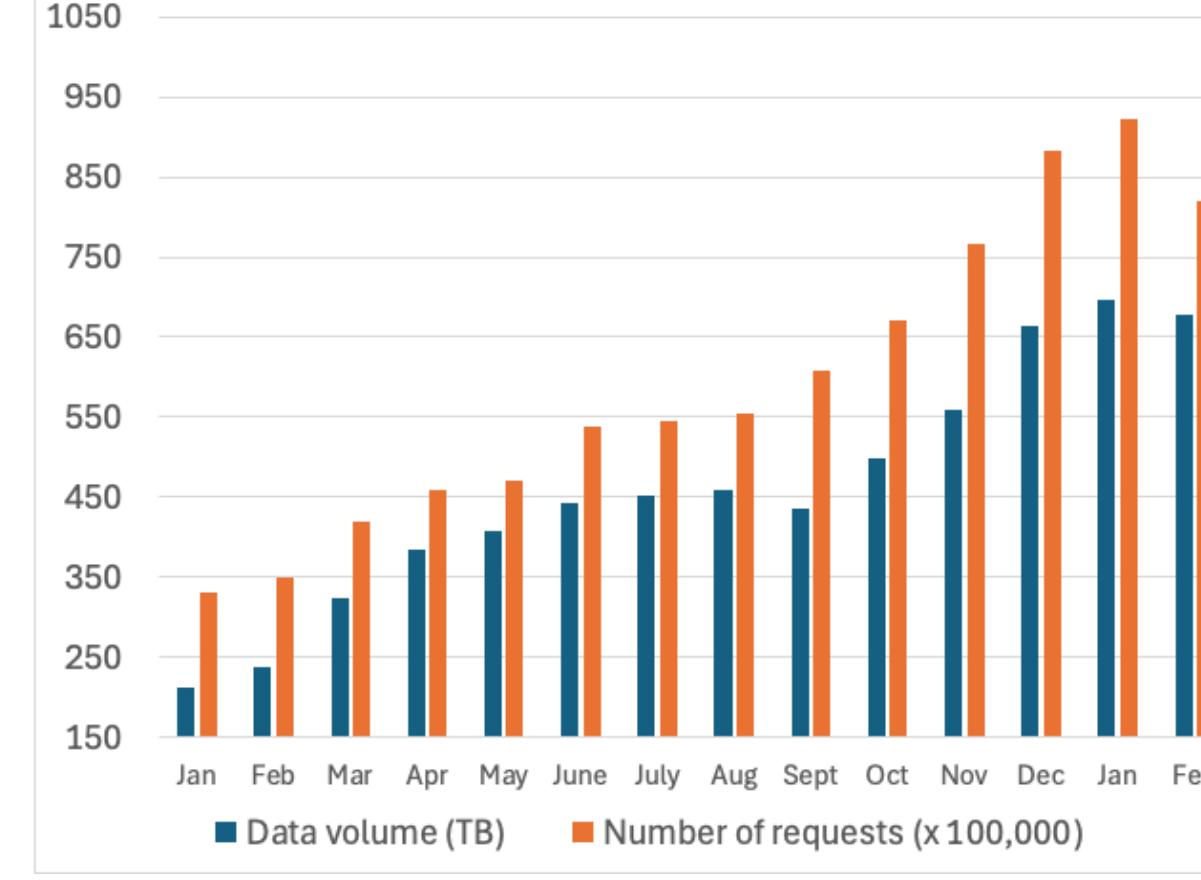
## Challenges on the pathway to open data

- Controlled Decrease of Revenue:** Even though steps towards open data have been taken, revenue from information cost continues to increase. ECMWF must balance this increase in revenue with commitments made to its Member and Co-Operating States.
- Feedback and attribution:** If there is no registration required to access the data, ECMWF risks losing feedback, recognition and attribution.
- Complex licensing / Data provision:** Users can have part of their data requirements as open and free data, while another part is still closed and subject to charges.
- Increasing in number of users and data volume:** There is a significant growth in users and in volume of data downloaded.

Increase of number of chargeable licenses from 2015



Open data usage in 2024



## Open data delivered by cloud providers



- Delivery via Microsoft Azure in 2024: 34.80 GB/day
- Delivery via Amazon in 2024: 18134 GB/day
- Delivery via Google in 2024: 581 GB/day

## FAIR Data Access

Compliance to “FAIR” = Findable, Accessible, Interoperable and Reusable: Jupyter Notebooks for open charts

- Design of an API to easily download the data
- Development of open-source Python libraries to process and visualise the data
- Development of Jupyter notebooks that showcase the use of libraries and the data
- Updated and maintained user documentation to support increasing number of active users

Plotting the data  
And finally, we can plot the data on the map.

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fig.contours_shaded(rgp15, style='probability_cvd')
fig.coastlines(resolution='medium')
fig.gridlines()
fig.title('Probabilities: 24h max of 10m wind gusts, 10m/s, 2000m, 1000m, 500m, 250m, 125m, 62.5m, 31.25m, 15.625m, 7.8125m, 3.90625m, 1.953125m, 0.9765625m, 0.48828125m, 0.244140625m, 0.1220703125m, 0.06103515625m, 0.030517578125m, 0.0152587890625m, 0.00762939453125m, 0.003814697265625m, 0.0019073486328125m, 0.00095367431640625m, 0.000476837158203125m, 0.0002384185791015625m, 0.00012020928955078125m, 0.000060104644775390625m, 0.0000300523223876953125m, 0.00001502616119384765625m, 0.000007513080596923828125m, 0.0000037565402984619109375m, 0.00000187827014923095546875m, 0.00000093913507461547753125m, 0.00000046956753730773876875m, 0.000000234783768653869384375m, 0.0000001173918843269346921875m, 0.00000005869594216346734609375m, 0.000000029347971081733673046875m, 0.0000000146739855408668365234375m, 0.00000000733699277043341826171875m, 0.0000000036684963852167091308875m, 0.00000000183424819260835456544375m, 0.000000000917124096304177282721875m, 0.0000000004585620481520886413609375m, 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