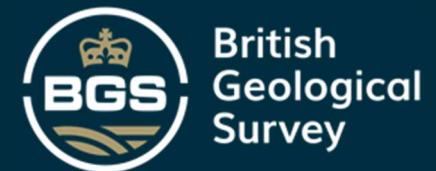


World Data Centre for Geomagnetism, Edinburgh: New data portal, API, and metadata tools

SARAH REAY (sjr@bgs.ac.uk), ADAM EMSLEY, OLI
CHAMBERS, EWELINA LAWRENCE, JOHN WILLIAMSON,
ADAM COLLINS, WILL BROWN, JANE EXTON



INTRODUCTION

World Data Centre for Geomagnetism, Edinburgh

- The World Data Centre (WDC) for Geomagnetism, Edinburgh serves the geomagnetism community by hosting and providing access to geomagnetic data.
- This includes:

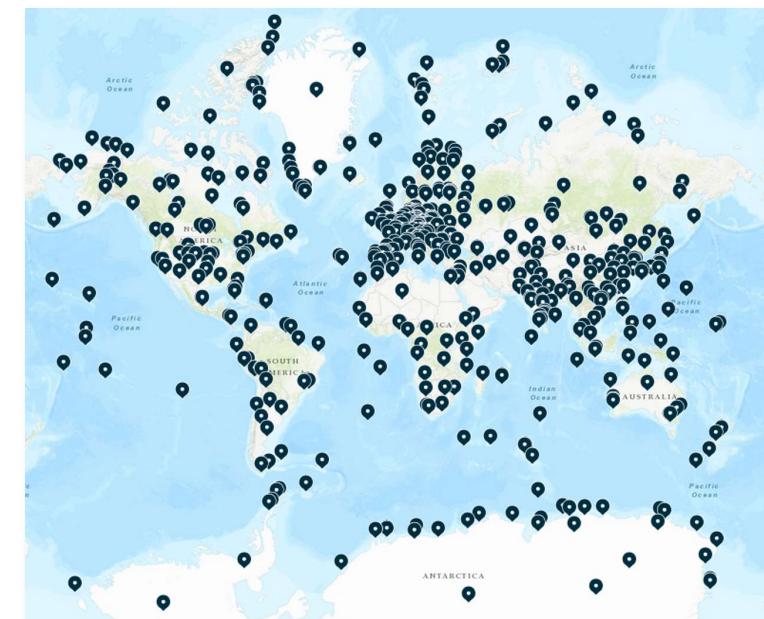
Data and metadata for ~500 magnetic observatories worldwide.

Definitive geomagnetic observatory data:
annual means (from 1813), hourly means (from 1883), minute means (from 1969)

Magnetic survey records & magnetic field models.

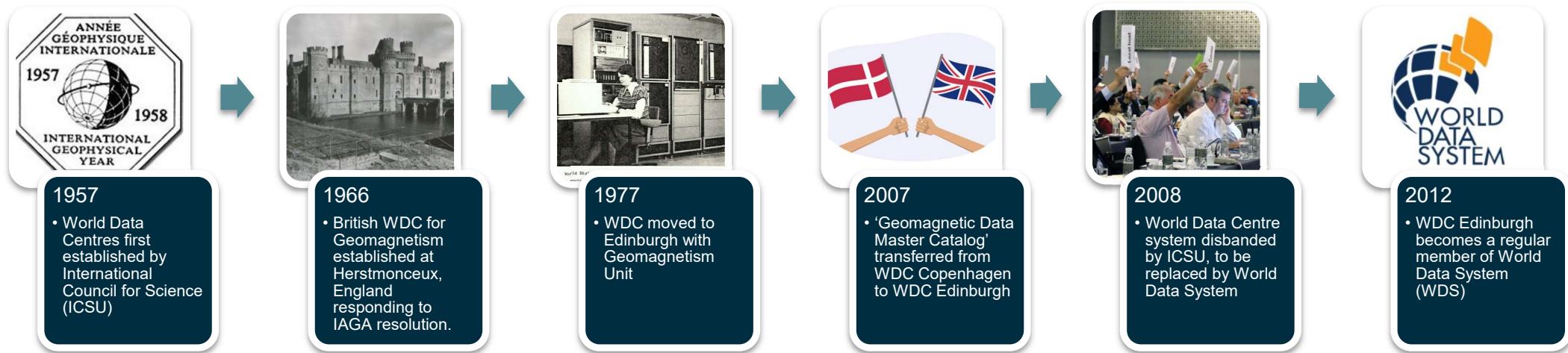
Historic UK magnetograms (from 1850), including an online archive of scans.

Physical storage of historic observatory yearbooks from UK and worldwide.



INTRODUCTION

History of the World Data Centre for Geomagnetism, Edinburgh



INTRODUCTION

Issues with the WDC Edinburgh services

Master Catalog of WDC Geomagnetism Edinburgh - Mozilla Firefox

File Edit View History Bookmarks Tools Help

<http://www.wdc.bgs.ac.uk/catalogmaster.html>

Google

Main page

Observatory list by IAGA code

Observatory list by name

WDC

World Data Centre for Geomagnetism (Edinburgh)

Geomagnetic Data Master Catalogue

[How to use the Master Catalogue](#)

WDC hourly & 1-min and new IAGA-2002 data formats

Geomagnetic Indices at IAGI and WDC and BGS

Observatory annual means and global magnetic survey data

WDC for Solar-Terrestrial Physics, Boulder, U.S.A.

WDC for Geomagnetism, Kyoto, Japan

WDC for Solar-Terrestrial Physics, Moscow, Russia

INTERMAGNET Main Home Page

[Go to WDC Home page](#)

Hourly values Catalogue

FTP data by Name or Year

Abinger (AIIH)

	1979	JFMAM	JASOND
1980	JFMAM	JASOND	
1981	JFMAM	JASOND	
1982	JFMAM	JASOND	
1983	JFMAM	JASOND	
1984	JFMAM	JASOND	
1985	JFMAM	JASOND	
1986	JFMAM	JASOND	
1987	JFMAM	JASOND	
1988	JFMAM	JASOND	
1989	JFMAM	JASOND	
1990	JFMAM	JASOND	
1991	JFMAM	JASOND	
1992	JFMAM	JASOND	
1993	JFMAM	JASOND	
1994	JFMAM	JASOND	
1995	JFMAM	JASOND	
1996	JFMAM	JASOND	
1997	JFMAM	JASOND	

1-Min Values Catalogue

Abisko (ABK)

	1979	JFMAM	JASOND
1980	JFMAM	JASOND	
1981	JFMAM	JASOND	
1982	JFMAM	JASOND	
1983	JFMAM	JASOND	
1984	JFMAM	JASOND	
1985	JFMAM	JASOND	
1986	JFMAM	JASOND	
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1992	JFMAM	JASOND	
1993	JFMAM	JASOND	
1994	JFMAM	JASOND	
1995	JFMAM	JASOND	
1996	JFMAM	JASOND	
1997	JFMAM	JASOND	

- Website used frames
- Data delivered by FTP

World Data Centre for Geomagnetism

Geomagnetism Data Portal

WDC Catalogue Search

Use the controls below to search for data. You can filter the results by: station name or IAGA code; year; data type (hourly or 1-minute values); and geographical coordinates of station (by drawing a bounding box on the map).

Datasets matching your selection criteria will be listed in the right-hand panel. You can view a plot of any of the results by clicking on the 'go!' icon that appears when you hover over a result. Data may be downloaded by checking the required datasets, choosing a data format from the drop-down menu, then clicking 'Download'.

[API Documentation](#)

Filter by station:

Filter by year range: 1883 - 2024

Dataset Type: Hourly 1-Minute

Map Satellite



Search Results (Found: 9922)

Group by: Station Results/page: 100

Selected: 0

Select All Results Select None

On this page (51): Select All Select None

AAA
 AAA 1960
 AAA 1964
 AAA 1965
 AAA 1966
 AAA 1967
 AAA 1968
 AAA 1969
 AAA 1970
 AAA 1971
 AAA 1972
 AAA 1973
 AAA 1974
 AAA 1975
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 AAA 2016
 AAA 2017
 AAA 2018
 AAA 2019
 AAA 2020
 AAA 2021
 AAA 2022

- Data Portal and webservice developed

- Didn't fully replace previous functionality
- Not fully integrated to back-end processes

Annual mean data delivered from a different website to the hourly & minute data

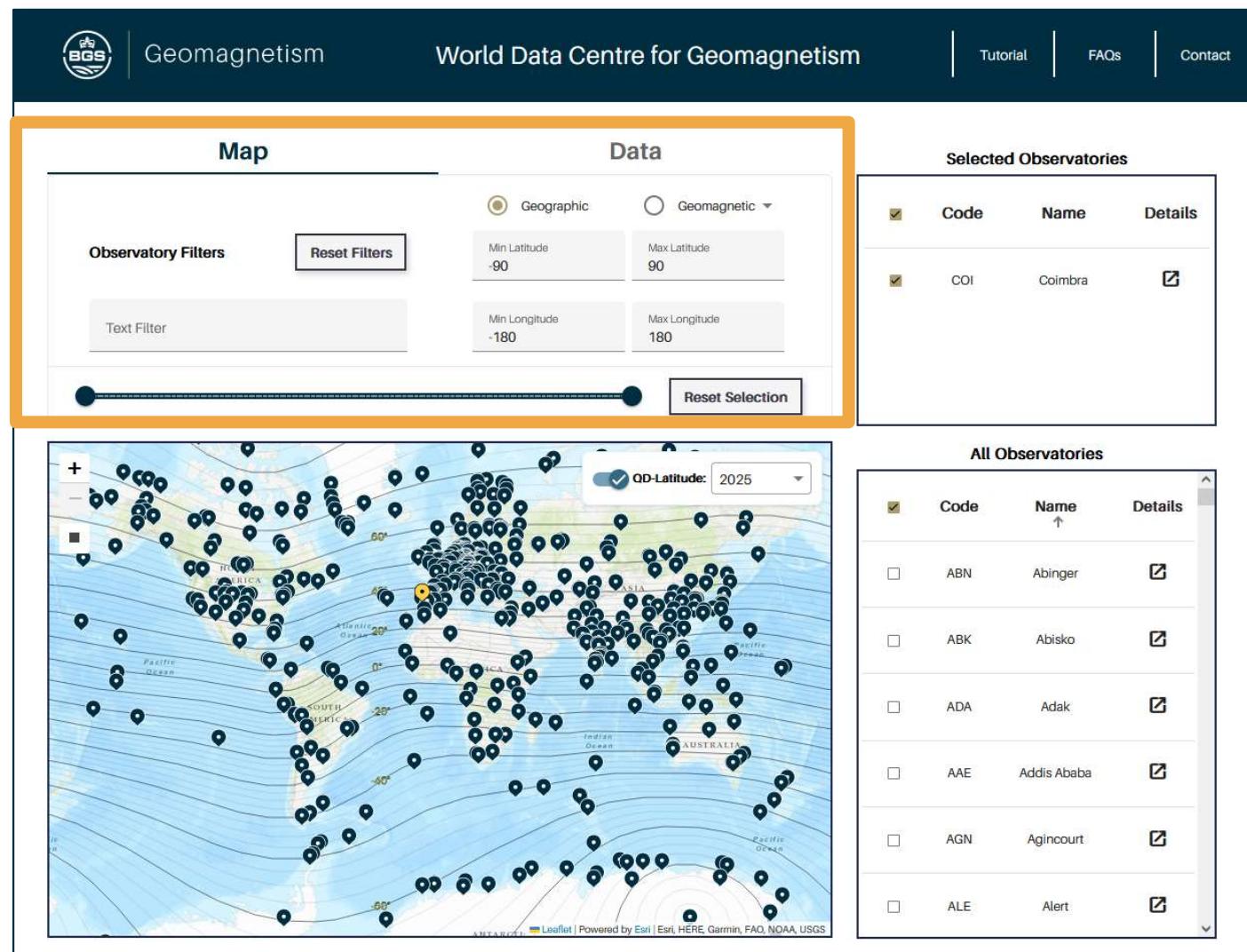
NEW DEVELOPMENTS

New WDC Portal

- Launched October 2024

Data discovery

- Temporal, spatial and text-based filtering.
- Filter by geographic or geomagnetic coordinates (quasi-dipole or dip angle).



Explore the new portal: wdc-dataportal.bgs.ac.uk

NEW DEVELOPMENTS

New WDC Portal

Data discovery

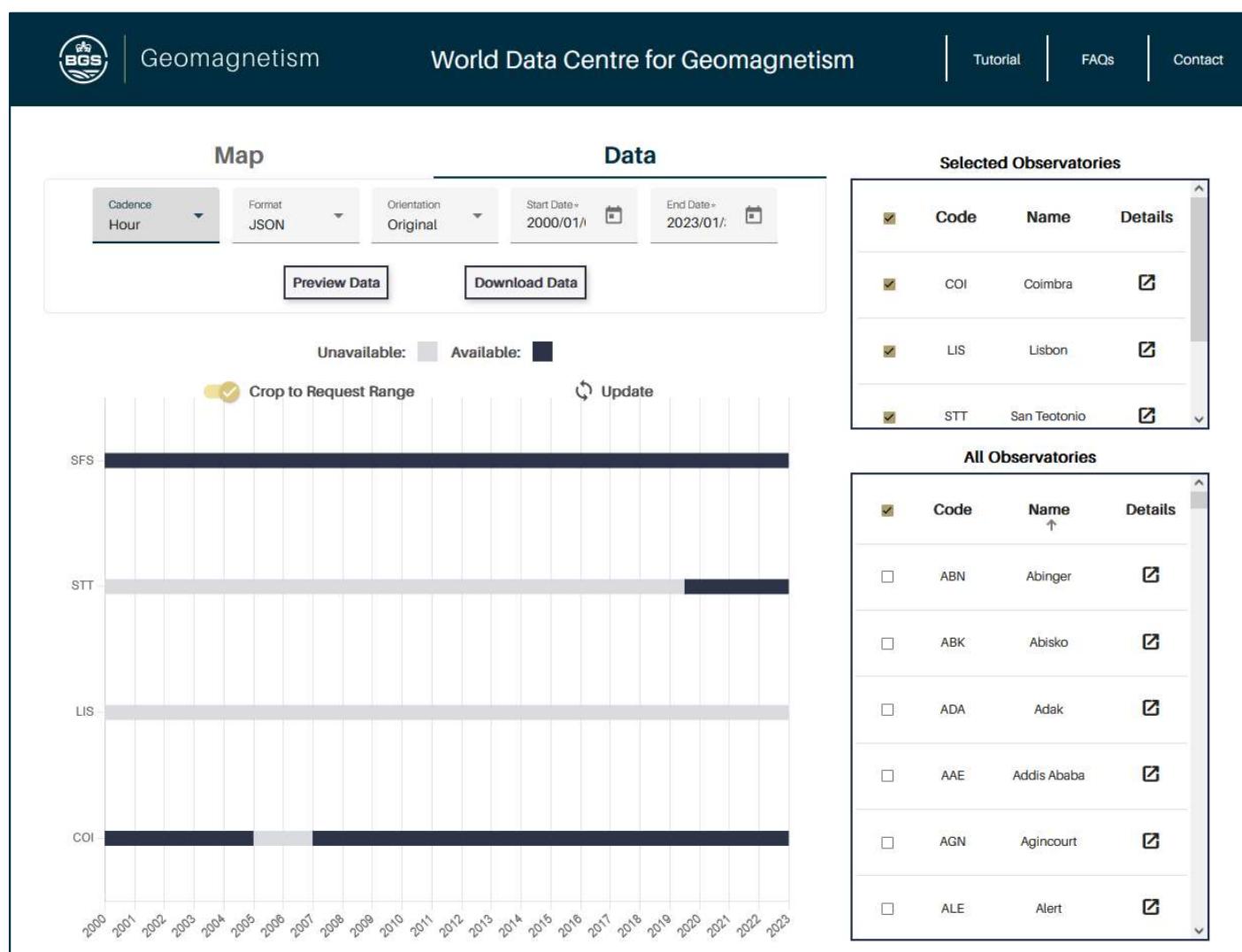
- Data availability can be displayed as a chart.

Larger downloads

- Up to 10 years of minute means and 50 years of hourly means available in a single download.

Range of Formats

- IAGA-2002, WDC, JSON, COV-JSON, XML and CSV



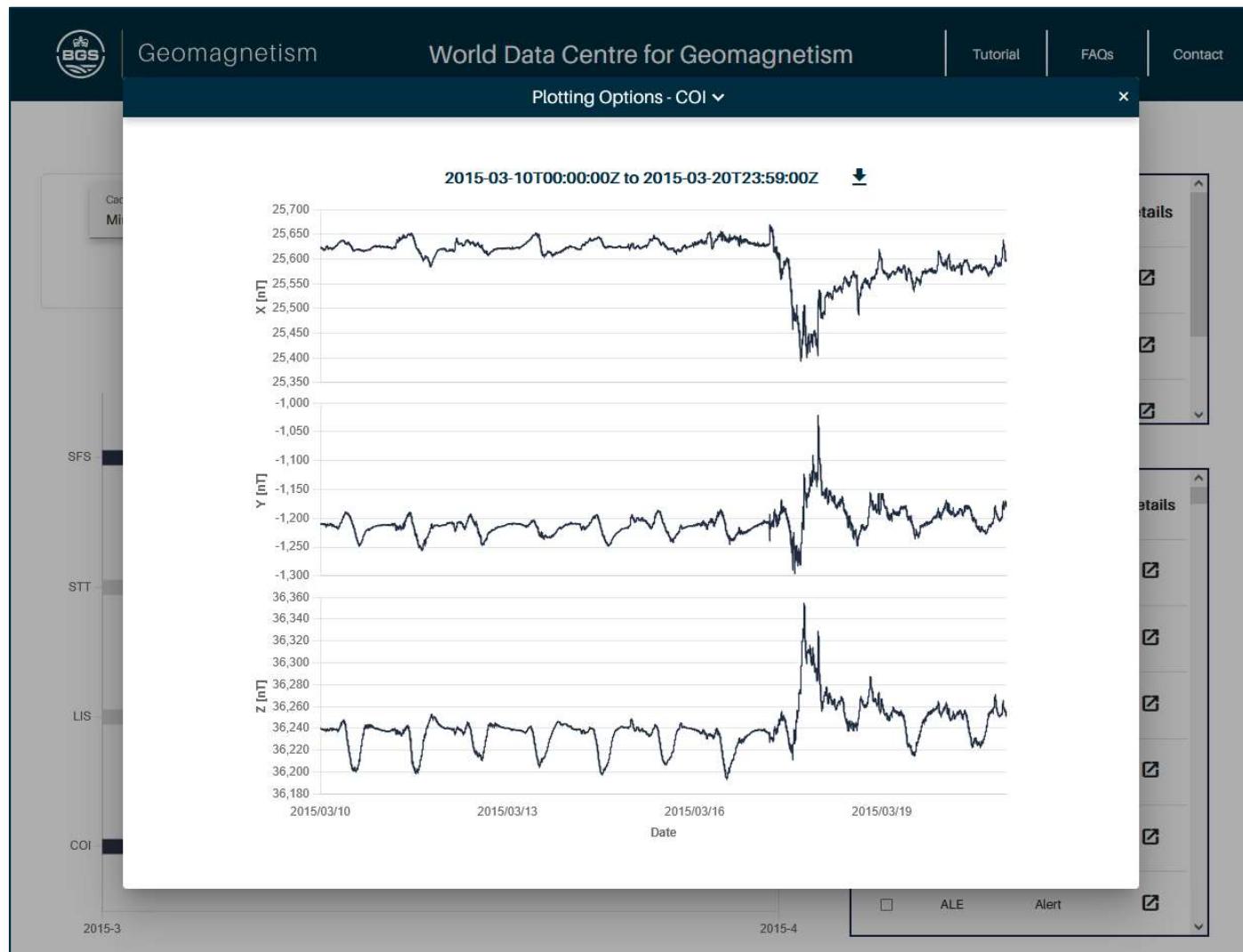
Explore the new portal: wdc-dataportal.bgs.ac.uk

NEW DEVELOPMENTS

New WDC Portal

Data plotting and preview

- Users can view the original dataset orientation or convert between XYZ and HDZ.
- Plots can be saved as PNG figures.



Explore the new portal: wdc-dataportal.bgs.ac.uk

NEW DEVELOPMENTS

New WDC Portal

Detailed metadata

- Web pages displaying detailed metadata for each observatory are maintained and improved (wdc.bgs.ac.uk/observatories)

Acknowledgements

- Information about observatory operators is automatically included for all datasets downloaded.

WD Observatory Information

Name	Coimbra
IAGA Code	COI
Acknowledgement	Instituto Geofísico, Universidade de Coimbra
Website	Visit

Observatory Details

Address Information

Locations

Institutes

Instruments

Persons

Explore the new portal: wdc-dataportal.bgs.ac.uk

NEW DEVELOPMENTS

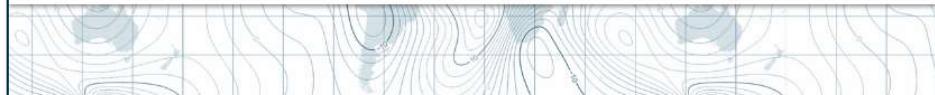
New API (application programming interface)

- A standard, language-agnostic interface to APIs which allows humans and computers to discover and understand the capabilities of the service.
- Endpoints include: Data Availability, Data (Zipped & Text), Metadata, Acknowledgements.
- Heliophysics Data Application Programmer's Interface (HAPI) specification capabilities
- Metadata endpoints for INTERMAGNET & EPOS



WDC Portal | INTERMAGNET | EPOS

 Geomagnetism WDC Edinburgh API



World Data Centre (WDC) API 1.0.0 OAS 3.1

[/openapi.json](#)

Here you can find the home of the documentation for the API for the World Data Centre for geomagnetism at Edinburgh, hosted by the British Geological Survey.

Data is available in all standard formats (IAGA-2002, WDC, XML, JSON, CSV) as zipped downloads or as text endpoints.

Metadata for all observatories are also available. The metadata database will be updated soon, ensuring the latest up-to-date results.

WDC Endpoints

Observatory Metadata - All Metadata and Contacts

WDC GeoJSONs

Data Availability

Zipped Data

Text Data

Monthly Mean Files in BGS Format

Annual Means Catalogue

Observatory Acknowledgement

API Documentation: wdcapi.bgs.ac.uk/docs

NEW DEVELOPMENTS

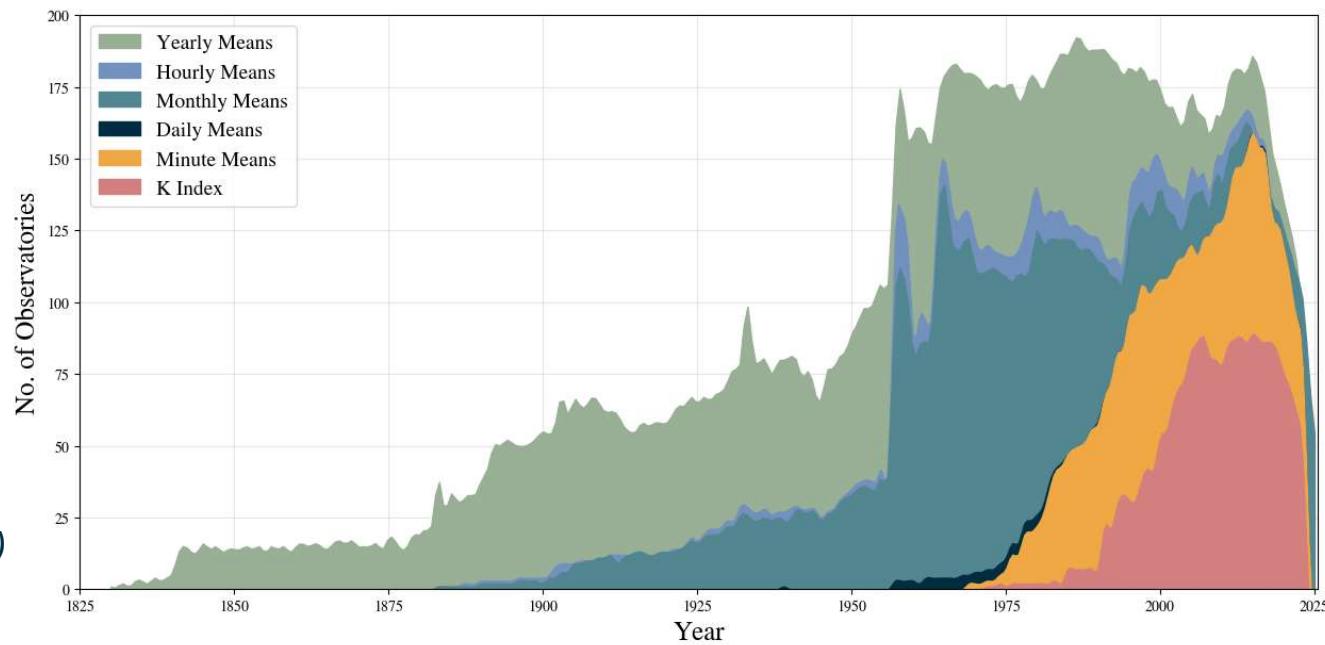
More data types available

More data types, and time cadences now available

- Daily Means (*from IAF files*)
- K-Index (*from IAF files*)
- Annual Means - now available from same webservice as other datasets
- Monthly Means (*calculated by BGS* wdc.bgs.ac.uk/monthlymeans/index)

Future developments

- One-second data
- Improved access to digital yearbooks



The number of datasets per year available from the WDC Edinburgh for each data type.

NEW DEVELOPMENTS

Core Trust Seal Accreditation

- Certified as a Trustworthy Data Repository by the CoreTrustSeal Standards and Certification Board in February 2025.
- Certification valid for 3 years.
- Demonstrated evidence over 16 requirements which reflect a trustworthy repository.
- CoreTrustSeal certification
[doi:10.34894/H318RO](https://doi.org/10.34894/H318RO)
- CoreTrustSeal requirements are also revised every 3 years



CoreTrustSeal Requirements 2023-2025

Organizational Infrastructure

- R1 Mission & Scope
- R2 Rights Management
- R3 Continuity of service
- R4 Legal & Ethical
- R5 Governance & Resources
- R6 Expertise & Guidance

Digital Object Management

- R7 Provenance and authenticity
- R8 Deposit & Appraisal
- R9 Preservation plan
- R10 Quality Assurance
- R11 Workflows
- R12 Discovery and identification
- R13 Reuse

Information Technology & Security

- R14 Storage & Integrity
- R15 Technical infrastructure
- R16 Security

FUTURE DEVELOPMENTS

Metadata update tool

- A new tool is in development for data providers to review and update observatory metadata.
- Tool will support multiple languages.

Instrument Name	LEMI-025
Instrument Type	Non-suspended fluxgate vector magnetometer
Absolute	N
Primary	Y
Orientation	HDZ
Dynamic Range	70000
Resolution	0.01
Sample Period	1
Serial Number	
Valid From (DD/MM/YYYY)	2022-01-01T00:00:00
Valid To (DD/MM/YYYY)	
Manufacturer	LEMI
Description	
Filter	61-point cosine
Language	English (en)

Improve data submission?

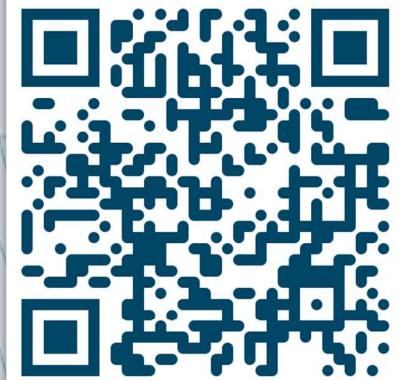
- Data can currently be submitted by email or writeable FTP
 - FTP will be decommissioned soon
- Develop new tool to enable data providers to submit data online?
 - Provide better guidance on accepted data types and formats
 - Ask data providers to include relevant metadata at point of submission



Conclusion

- New WDC Data Portal and API launched
- Users can now easily search for, plot, and download observatory data
- More data types (K-index, Daily & Monthly means) now available
- WDC has been certified by the CoreTrustSeal as a trustworthy data repository
- A tool to review and update metadata is in development

Data Portal



wdc-dataportal.bgs.ac.uk



API Documentation

wdcapi.bgs.ac.uk/docs

Submit your data: wdcgeomag@bgs.ac.uk