

# World Data Centre for Geomagnetism, Edinburgh



**British Geological Survey**  
NATURAL ENVIRONMENT RESEARCH COUNCIL



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## What is the WDC for Geomagnetism, Edinburgh?

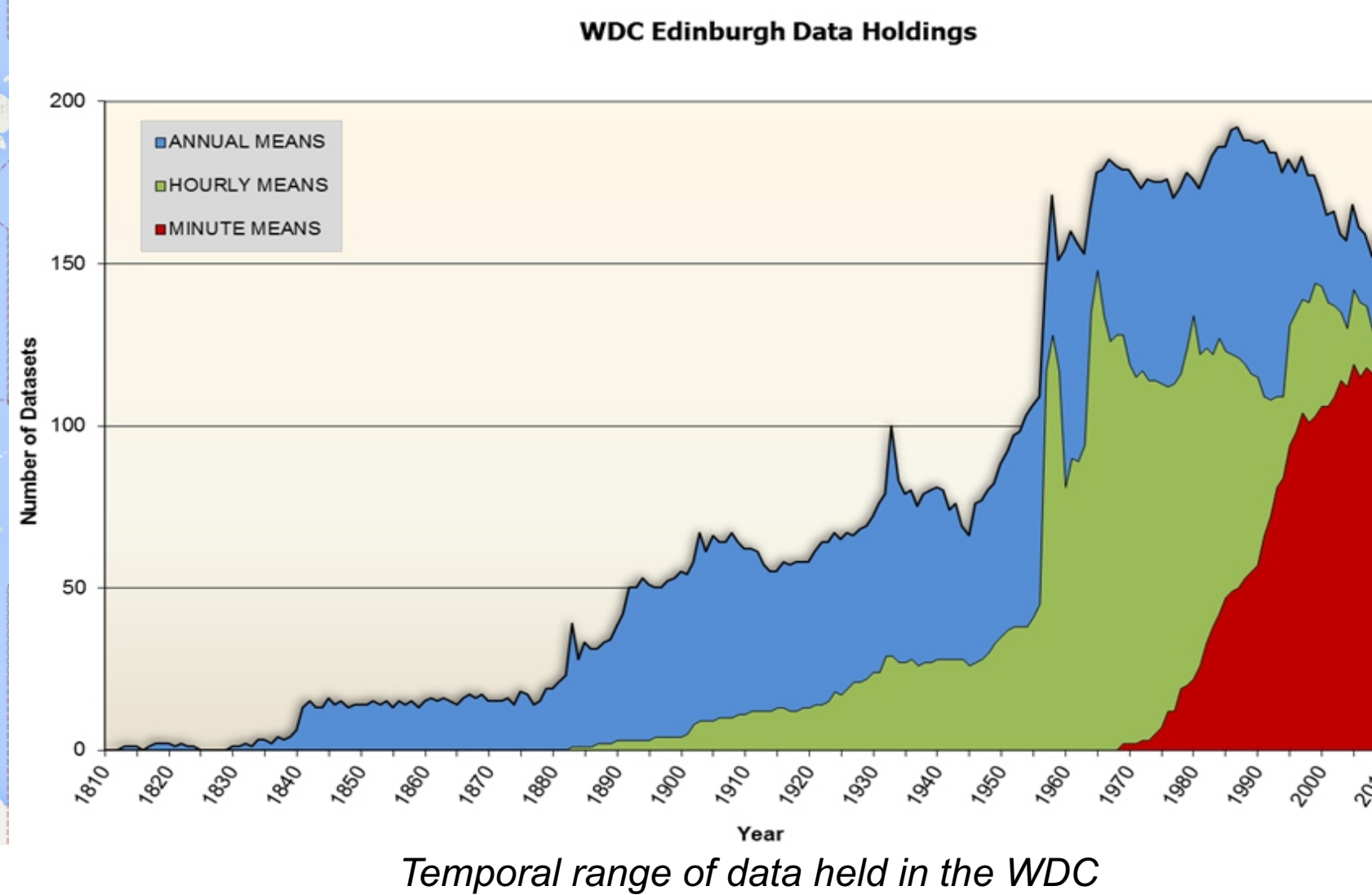
The British Geological Survey have operated a World Data Centre for Geomagnetism since 1966.

In 2007 we took over responsibility for the archive of geomagnetic observatory hourly and minute mean data from WDC for Geomagnetism, Copenhagen.

We were formally accepted as a regular member of the World Data System (WDS) in February 2012.



Spatial range of data held in the WDC



Temporal range of data held in the WDC

The WDC for Geomagnetism, Edinburgh currently holds:

- Geomagnetic observatory annual, hourly, minute means
- Global & local magnetic model information
- Land, marine, aeromagnetic and repeat stations survey
- Solar & geomagnetic indices
- Analogue magnetograms
- Historical yearbooks, memoirs, logs etc.
- Ship-borne data
- Observatory metadata

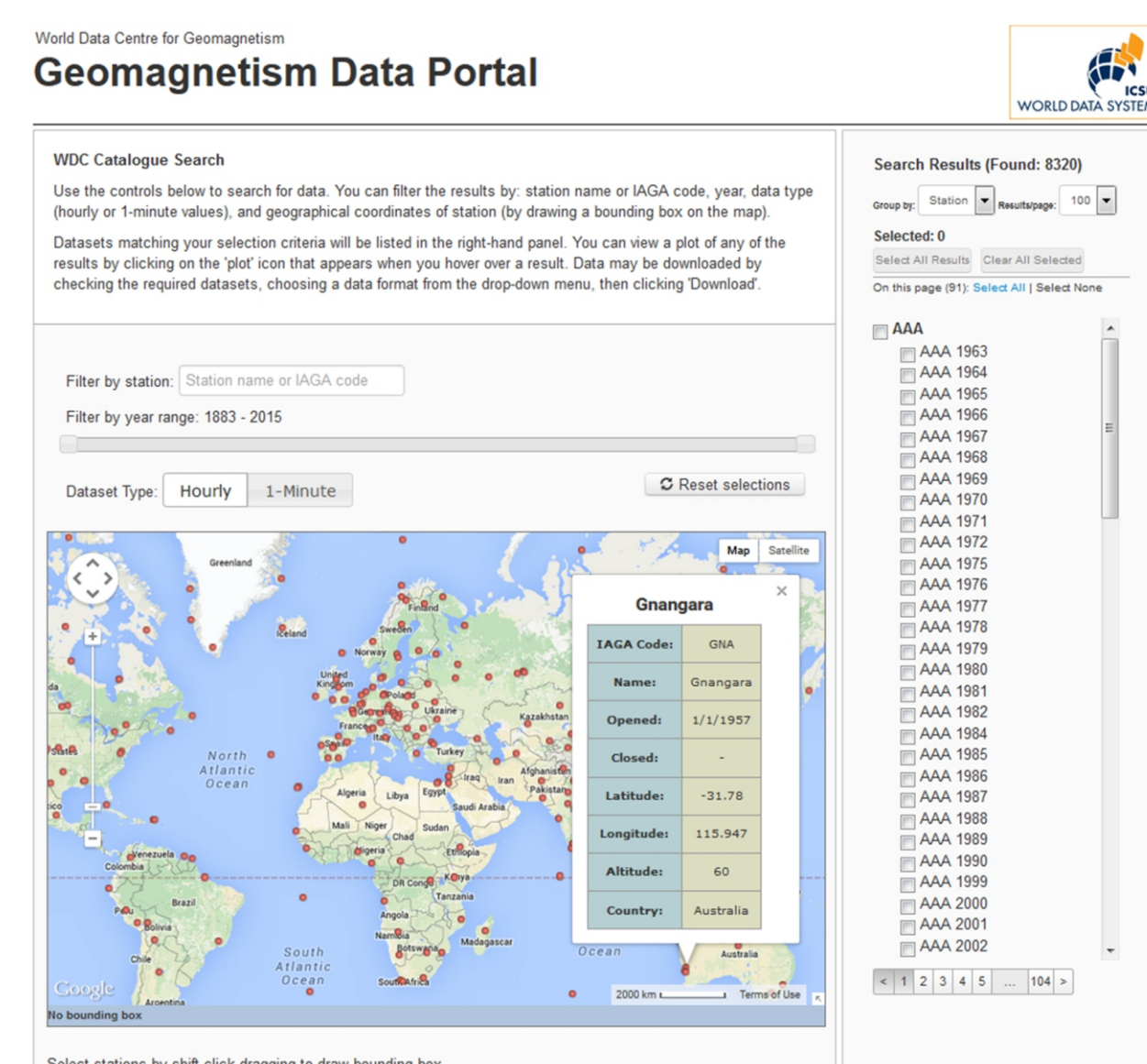
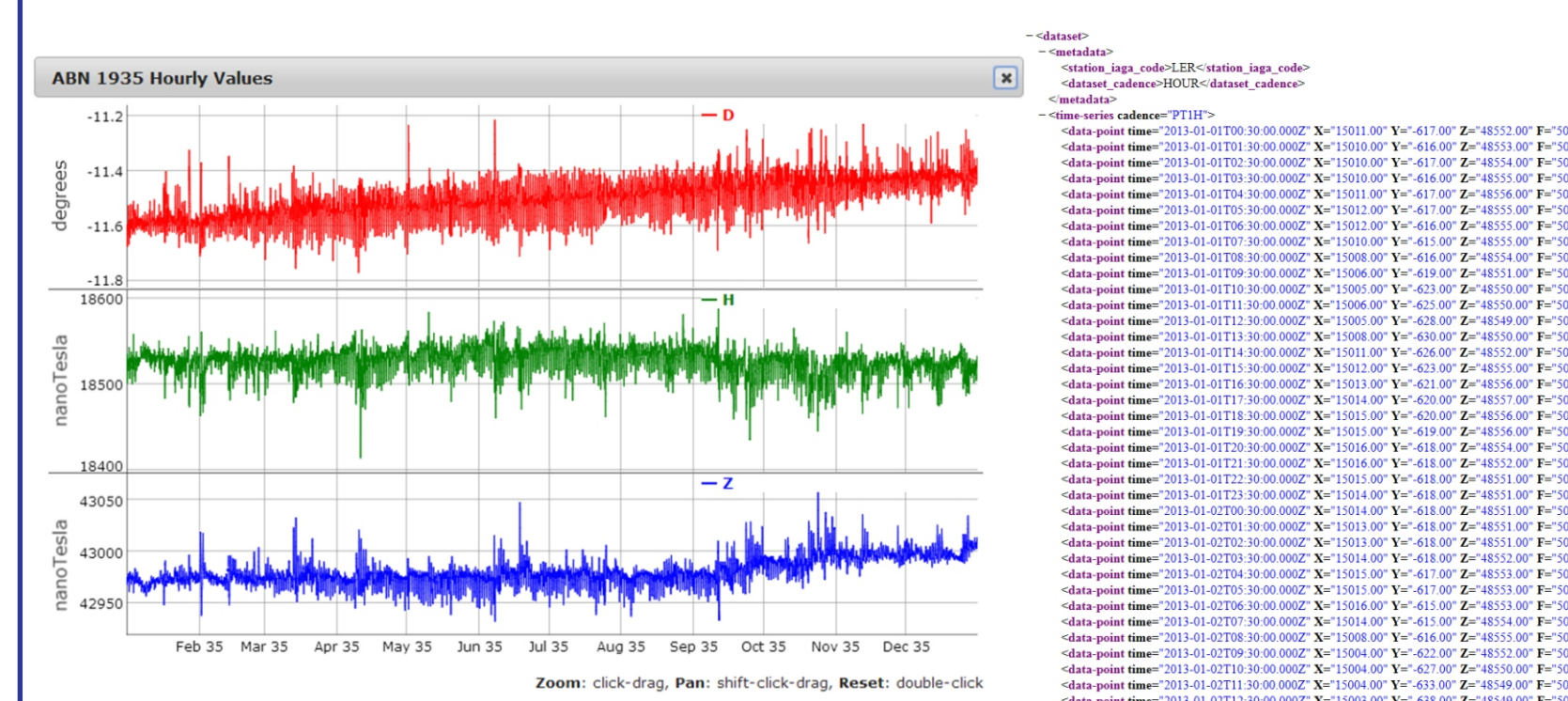
## Challenges, Difficulties and Successes

### Challenge - Physical movement of records



In February 2016 the British Geological Survey moved to a new office on the outskirts of Edinburgh. This new office is smaller and it was not possible to store all the analogue records associated with the WDC at this new site. A process to catalogue our holdings was carried out. Each record was barcoded and stored in archive-quality custom fitted boxes. These were then transported to BGS's headquarters based in Keyworth, England. A catalogue of records is now available here: <http://bgs.ac.uk/services/ngdc/datadeposited.html> and a system of request and retrieval is in place.

### Success - Launch of data portal



In 2015 we released a new method for users to access observatory data online from our WDC. The WDS Data Portal <http://www.wdc.bgs.ac.uk/dataportal/> is web application using AngularJS and jQuery based on a RESTful web service. This allow users to better search for available hourly and minute geomagnetic observatory data either by date range, location, name or observatory code. The catalogue of available data is then displayed and users can select their required data. This can be downloaded in IAGA2002, WDC, XML, JSON and CSV data formats. Plots of the data can also be displayed in the data viewer.

### Difficulty - Metadata Standards

The geomagnetism community has been deliberating on how to best define a metadata standard for time series geomagnetic data. At our WDC we provide and maintain metadata records for geomagnetic observatories. However this is not stored in any metadata standard and is therefore not interoperable with other data repositories. WDS network member INTERMAGNET is currently working to define geomagnetism standards and when resolved we will adopt these community standards in the operation of our WDC.

### Difficulty - Data Publishing

The geomagnetism community are also in discussion to define standards on data publishing for time series data. A working group within the International Association of Geomagnetism and Aeronomy (IAGA) are working on this issue and we await the outcome of this before considering data publication.

## Best Practices

### Continuity plan for safe stewardship of data

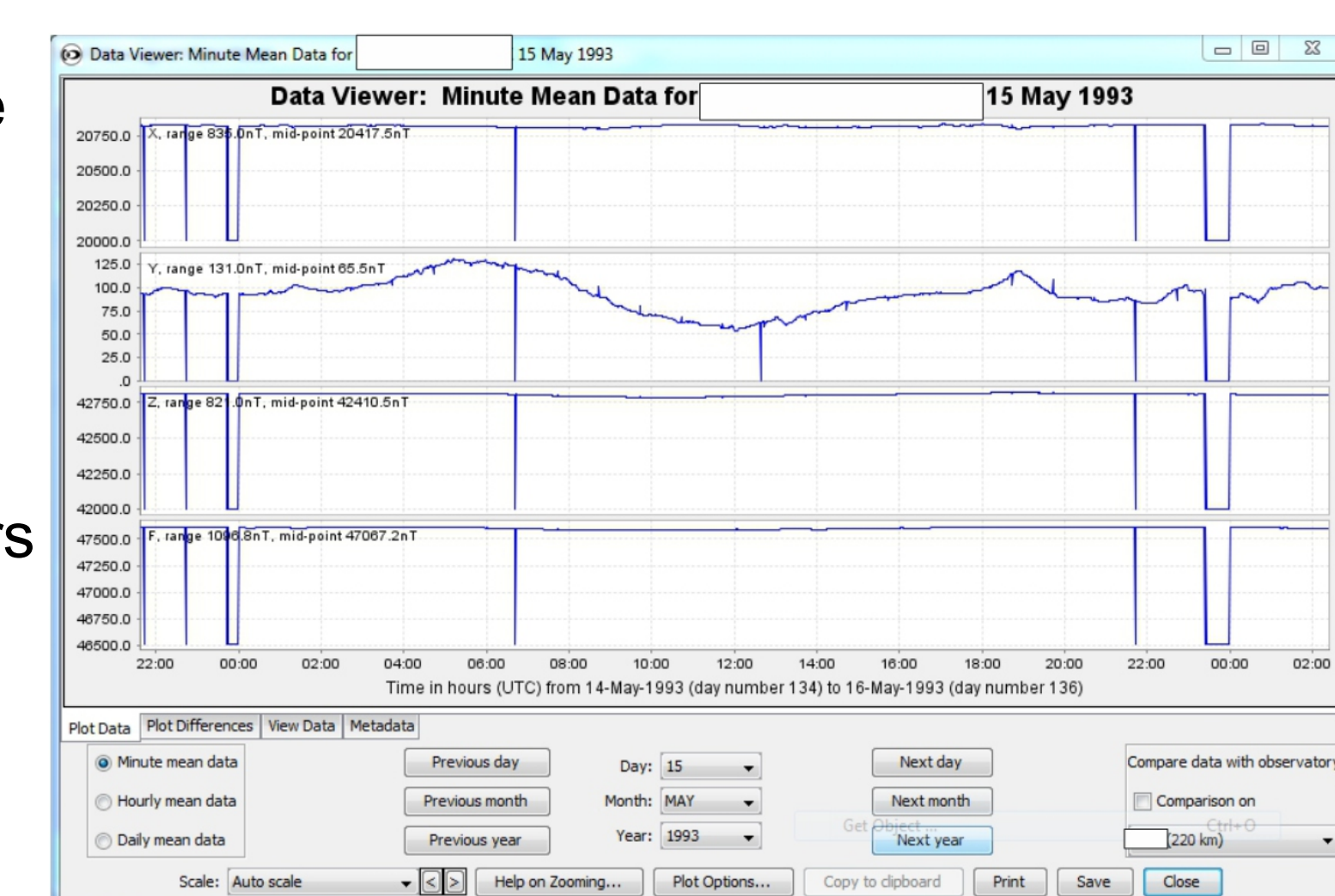
As part of the BGS office relocation, duplicate copies of analogue records could no longer be accommodated in the WDC archive. This included rare historical observatory yearbooks from UK observatories back to the 1840's. We offered these duplicate records to our colleagues in other WDCs for Geomagnetism around the world.

WDC Kyoto kindly agreed to store a copy of each record and we arranged safe transport of around 250 yearbooks from the UK to Japan. We were also able to send other documents to both the United States and Russia to fill gaps in their data holdings. We are very grateful to all WDCs who helped to maintain copies of these important historical records when they may otherwise have been disposed of.



### Verifying authenticity and integrity of datasets

When data are first received by our WDC the authenticity and integrity of the data are assessed. Various quality checks are applied to the incoming data and if any problems are found, the data provider is invited to make corrections before re-submitting. We may also choose to edit the data if any formatting or typographical errors are found. Gross errors (such as spikes in the data, *see right*) may also be removed. Any changes made to the data are logged, and all previous versions of the data are maintained to provide traceability.



We have also, in the past, conducted dedicated programmes of data quality assessment to improve the overall quality and integrity of the data sets held in the WDC.

### Local oversight by experts

The World Data Centre for Geomagnetism, Edinburgh is managed by the Geomagnetism Team of the British Geological Survey. This team operates nine geomagnetic observatories around the world providing us with an understanding of the data from the perspective of data producers. We also, as scientists, use the data held within the WDC for research into geomagnetic magnetic field modelling and space weather science. This is a strong motivation to enhance the scope and quality of the data held.

Furthermore we are active within the geomagnetism community helping to shape advances in geomagnetic data and its management. Our activities include:

- Chair of INTERMAGNET Executive Council and two Chairs of Operations sub-committees
- Member of the IAGA Executive Committee
- Co-Chair of IAGA Division V Working Group on Data and Indices
- Members of European Plate Observing System (EPOS) Work Package 13 on Geomagnetic Observations

