

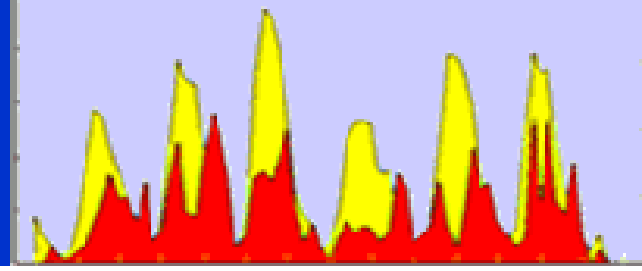
# Working Group V-DAT Business Meeting

July 14, 2019

12:00-13:30 @ MCC - Floor 5 512A

Montreal, Canada

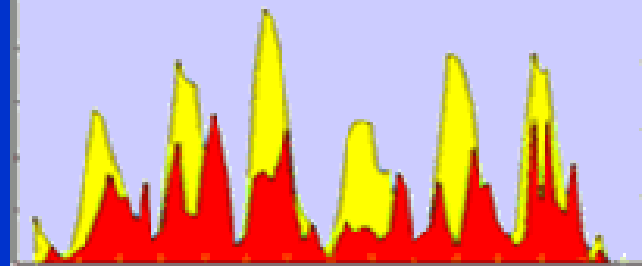
# Working Group V-DAT: Geomagnetic Data and Indices



## Agenda

1. Status of the IAGA indices
  - ISGI roadmap (A. Chambodut)
  - aa, CK days, am (A. Chambodut)
  - PCN, PCS (N. Olsen on behalf of A. Willer and O. Troshichev)
  - Kp, Q/D days (J. Matzka)
  - Dst, AE (H. Toh, S. Taguchi)
  - SC, SFE (J. J. Curto)
2. Reports
  - INTERMAGNET updates (S. Flower, A. Thomson)
  - Data DOI Task Force (M. Nosé)
  - World Data Center activities - Edinburgh, Moscow (E. Clarke)
3. Election of new officers
4. Resolution
  - SC and SFE lists of remarkable events: support to Ebro observatory
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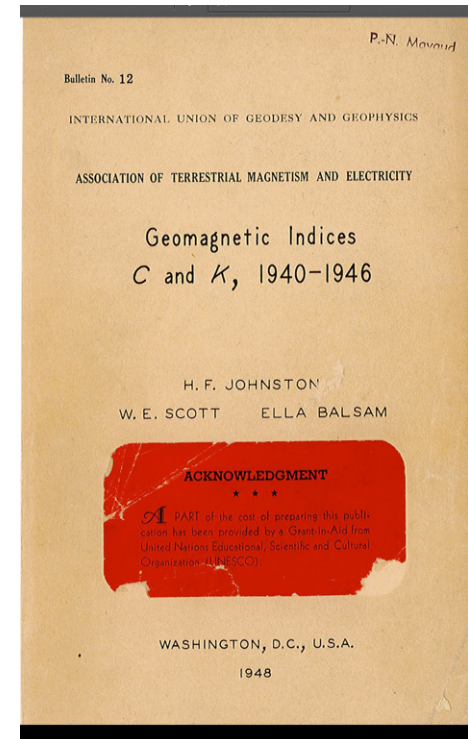
# ISGI Roadmap

## Actions achieved 2018-2019

- Drafting of all *Living Documents* of ISGI Data Repository:
  - 3 Workflows Description (Calculation, Ingestion, Dissemination)
  - Documented storage procedures
  - Preservation plan
  - Data Management Plan
- Management of physical archives: Scan and OCR of **87 IAGA Bulletins**  
*Already online!*
- Exchanges with ISGI-Collaborating-Institutes & Customers
- Implementation of Web services (7 institutional customers)

## Pending Actions

- *aa* & *am* DOI minting



## Missing Bulletins:

No. 53, No. 50,  
No. 48, No. 45, No. 43, No. 42, No. 41,  
No. 38, No. 36, No. 34, No. 30,  
No. 26, No. 24, No. 23, No. 22,  
No. 19, No. 17, No. 13, No. 11 and  
before



# ISGI Roadmap

## Actions planned 2020-2021

- Set up of new download formats (JSON, csv, ...) for all IAGA-endorsed geomagnetic indices
- Make available *aa* and *am* monthly means and yearly means (demand of community in Space Climate)
- Ingest / Make available possible others indices on playground area
- Increase database of references
- Collaborate with WG V-DAT and V-OBS for adding K=9 Lower Limits to list of magnetic observatories managed by V-OBS
- Organised Metadata of *aa* and *am* indices for possible integration to OAI-PMH\* protocol
- Renew WDS regular membership (*CoreTrustSeal* Certification)



\*(Open Archives Initiative Protocol for Metadata Harvesting)



Gentle reminder:

Since 1987, K=9 Lower Limits of magnetic observatories are determined and provided by ISGI (Mayaud, 1980).

To disseminate information and keep records in the frame of development of **magnetic observatories' metadata system**, we propose to integrate K=9 lower limits in *list of magnetic observatories* managed by V-OBS.

→ **collaboration between WGs V-OBS, V-DAT and ISGI**

WGs V-OBS and V-DAT will thus ensure that new magnetic stations are getting suitable K=9 Lower Limit together with already provided unique IAGA 3 letter code for name.

Gentle recall:

Please, indicate into the metadata and/or header of K index files, the used K=9 Lower Limit for calculation.

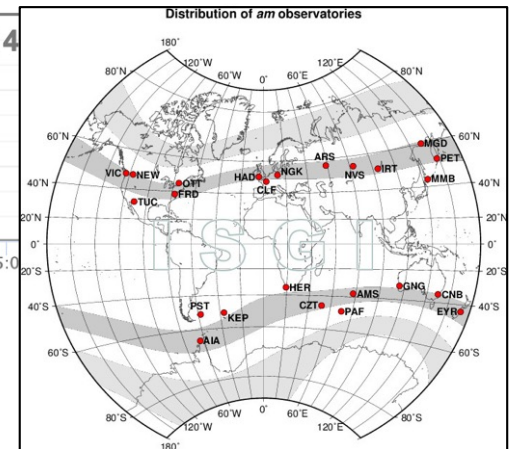
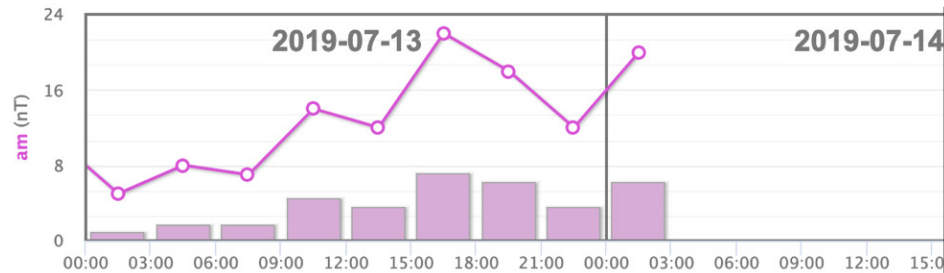
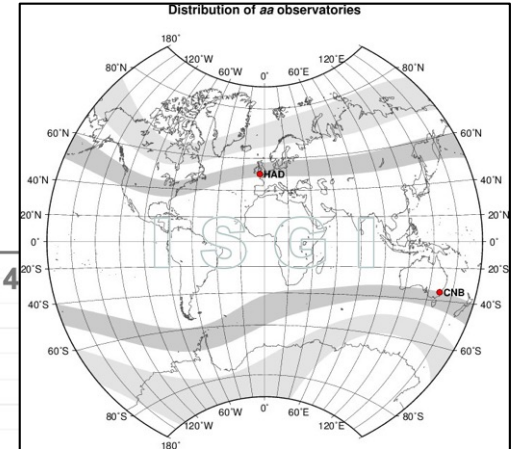
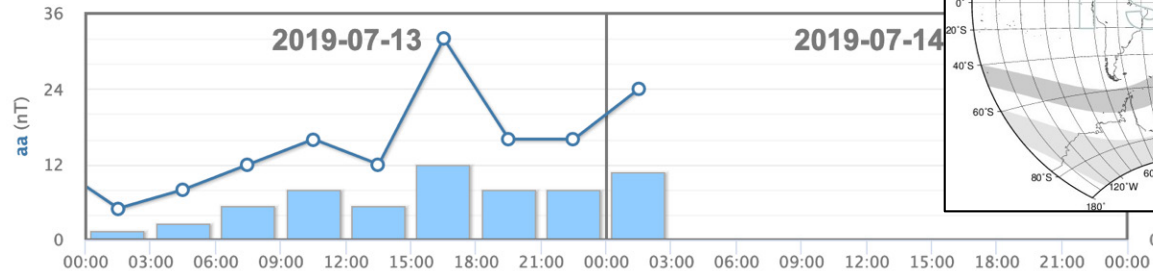
# *aa* and *am* indices - status

- *aa* and *am* indices are routinely calculated by EOST, Strasbourg

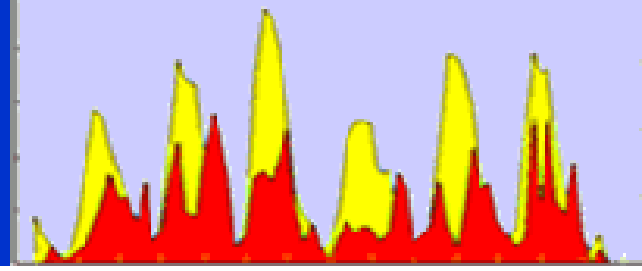
Quicklook

Provisional

Definitive



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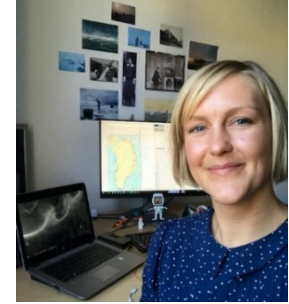


# PC index - status

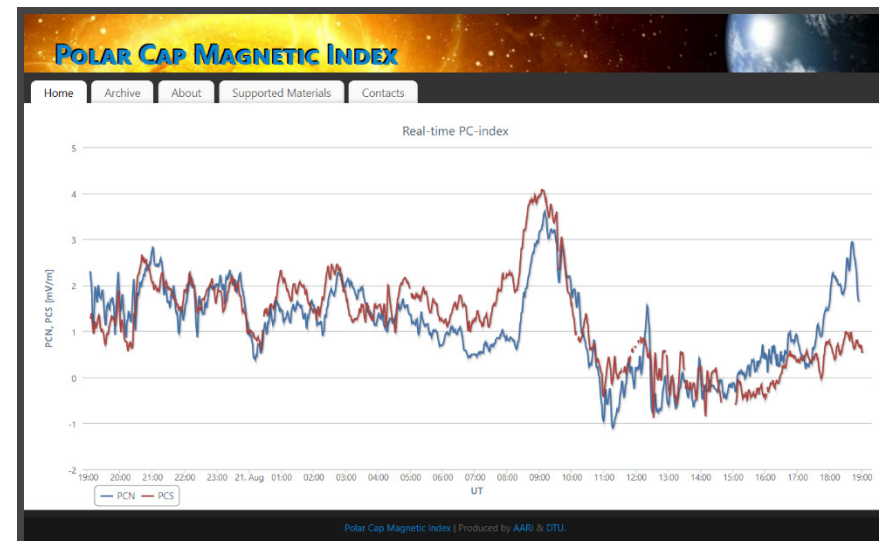
- PCS and PCN indices are routinely determined in a collaboration between AARI and DTU Space using the algorithm endorsed by IAGA in 2013
- Documentation, data and prototype programs are available at [www.pcindex.org](http://www.pcindex.org) and at *WDC for Geomagnetism Copenhagen* [space.dtu.dk/wdc/pcn-index](http://space.dtu.dk/wdc/pcn-index).  
Data and documentation are also available at *The International Service of Geomagnetic Indices* (ISGI) <http://isgi.unistra.fr>



PCS Contact: Oleg Troshichev  
[olegtro@aari.ru](mailto:olegtro@aari.ru)



PCN Contact: Anna Willer  
[anna@space.dtu.dk](mailto:anna@space.dtu.dk)



# PC index - status

- Definitive PCN index

The definitive PCN index is based on definitive data from Qaanaaq (THL) observatory, and is now available for 1975 – 2017 from WDC for Geomagnetism Copenhagen and ISGI.

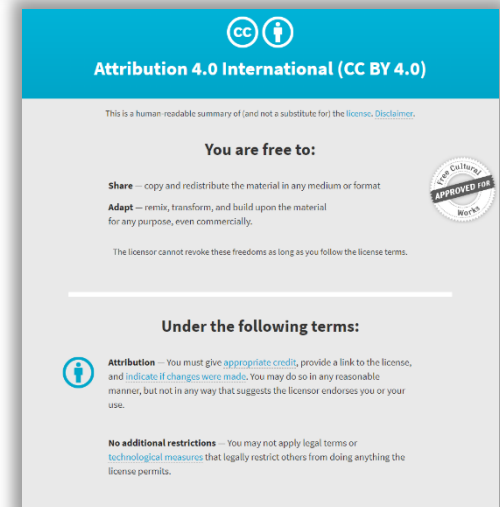
- License

PCN index by DTU Space is licensed under the Creative Commons Attribution 4.0 International (CC BY 4.0)  
<https://creativecommons.org/licenses/by/4.0/>

- DOI

Definitive PCN index by DTU Space has DOI  
<https://doi.org/10.11581/DTU:00000057>  
landing page: [www.space.dtu.dk/wdc/pcn-index](http://www.space.dtu.dk/wdc/pcn-index)

```
Format          IAGA-2002
Source of Data   DTU
Station Name     Polar Cap North (PCN) index (from THL obs.)
IAGA Code        PCN
Geodetic Latitude 77.467
Geodetic Longitude 290.767
Data Interval Type 1-min
Data type        Definitive
# Missing values are indicated by value 99999.00
# PCN: Polar Cap index North, unit 1 mV/m
# License: CC BY https://creativecommons.org/licenses/by/4.0/
DATE            TIME            DOY            PCN
2015-01-01      00:00:00.000      001            -0.23
2015-01-01      00:01:00.000      001            -0.28
2015-01-01      00:02:00.000      001            -0.32
2015-01-01      00:03:00.000      001            -0.36
2015-01-01      00:04:00.000      001            -0.38
2015-01-01      00:05:00.000      001            -0.37
```



# PC index – plans for near future

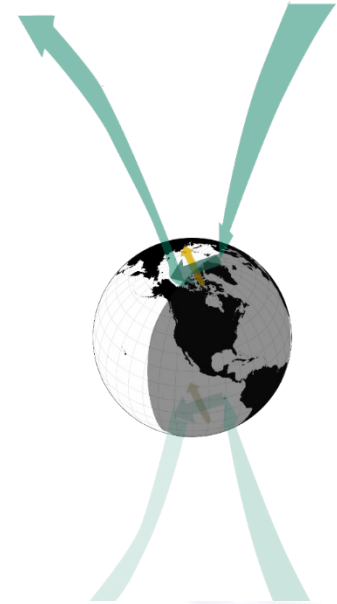
AARI and DTU Space are working on

- **Metadata on pcindex.org.** Enhanced presentation of PCS and PCN on pcindex.org and the WDC homepage in order to achieve consistency with other geomagnetic indices and to avoid confusion about index level (quick look, provisional or definitive).

*AARI and DTU Space*

- Implementing a **DOI and license** for PCS index *AARI*
- Establishing a **new observatory at Thule Air Base** located nearby Qaanaaq (THL), to ensure long term data record (in a few years the present Qaanaaq observatory will likely be magnetically disturbed due to nearby houses and ongoing construction). Foundation for absolute house (with absolute pillar) and computer house are established. The buildings are planned to be ready in summer 2020

*DTU Space*

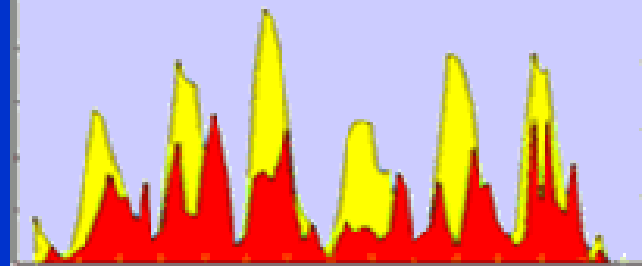


Qaanaaq  
Thule Air Base

QD lat, lon(deg.): 84.05 26.79  
QD lat, lon(deg.): 83.19 25.25



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# Report on the Kp index service IUGG Montreal, 2019

Jürgen Matzka, Oliver Bronkalla

GFZ German Research Centre for Geosciences, Potsdam, Germany  
Geomagnetic Observatory Niemegk

# Kp index

## Contributing organisations:

- GA, GNS – Australia/NZ
- USGS, NRCAN - Americas
- BGS, SGU, DTU, GFZ – Europe



Natural Resources  
Canada

Ressources naturelles  
Canada



## Properties:

- Available since 1932
- **3-hourly index**
- **0, 0+, 1-, 1o, ..., 9-, 9**
- **Licence CC BY 4.0, DOI coming soon**

# Kp index distribution

## News:

- FTO server, no changes here
- Website easier for newcomers, more explanation for users higher up on the page



Helmholtz Centre  
POTSDAM

Press | Job Offers | Contact

GFZ

[Home](#) [ABOUT US](#) [CENTRE](#) [RESEARCH](#) [SCIENTIFIC INFRASTRUCTURE](#)

[Home](#) / [Geophysics](#) / [Geomagnetism](#) / [Data, Products, Services](#) / [Geomagnetic Kp Index](#)

## Indices of Global Geomagnetic Activity

The geomagnetic three-hourly *Kp* index was introduced by J. Bartels in 1949 and is derived from the standardized *K* index (*Ks*) of 13 magnetic observatories. It is designed to measure solar particle radiation by its magnetic effects and today it is considered a proxy for the energy input from the solar wind to Earth.

The geomagnetic indices *ap*, *Ap*, *Cp* and *C9* and the classification of international Q-days (quiet days in the sense of days with low geomagnetic activity) and D-days (disturbed days in the sense of days with high geomagnetic activity) are derived from the *Kp* index.

GFZ provides both the definitive index values as well as nowcast versions of the indices. All index data and graphs on this website are subject to the Creative Commons Attribution 4.0 International (CC BY 4.0) license. Please refer to GFZ German Research Centre for Geosciences as data source.

This service contributes to the [International Service of Geomagnetic Indices \(ISGI\)](#) of the [IAGA](#).

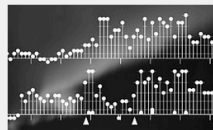
### Nowcast Kp Index



Nowcast *Kp* index, shown daily in a bar plot with an overview of the last six days:

- [Plot of Nowcast \*Kp\* index](#)

### Most Recent Definitive Indices of the Kp index



Planetary magnetic three-hour-range indices, shown in old style musical diagram:

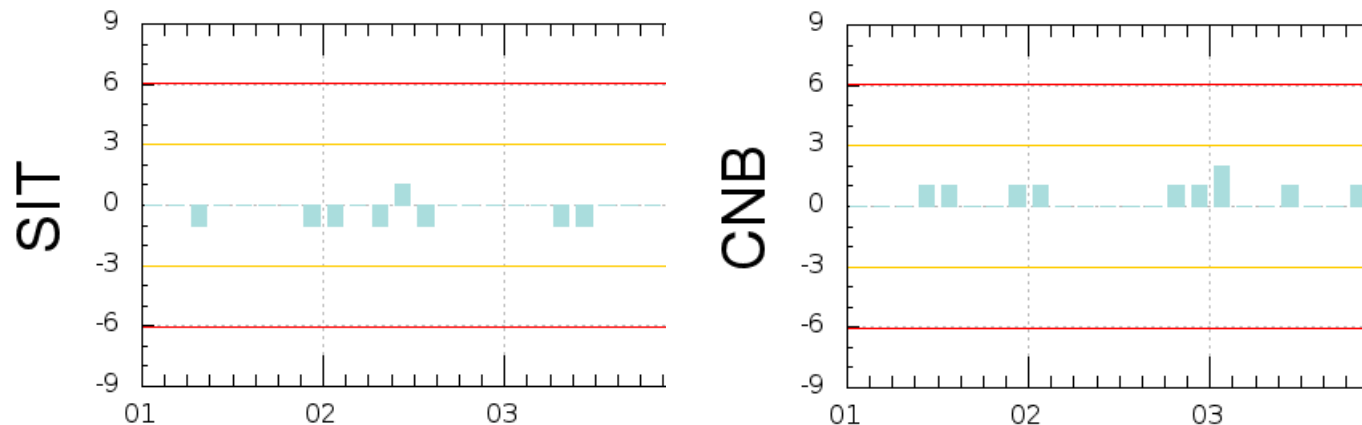
- [Plot of most recent definitive indices](#)

<https://www.gfz-potsdam.de/en/kp-index/>

# Definitive Kp index

**Based on K values reported by contributing organizations.  
News:**

- *sfes* of September 6 and 10, 2017: K and non-flare K'
- Delays early 2019 due to US government shut down
- We looked at K-derivation methods used by individual organisations, example from January 2018:



FMI-algorithm minus definitive K is typically negative for SIT and positive for CNB. We are in contact with the contributing organizations to gain more knowledge on their algorithms.



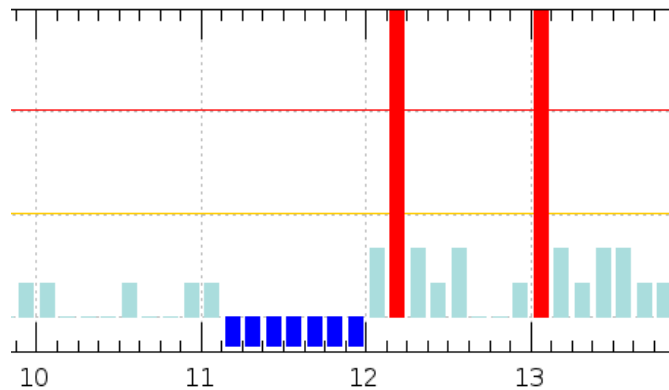
# Nowcast Kp index

## Based on NRT observatory data

### News:

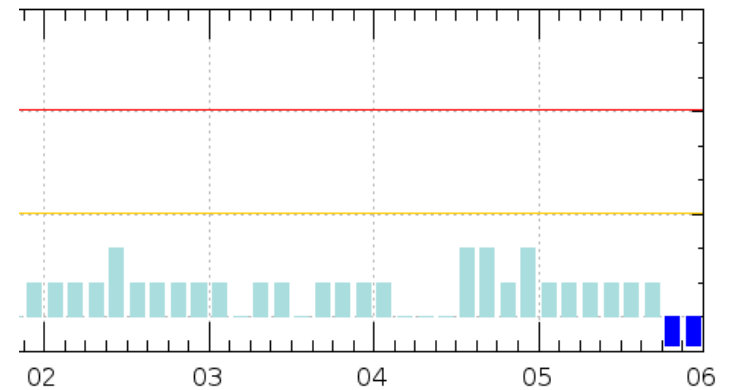
- After the INTERMAGNET FTP-server was changed in late 2018, data ingestion streamlined with the contributors:
- added redundancy: INTERMAGNET plus dedicated streams
- improved timeliness
- automatic and visual checks of K, example:

June 2019



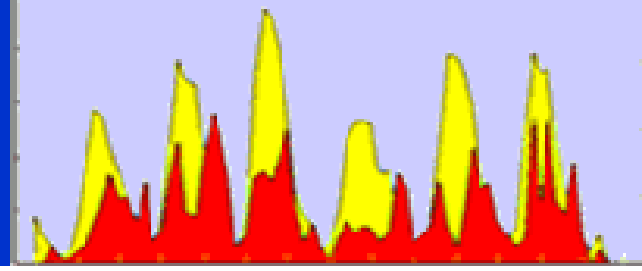
gaps, automatically removed K=9

July 2019



timeliness of NRT

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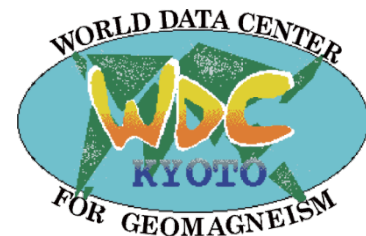
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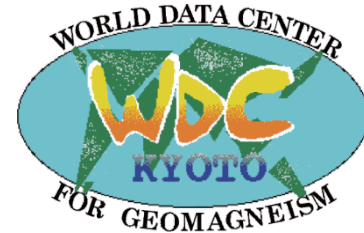


# Status report on Dst and AE indices

Toh, H and S. Taguchi

*World Data Center for Geomagnetism, Kyoto*

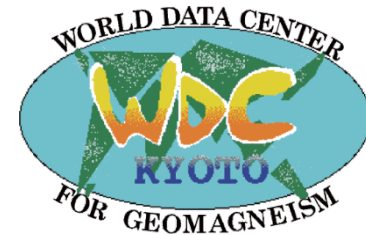
# Current status of Dst index derivation (as of July 2019)



	Final	Provisional	Real-time
~2003	Done	←	
2004-2013	Done	←	←
2014		Done	←
2015 (+2017)		Done	←
2016-18			Done
2019/Jan-Jul			Done

- The Dst index is derived by cooperation with the following 4 stations.  
Kakioka [JMA, Japan], Honolulu and San Juan [USGS, USA], Hermanus [SANSA, South Africa]
- Digital data and plots are available at the following webpage:  
<http://wdc.kugi.kyoto-u.ac.jp/dstdir/index.html>
- DOI has been introduced. (doi:10.17593/14515-74000)

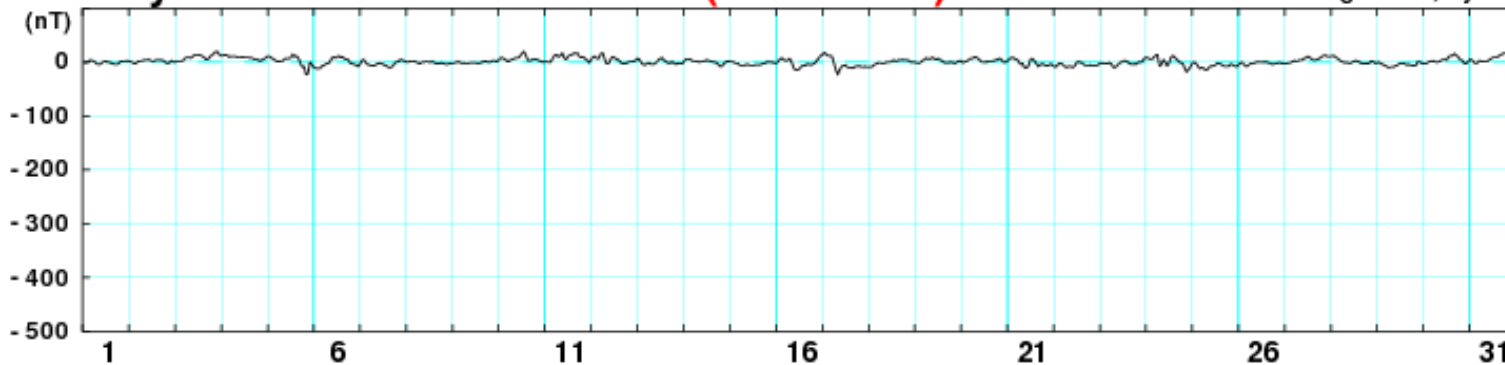
# Example of Real-time Dst index



July 2018

Dst (Real-Time)

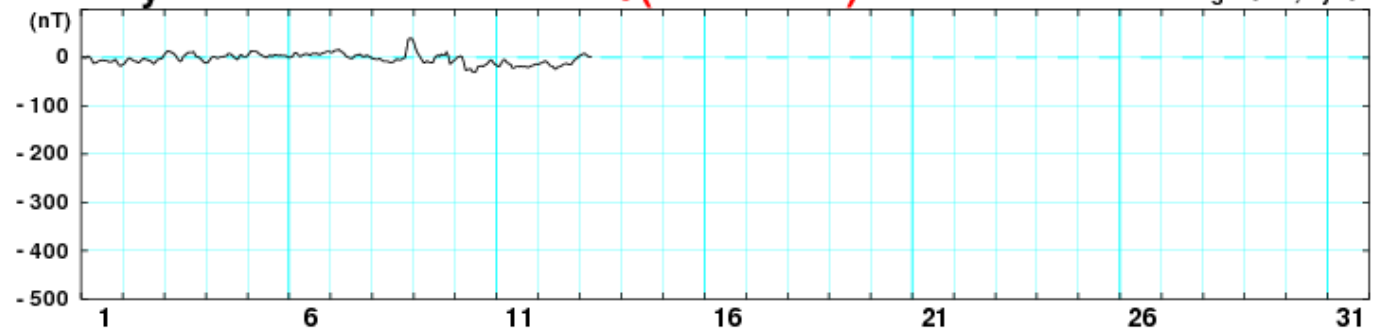
WDC for Geomagnetism, Kyoto



July 2019

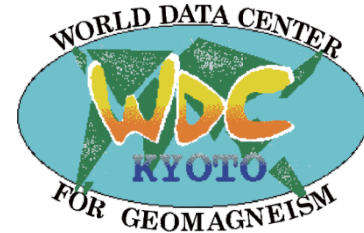
Dst (Real-Time)

WDC for Geomagnetism, Kyoto



[Created at 2019-07-13 06:30UT]

# Current status of AE index derivation (as of July 2019)



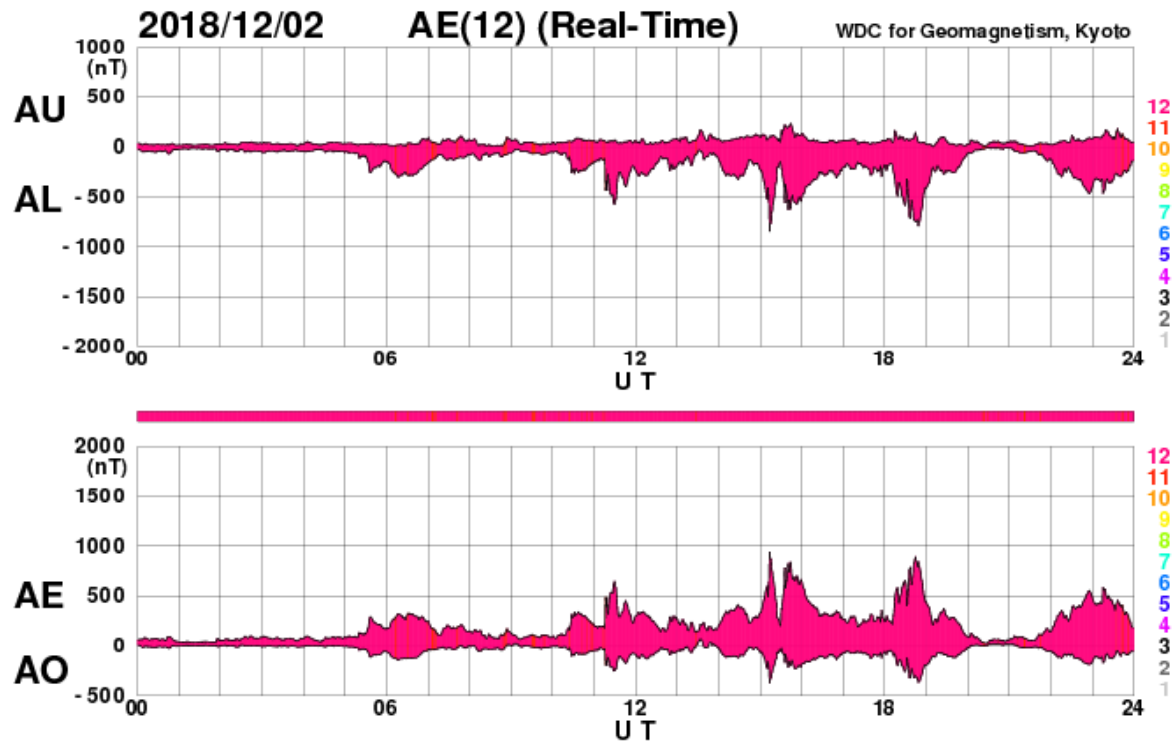
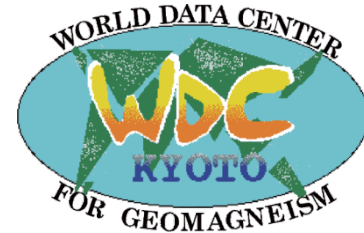
	Final	Provisional	Real-time
1978 – 1995	Done as final (or provisional)		
1996 – 2018 Feb 28		Done as provisional (substantially final)	
2018 Mar 01 – 2018 Oct 22			Done
2018 Oct 23 – present			Done (For most intervals, data from the complete 12 AE stations are used.)

<http://wdc.kugi.kyoto-u.ac.jp/aedir/index.html>

DOI has been introduced: doi:10.17593/15031-54800)

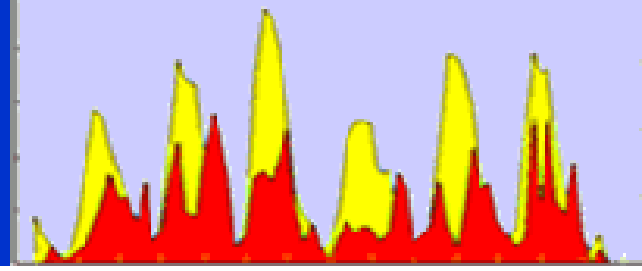
Thanks to the effort for  
Pebek by the researchers  
at AARI, Russia

# Example of Real-time AE index (from complete 12 AE stations)



[Created at 2019-03-31 15:14UT]

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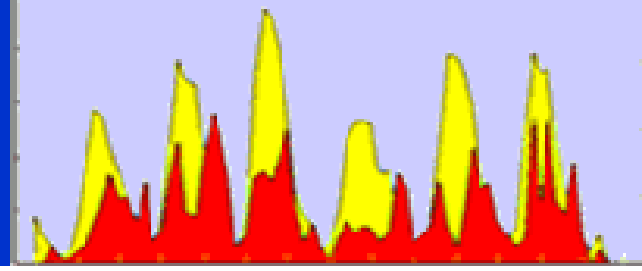
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# Service of Rapid Magnetic Variations.

## Lists of remarkable events: SC and Sfe

- Juan José Curto took the Service in 2018 after his predecessor, Fr. Alberca, died.
- Licence Creative Commons CC BY-NC 4.0
- To mint a DOI, a work in progress.
- 13 scientific papers in the last years to gain knowledge of the SC and SFE phenomena.
- A big effort in automatizing the process of detection. SC well developed, Sfe in progress.
- Use of new platforms (EPOS) to facilitate the access of the products to the users.
- Digitalization of old IAGA bulletins, so lists of Sfe (1970-1985) now available in digital form.
- Solar minimum: few events in the lists.
- Development of an ionospheric index from GSNN data being sensitive to solar flare as a proxy of Sfe (in this congress).



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British  
Geological Survey  
Expert | Impartial | Innovative

# Gateway to the Earth

## Recent Developments in INTERMAGNET *An Update*



[www.intermagnet.org](http://www.intermagnet.org)

Simon Flower<sup>1</sup>, Alan W P Thomson<sup>2</sup>

<sup>1</sup>Chair, Operations Committee of INTERMAGNET

<sup>2</sup>Chair, Executive Council of INTERMAGNET



IUGG July 2019 Montreal: IAGA Division 5 Working Group Business Meetings

# Aims and Activities

## The INTERMAGNET mission is to

“Establish and maintain an organization with a worldwide membership drawn from institutes operating geomagnetic observatories that is dedicated to building a network of geomagnetic observatories supplying consistent data, with the geographical coverage, quality, and timeliness of delivery required to meet the evolving needs of research and applied science”

## What we do

- Set standards for measurement, processing, formats and transmission
- Provide advice on establishing new observatories
- Support data services, as a member of the World Data System
- Communicate with data users to promote use of INTERMAGNET data
- Work closely with organizations concerned with magnetic observatory operations
- Maintain a dialog with technology providers

- Started in 1991
- Run by an Operations Committee and an Executive Council
- Produces an annual 1-minute definitive data set



# Access

Project	: GeomagMetadataCorporate.DM1
File Name	: GeomagMetadataCorporate.DM1
SubModel	: GMM
Author	: Anne Richardson
Company	: British Geological Survey
Version	: 2.7 Modified: 18/06/2019
Copyright (c)	2019 British Geological Survey

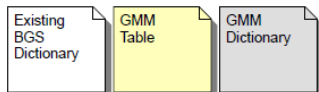


Table	Columns
...	...

Table	Columns
...	...

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TRANSLATION	VARCHAR2(80)	NOT NULL
EPSG_CODE	VARCHAR2(20)	NULL
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USER_ENTERED	VARCHAR2(10)	NOT NULL
DATE_UPDATED	DATE	NULL
USER_UPDATED	VARCHAR2(10)	NULL

DIC\_GMM\_RELATIONSHIP

<b>CODE (PK)</b>	VARCHAR2(5)	NOT NULL
DESCRIPTION	VARCHAR2(250)	NOT NULL
TRANSLATION	VARCHAR2(50)	NOT NULL
STATUS	VARCHAR2(1)	NOT NULL
USER_ENTERED	VARCHAR2(10)	NOT NULL
DATE_ENTERED	DATE	NOT NULL
USER_UPDATED	VARCHAR2(10)	NULL
DATE_UPDATED	DATE	NULL

DIC\_GMM\_PERSON\_ROLE

<b>CODE (PK)</b>	VARCHAR2(5)	NOT NULL
DESCRIPTION	VARCHAR2(250)	NOT NULL
TRANSLATION	VARCHAR2(50)	NOT NULL
STATUS	VARCHAR2(1)	NOT NULL
USER_ENTERED	VARCHAR2(10)	NOT NULL
DATE_ENTERED	DATE	NOT NULL
USER_UPDATED	VARCHAR2(10)	NULL
DATE_UPDATED	DATE	NULL

DIC\_GMM\_REGION

<b>CODE (PK)</b>	NUMBER(38,0)	NOT NULL
REGION_CODE	VARCHAR2(5)	NOT NULL
LANGUAGE_CODE (FK)	VARCHAR2(2)	NOT NULL
DESCRIPTION	VARCHAR2(250)	NOT NULL

GMM\_CONSTANT\_PROPERTIES

<b>CONSTANT_PROPERTIES_ID (PK)</b>	NUMBER(38,0)	NOT NULL
GROUP_NAME	VARCHAR2(50)	NULL
CONST_NAME	VARCHAR2(50)	NULL
CONST_VALUE	VARCHAR2(250)	NULL
ADDITIONAL_INFO	VARCHAR2(250)	NULL
USER_ENTERED	VARCHAR2(10)	NOT NULL
DATE_ENTERED	DATE	NOT NULL
USER_UPDATED	VARCHAR2(10)	NULL
DATE_UPDATED	DATE	NULL

GMM\_INTERMAGNET\_OBSERV

<b>OBSERVATORY_IAGA_CODE (PK)(FK)</b>	VARCHAR2(4)	NOT NULL
<b>INTERMAGNET_GIN_CODE (FK)</b>	VARCHAR2(20)	NULL
PUBLICATION_DELAY	NUMBER(10,2)	NULL
PLOT_DELAY	NUMBER(10,2)	NULL
USER_ENTERED	VARCHAR2(10)	NOT NULL
DATE_ENTERED	DATE	NOT NULL
USER_UPDATED	VARCHAR2(10)	NULL
DATE_UPDATED	DATE	NULL
GIN_COMMS	VARCHAR2(100)	NULL

GMM\_INST\_PERSON\_CONN

<b>INST_PERSON_CONN_ID (PK)</b>	NUMBER(38,0)	NOT NULL
<b>INSTITUTE_ID (FK)</b>	NUMBER(38,0)	NULL
<b>PERSON_ID (FK)</b>	NUMBER(38,0)	NOT NULL
VALID_FROM	DATE	NOT NULL
VALID_TO	DATE	NULL
<b>ROLE_CODE (FK)</b>	VARCHAR2(5)	NULL
USER_ENTERED	VARCHAR2(10)	NOT NULL
DATE_ENTERED	DATE	NOT NULL
USER_UPDATED	VARCHAR2(10)	NULL
DATE_UPDATED	DATE	NULL

<b>GMM</b>
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DIC\_CRS\_HORIZ\_CS

<b>CODE (PK)</b>	VARCHAR2(20)	NOT NULL
DESCRIPTION	VARCHAR2(200)	NOT NULL
TRANSLATION	VARCHAR2(80)	NOT NULL

# 1-Second Data

Table 1 – INTERMAGNET One-second Definitive Data Specifications	
General Specifications	
Time-stamp accuracy	0.01 s
Phase response	$\pm 0.01$ s
Maximum filter width	25 seconds
Instrument Amplitude Range	$\geq \pm 4000$ nT High Latitude, $\geq \pm 3000$ nT Mid/Equatorial Latitude
Data resolution	1 pT
Pass band	DC to 0.2 Hz
Maximum component orthogonality error	2 mrad
Maximum Z-component verticality error	2 mrad
Pass Band Specifications [DC to 8 mHz (120 s)]	
Noise level	$\leq 100$ pT RMS
Maximum offset error	$\pm 2.5$ nT
Maximum component scaling & linearity error	0.25%
Pass Band Specifications [8 mHz (120 s) to 0.2 Hz]	
Noise level	$\leq 10$ pT/ $\sqrt{\text{Hz}}$ at 0.1 Hz
Maximum gain/attenuation	3 dB
Stop Band Specifications [ $\geq 0.5$ Hz]	
Minimum attenuation in the stop band ( $\geq 0.5$ Hz)	50 dB
Auxiliary measurements:	
Compulsory full-scale scalar magnetometer measurements with a data resolution of 0.01 nT at a minimum sample period of 30 seconds.	
Compulsory vector magnetometer temperature measurements with a resolution of 0.1 °C at a minimum sample period of one minute.	

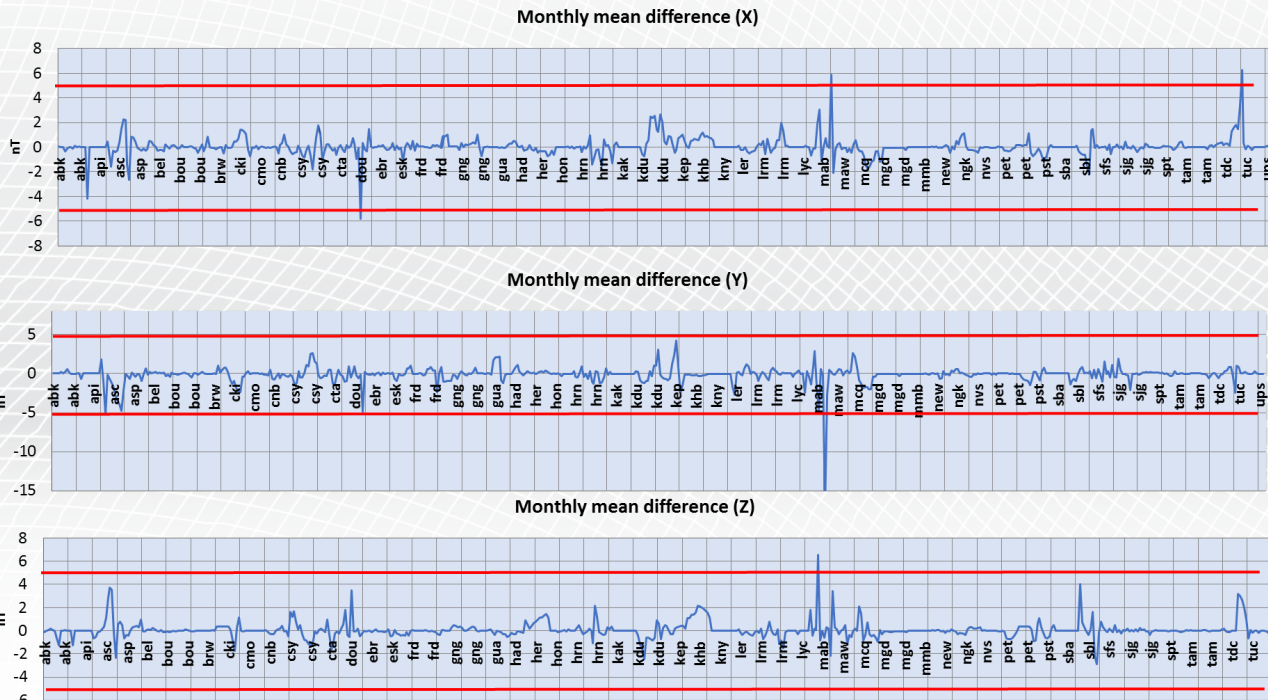


In response to new developments in instrumentation and the requirements of the research community, **INTERMAGNET has set a new quality standard for 1-second data and has called for observatories to supply absolute one-second data.**

The INTERMAGNET definitive one-second standard demands not only a faster sampling rate, but also sets higher demands on noise, absolute level and frequency response of the published data sets.

1-second data are currently available from 36 INTERMAGNET observatories from 2014 onwards.

# Quasi-Definitive Data



**Quasi-Definitive Data (QDD)** are data that have been corrected using provisional baselines.

Produced soon after acquisition, 98% of the differences between QDD and definitive data (X, Y, Z) monthly mean values should be less than  $5nT$ .

QDD are intended to support field modelling activities during the modern satellite survey era, providing extra constraints on, for example, secular variation modelling.

## Data quality example from 2015: 53 INTERMAGNET observatories

- Only 1% of data falls outside the  $5nT$  acceptance limit (from 4 observatories)
- 23% of daily QDD failed to be delivered within 90 days of measurement



# Data Licensing

**The Creative Commons 4.0 CC-BY-NC is the default license for data available from INTERMAGNET. This allows products to be developed from the data but protects against unauthorised commercial use.**

The existing data licence available for many years on the INTERMAGNET web site is similar in substance to the CC-BY-NC licence but changing to a Creative Commons licence will mean:

- The licence is widely understood
- It is machine readable
- It is available in multiple languages



Some INTERMAGNET institutes may have less restrictive licenses attached to their data.

*Previous  
INTERMAGNET Data  
License*

“The data made available through INTERMAGNET are provided for your use and are not for commercial use or sale or distribution to third parties without the written permission of the institute operating the observatory.”



# Digital Object Identifiers

**INTERMAGNET has published its first DOI, for the 2013 definitive data DVD.** The landing page (right) for the DOI is hosted by GFZ. Data for 2013 are also available from this site.

**INTERMAGNET will replace publishing data on physical objects (CD, DVD or USB) with publication of DOIs for 2016 data and onwards.**

INTERMAGNET will also mark the last production of definitive data on a physical medium, by producing a 'celebration' USB for the 2015 data, which will include all definitive data produced since 1991. **For 2016 data onwards, we will introduce the concept of an INTERMAGNET Reference Data Set (IRDS).**

*The DOI system should:*

- allow citation of data
- allow acknowledgment for data providers
- allow discovery and on-line access to data
- allow re-use and reproducibility of data
- include metadata to uniquely identify data



Global magnetic observatory data 2013

Released

Copy citation to clipboard

Cite as:  
Addis Ababa University, Institute of Geophysics, Space Science and Astronomy (Ethiopia); Altay-Sayan Branch of Geophysical Survey of Siberian Branch of Russian Academy of Sciences (Russia); Bureau Central de Magnétisme Terrestre, BCMT (France); Beijing Ming Tombs Geomagnetic Observatory Center, Institute of Geology and Geophysics, Chinese Academy of Sciences (China); et al. (2017): Global magnetic observatory data 2013. INTERMAGNET.  
<http://doi.org/10.5880/INTERMAGNET.2013>

Files

Download data

License: The data made available through INTERMAGNET are provided for your use and are not for commercial use or sale or distribution to third parties without the written permission of the institute operating the observatory. Publications making use of the data should include an acknowledgment statement of the form given on the INTERMAGNET website. A citation reference should be sent to the INTERMAGNET Secretary (secretary@intermagnet.org) for inclusion in a publications list on the INTERMAGNET website.

Related DOIs to be quoted, if applicable

Includes

Bureau Central de Magnétisme Terrestre (BCMT). (1921). French Global Network of Geomagnetic Observatories (Version 1) [Data set]. Bureau Central de Magnétisme Terrestre (BCMT).  
<https://doi.org/10.18715/bcmt-mag.def>

References

INTERMAGNET website  
INTERMAGNET Technical Manual

Find More Research Data  
<http://bib.telegrafenberg.de/finden/datenbanken/forschungsdaten/>

Abstract

Definitive digital one-minute values of the Earth's magnetic field recorded during 2013 at INTERMAGNET observatories around the world. This is the 23rd annual publication in the series. Some national data institutions may have related DOIs that describe subsets of the data. These DOIs are shown under "Related DOIs to be quoted".

For more information on the technical standards please refer to the INTERMAGNET Technical Manual and the Technical note TN6 "INTERMAGNET Definitive One-second Data Standard".

Methods

Geomagnetic data is recorded and quality controlled at the institutions responsible for each observatory. Before becoming a member of INTERMAGNET, institutions must make a detailed submission for each observatory that is to join. This submission is verified by a committee in INTERMAGNET before the observatory is admitted. Only data from INTERMAGNET members is published by INTERMAGNET. Each annual definitive data set is checked for quality by a team of data checkers in INTERMAGNET before the data is admitted to the series for that year.

Contact

Chair of INTERMAGNET Definitive Data Subcommittee; ➔

Keywords

definitive data  
GCMD Science Keywords  
EARTH SCIENCE > SOLID EARTH > GEOMAGNETISM  
EARTH SCIENCE SERVICES > ENVIRONMENTAL ADVISORIES > GEOLOGICAL ADVISORIES > GEOMAGNETISM  
In Situ Land-based Platforms > GEOPHYSICAL STATIONS/NETWORKS > GEOMAGNETIC STATIONS

More Metadata

iso19115: view inline / download xml  
datacite: view inline / download xml  
diff: view inline / download xml  
esidoc: view inline / download xml  
geosjon view inline

Location

Click/hover over markers or bounding boxes to see related details. Click/hover over details to see related marker or bounding box.

<http://doi.org/10.5880/INTERMAGNET.2013>

# Technical Manual



INTERMAGNET's technical manual describes standards for data measurement, processing, formatting and data submission to INTERMAGNET. The manual also describes how to join INTERMAGNET.

**Version 5 of the technical manual is nearing completion and will soon be released to existing and prospective INTERMAGNET members.**

# Software

**INTERMAGNET develops software for community use.**

A collection of source code can be found on the **INTERMAGNET GitHub**. This includes routines and toolboxes in Python, Mathematica, Matlab, IDL and Java for reading and writing the INTERMAGNET CDF format *ImagCDF*. This repository is open for other source code that would be useful to the community and **we encourage software contributions from the scientific community.**

## Examples

**Imcdview** (left) is an application for manipulating 1-minute definitive data and works with IAGA-2002 format.

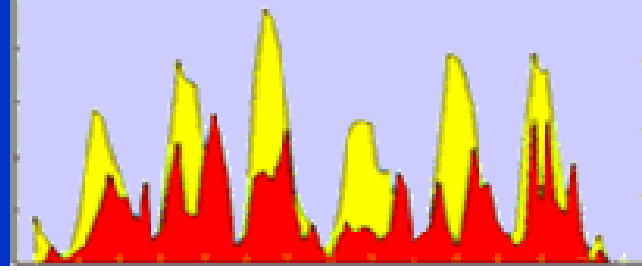
**Gm\_convert** allows conversion between many magnetic data formats, such as IAGA-2002, WDC format and several INTERMAGNET formats.

**MagPy** is a Python package for analysing data.



<http://intermagnet.org/publication-software/software-eng.php>



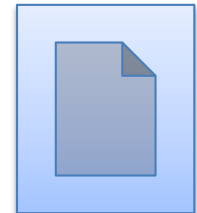


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1. Status of the IAGA indices
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  - aa, CK days, am (A. Chambodut)
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  - INTERMAGNET updates (S. Flower, A. Thomson)
  - Data DOI Task Force (M. Nosé)
  - World Data Center activities - Edinburgh, Moscow (E. Clarke)
3. Election of new officers
4. Resolution
  - SC and SFE lists of remarkable events: support to Ebro observatory
5. Sessions for IAGA-IASPEI 2021
6. Any other businesses

# Data DOI Task Force

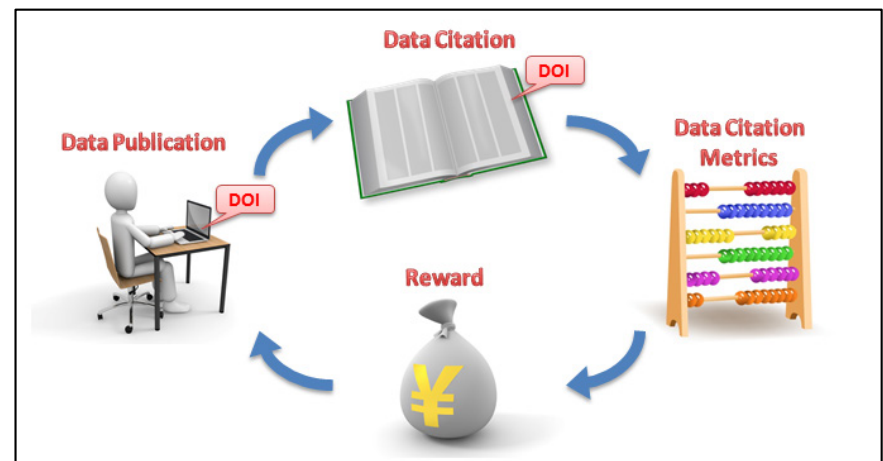
- This Task Force discusses **issues related to the DOI-minting to the geomagnetic data products** and shares the results of discussion with the WG V-DAT members.
- TF members
  - Masahito Nosé, Susan Macmillan, Erin Rigler, Manoj Nair, Brian Meyer, Aude Chambodut, Ellen Clarke, Kusumita Arora, Bhaskara Veenadhari, Renata Lukianova, Simon Flower, Jürgen Matzka, Gerhard Schwarz, Alena Rybkina, Vincent Lesur, Kirsten Elger, Heather McCreadie, Anatoly Soloviev (18 members)
- The TF made a survey about present status of DOI-minting to geomagnetic data or indices. Survey results are compiled in a report.
- The report for 2019 is available from the V-DAT web page.  
(<https://www.ngdc.noaa.gov/IAGA/vdat/TaskForce/doi.html>)

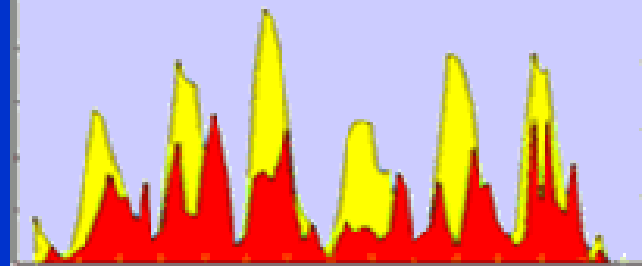


# TF Report on “Present Status of Data Publication and Data Citation of Geomagnetic Data/Indices”

	Data Publication (Number of DOI-minting)	Data Citation (Number of DOI-citing)
Denmark (DTU)	1 [PCN]	0
France (BCMT)	2	0
Germany (GFZ)	6	6
INTERMAGNET	1	0
Japan (WDCs)	18 [Dst, AE]	3
Russia (RAS)	72	10
USA (NECI)	9	0

- Data citation has just started.
- That's one small step for each data center, one giant leap for the Division V community.





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### 2. Reports

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### 3. Election of new officers

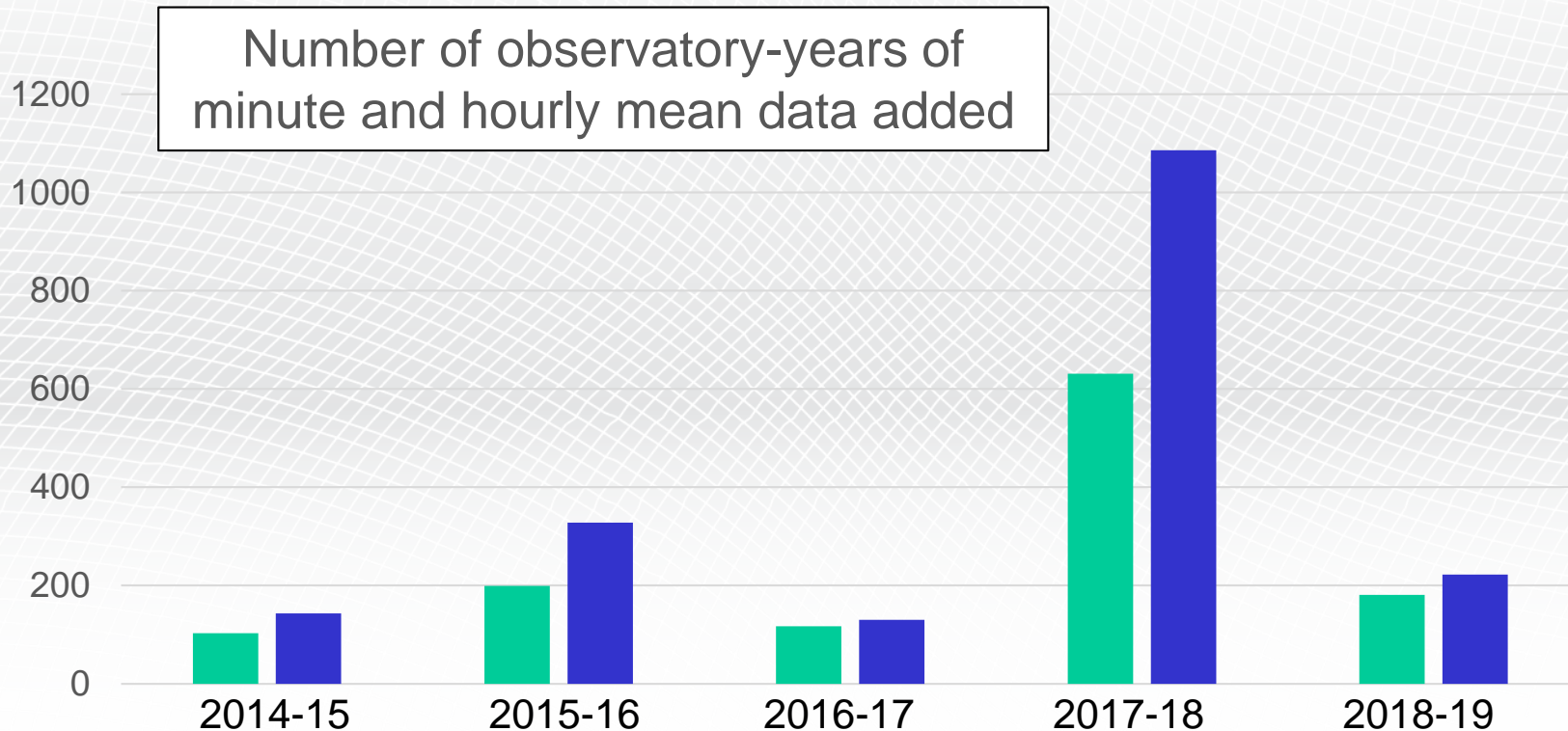
### 4. Resolution

- SC and SFE lists of remarkable events: support to Ebro observatory

### 5. Sessions for IAGA-IASPEI 2021

### 6. Any other businesses

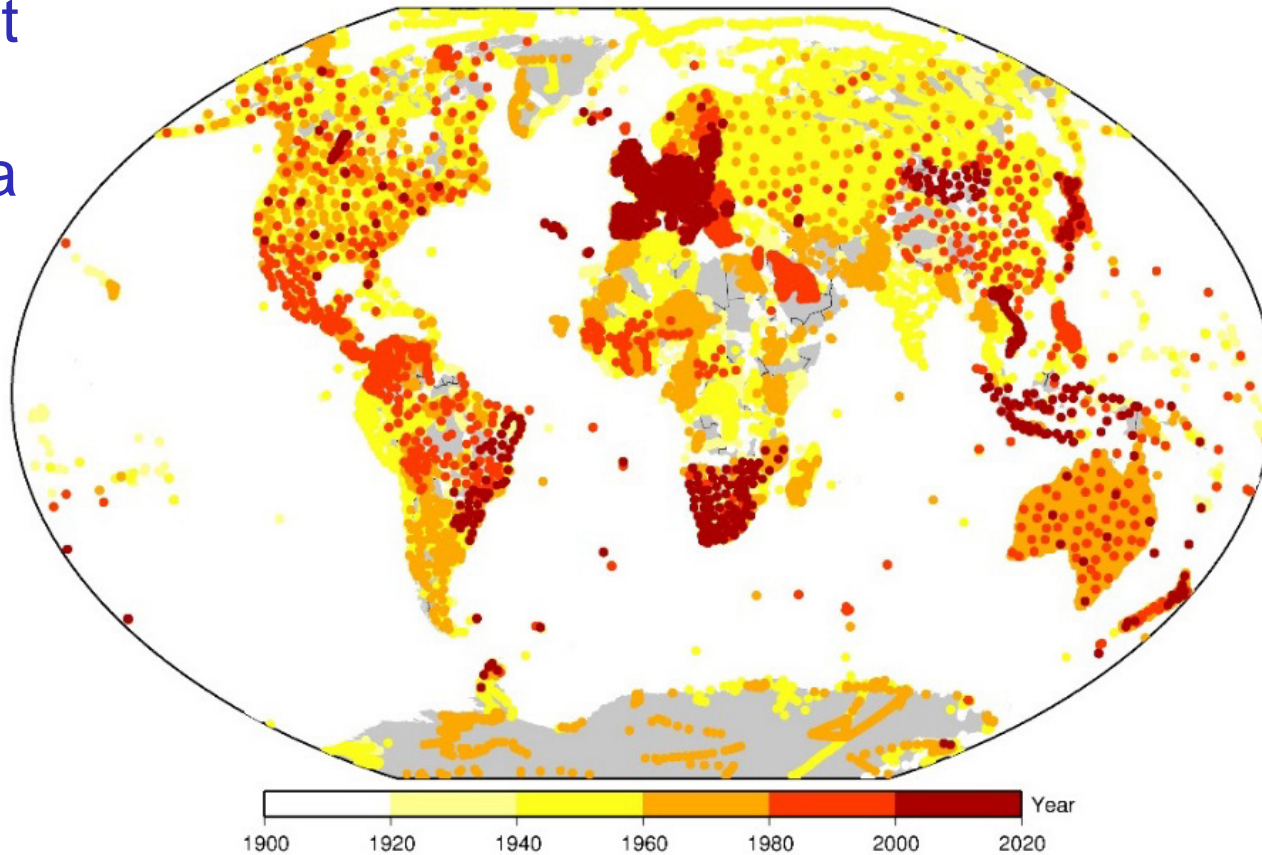
# World Data Centre- BGS Edinburgh



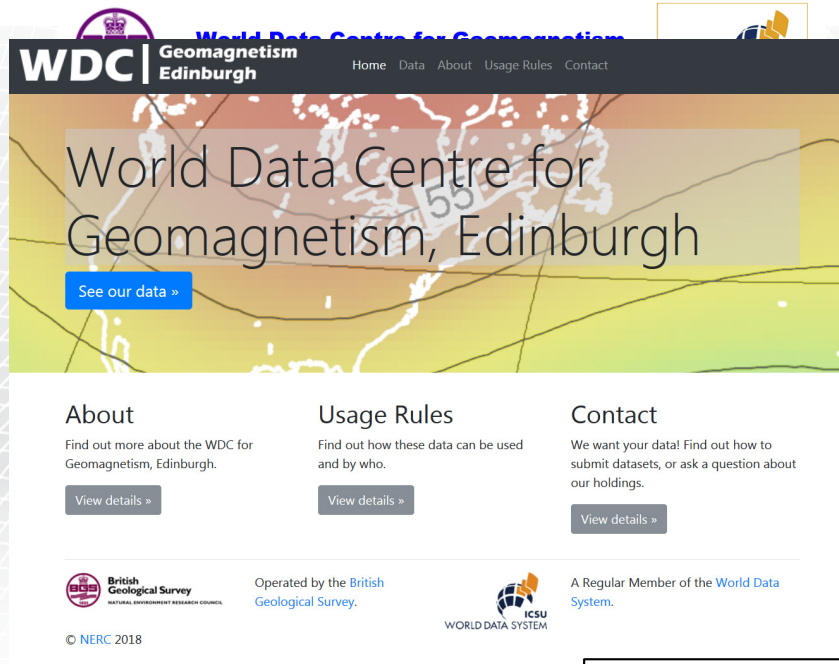


# World Data Centre- BGS Edinburgh

Most recent  
repeat  
station data  
added

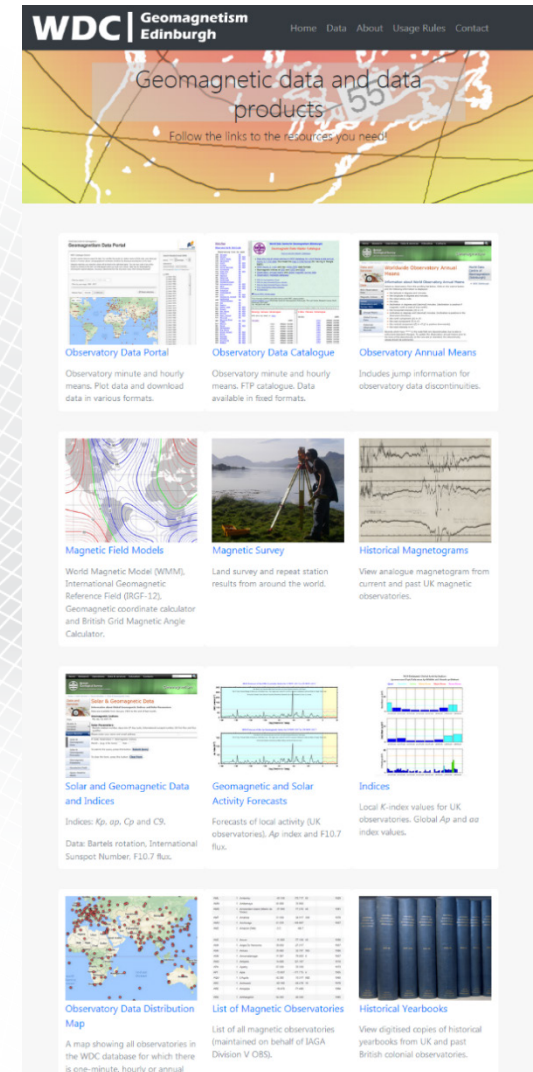


# New WDC website



- [Other Data Holdings](#)
  - [Observatory annual mean values](#)
  - [Global magnetic survey data](#)
  - [Charts and computation of model values](#)
  - [Solar and geomagnetic data and indices](#)
  - [Geomagnetic and solar activity forecasts](#)
  - [Historic UK magnetograms](#)
  - [Historic Yearbooks \(mainly UK\)](#)
- [Map showing all observatories in WDC Edinburgh database for which there is one-minute, hourly or annual data](#)
- [List of all magnetic observatories \(maintained on behalf of IAGA Division V OBS\)](#)

**wdc.bgs.ac.uk**





# WDC for STP in Moscow activities

**Database for geomagnetic data** and **special software** are being created to upgrade the storage technology of large data arrays and modify the means of access to them. Simple, user-friendly interface for the work with online database will be provided to users.

Online database will contain hourly mean and one-minute values of geomagnetic field components, and values of  $K$  index according to the observatories of Russia and CIS countries.

The user can get data in one of three output formats, such as WDC, CSV or IAGA2002, and save sampling.

Geophysical Center of the Russian Academy of Sciences - GC RAS  
World Data Center  
for Solar-Terrestrial Physics  
Moscow, Russia

ICSU  
WORLD DATA SYSTEM

World data system WDC in Russia and Ukraine Ресурсы

**Type of data**  
☒ Hourly average ☐ Minute ☐ K index

**Observatory**  
The name of the Observatory:  
IRT, Irkutsk (Patrony)

**Time interval**  
from 1980-01-01 to 1980-01-31

**The format of the output data**  
☒ WDC ☐ CSV ☐ IAGA2002

Email: nata@wdcb.ru

[Help](#)

Map showing the location of the Irkutsk (Patrony) observatory in Russia. The map includes a zoom control (+/-) and a data popup box with the following information:  
IAGA code: IRT  
Name: Irkutsk (Patrony)  
Country: Russia  
Latitude, longitude, altitude(m): 52.167, 104.450, 465.0  
Minute values: 1998 - 2016  
Hour values: 1957 - 2016

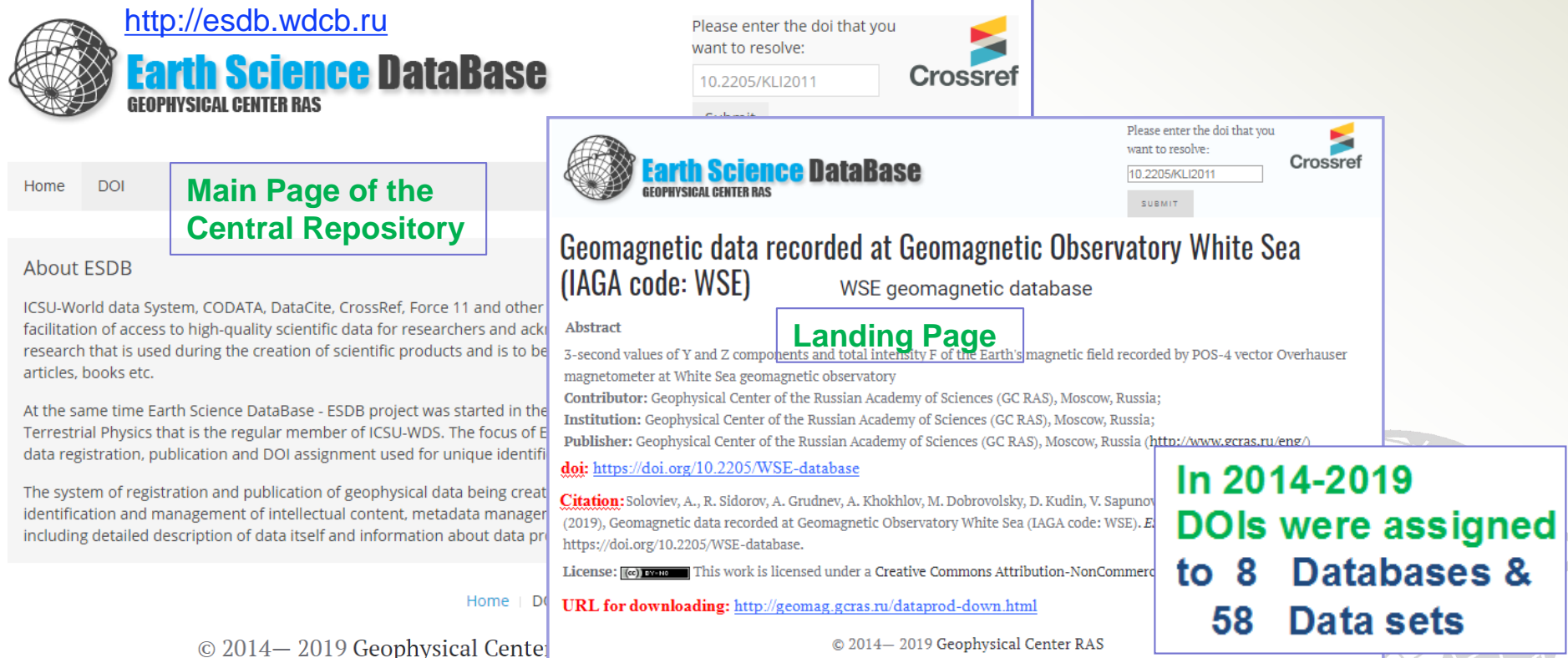
IRT8001D01	19	-2-215-208-202-200-202-220-236-243-243-242-244-236-228-224-206-146-178-160-146-174-113-152-214-233-203
IRT8001D02	19	-2-276-234-235-239-230-238-244-240-235-232-236-238-238-236-223-218-204-204-206-212-212-215-214-216-228
IRT8001D03	19	-2-211-198-194-225-236-232-239-243-238-232-232-230-216-238-228-221-216-209-210-224-187-186-212-228-220
IRT8001D04	19	-2-229-218-214-218-218-222-242-238-230-234-228-224-224-222-220-239-202-188-227-218-196-209-226-224-221
IRT8001D05	19	-2-215-206-190-202-215-232-245-244-230-222-222-222-231-211-200-211-206-199-210-217-232-227-232-240-219
IRT8001D06	19	-2-210-206-196-234-230-242-244-244-234-224-224-227-228-224-210-216-220-223-223-226-223-228-221-220-224
IRT8001D07	19	-2-216-208-202-206-223-243-255-254-244-226-224-228-226-218-222-221-221-224-223-225-231-222-220-234-226
IRT8001D08	19	-2-232-216-191-204-222-248-258-250-240-230-223-228-227-224-224-223-223-222-222-222-221-221-216-225
IRT8001D09	19	-2-206-195-180-180-190-212-234-242-237-227-226-231-227-223-222-223-228-232-235-235-236-231-224-219-221
IRT8001D10	19	-2-206-187-180-189-203-231-254-251-232-220-224-227-226-229-226-221-228-230-226-229-226-222-222-218-221
IRT8001D11	19	-2-206-182-168-164-177-193-230-240-232-227-235-234-226-218-221-206-208-205-210-223-215-216-222-221-212
IRT8001D12	19	-2-212-202-204-202-206-222-236-238-232-227-229-232-228-224-224-224-225-226-226-227-226-227-224-221-223
IRT8001D13	19	-2-208-190-184-193-198-212-233-238-242-232-226-219-237-250-226-201-148-182-198-168-184-206-226-252-211
IRT8001D14	19	-2-234-210-214-215-227-233-236-234-236-230-232-232-226-225-222-198-220-222-222-225-226-226-230-225

# WDC for STP in Moscow activities

## “Earth Science DataBase” Project

- Goals:**
- creation of a modern system for geophysical data registration and publication with Digital Object Identifier (DOI) minting through Crossref agency;
  - promotion of a culture of data citation.

DOIs are assigned to geomagnetic data of the WDC for STP and observatories of the Russian-Ukrainian INTERMAGNET segment



The image displays two screenshots of the Earth Science DataBase (ESDB) website. The top screenshot shows the main page with a navigation bar (Home, DOI), a search bar, and a Crossref logo. The bottom screenshot shows a landing page for geomagnetic data recorded at the White Sea (IAGA code: WSE), featuring an abstract, contributor information, and a download URL. A green box highlights the 'Main Page of the Central Repository' and another green box highlights the 'Landing Page'. A white box with green text states: 'In 2014-2019 DOIs were assigned to 8 Databases & 58 Data sets'.

<http://esdb.wdcb.ru>

**Earth Science DataBase**  
GEOPHYSICAL CENTER RAS

Home DOI

**Main Page of the Central Repository**

About ESDB

ICSU-World data System, CODATA, DataCite, CrossRef, Force 11 and other facilitation of access to high-quality scientific data for researchers and acknowledgment of research that is used during the creation of scientific products and is to be published in articles, books etc.

At the same time Earth Science DataBase - ESDB project was started in the Terrestrial Physics that is the regular member of ICSU-WDS. The focus of ESDB is data registration, publication and DOI assignment used for unique identification of data.

The system of registration and publication of geophysical data being created includes identification and management of intellectual content, metadata management including detailed description of data itself and information about data processing.

Home | DOI

© 2014— 2019 Geophysical Center RAS

Please enter the doi that you want to resolve:

10.2205/KLI2011

Crossref

**Earth Science DataBase**  
GEOPHYSICAL CENTER RAS

WSE geomagnetic database

**Geomagnetic data recorded at Geomagnetic Observatory White Sea (IAGA code: WSE)**

**Landing Page**

**Abstract**

3-second values of Y and Z components and total intensity F of the Earth's magnetic field recorded by POS-4 vector Overhauser magnetometer at White Sea geomagnetic observatory


**Contributor:** Geophysical Center of the Russian Academy of Sciences (GC RAS), Moscow, Russia;

**Institution:** Geophysical Center of the Russian Academy of Sciences (GC RAS), Moscow, Russia;

**Publisher:** Geophysical Center of the Russian Academy of Sciences (GC RAS), Moscow, Russia (<http://www.gcras.ru/eng/>)

**doi:** <https://doi.org/10.2205/WSE-database>

**Citation:** Soloviev, A., R. Sidorov, A. Grudnev, A. Khokhlov, M. Dobrovolsky, D. Kudin, V. Sapunov (2019), Geomagnetic data recorded at Geomagnetic Observatory White Sea (IAGA code: WSE). <https://doi.org/10.2205/WSE-database>.

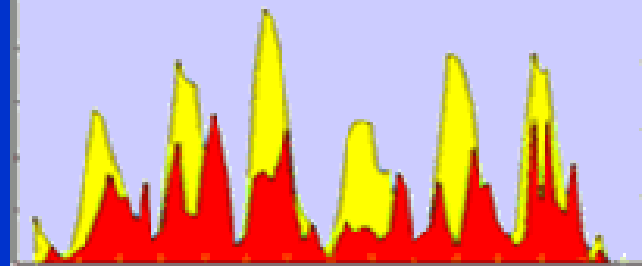
**License:**  This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

**URL for downloading:** <http://geomag.gcras.ru/dataprod-down.html>

© 2014— 2019 Geophysical Center RAS

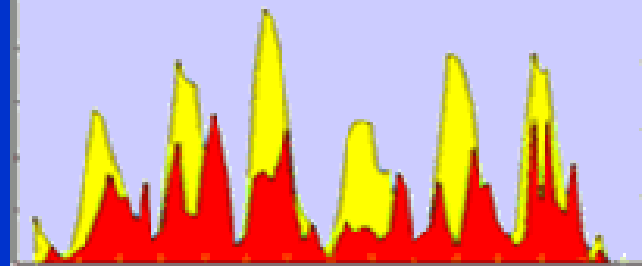
**In 2014-2019 DOIs were assigned to 8 Databases & 58 Data sets**

# Working Group V-DAT: Geomagnetic Data and Indices



## Agenda

1. Status of the IAGA indices
  - ISGI roadmap (A. Chambodut)
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  - SC and SFE lists of remarkable events: support to Ebro observatory
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6. Any other businesses



## Election of new officers

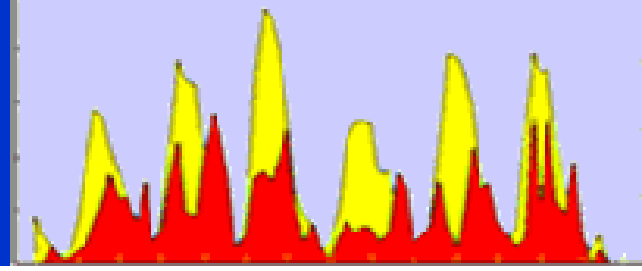
Chair:

- Ellen Clarke (British Geological Survey, United Kingdom)

Co-Chair:

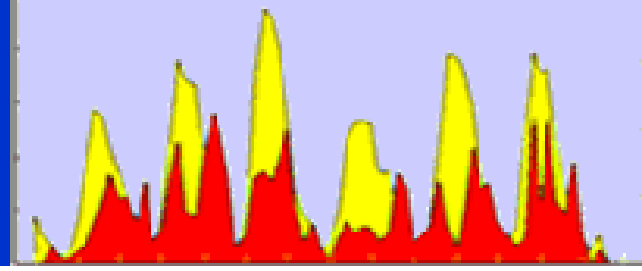
- Anna Willer (DTU, Denmark)
- Any other candidates?

# Working Group V-DAT: Geomagnetic Data and Indices



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## Resolution (proposed)

- Resolution: SC and SFE lists of remarkable events: support to Ebro observatory

IAGA,

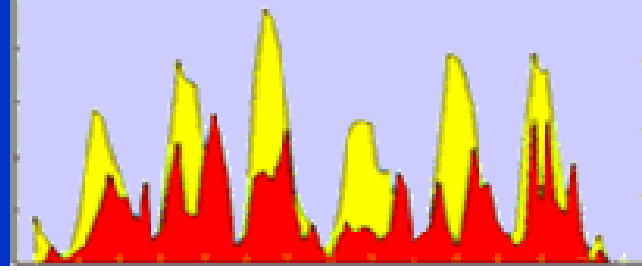
recognising the outstanding contribution of the Ebro Observatory in providing long time series of data on geomagnetism, ionospheric physics, and solar activity, and the ever-increasing need for continuing these long series of data for present and future studies such as those related to Global Change,

and noting that, in accordance with IAGA Resolutions no 6 at the XVI IUGG General Assembly (1975), and no 8 at the 8th IAGA Scientific Assembly (1997), Ebro, Observatory is responsible for the collection and preparation of SC and SFE Lists of magnetic remarkable events,

expresses deep appreciation for the work performed by the Observatory, and recommends that every possible effort be made to continue operation of Ebro Observatory and production of SC and SFE lists of remarkable events.

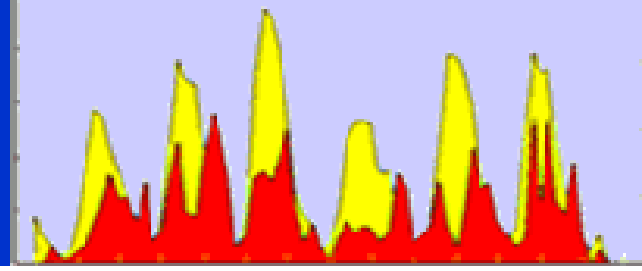


# Working Group V-DAT: Geomagnetic Data and Indices



## Agenda

1. Status of the IAGA indices
  - ISGI roadmap (A. Chambodut)
  - aa, CK days, am (A. Chambodut)
  - PCN, PCS (N. Olsen on behalf of A. Willer and O. Troshichev)
  - Kp, Q/D days (J. Matzka)
  - Dst, AE (H. Toh, S. Taguchi)
  - SC, SFE (J. J. Curto)
2. Reports
  - INTERMAGNET updates (S. Flower, A. Thomson)
  - Data DOI Task Force (M. Nosé)
  - World Data Center activities - Edinburgh, Moscow (E. Clarke)
3. Election of new officers
4. Resolution
  - SC and SFE lists of remarkable events: support to Ebro observatory
5. Sessions for IAGA-IASPEI 2021
6. Any other businesses



## Sessions for IAGA-IASPEI 2021

- Geomagnetic indices: derivation, history, evolution, application for space weather, real-time service, prediction and forecasting, ....
- Licensing, data publication, data citation (+trustworthy repository???) (+IASPEI)
- Geomagnetic observations for Earth and space science and for space weather and climatology applications?? (V-OBS, V-DAT, Div 4 and IDSW?)

### **IUGG 2019, Montreal, Canada:**

- Geoscience data licensing, production, publication, and citation
- Dependable, long-term geomagnetic indices and modern, index-based services: 70th anniversary of the Kp index
- Geomagnetic observations for Earth and space science and for space weather applications

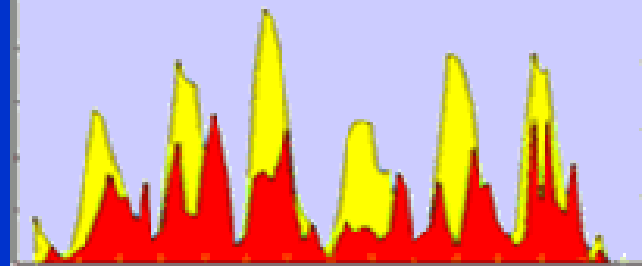
### **IUGG 2017, Cape Town, South Africa:**

- Magnetic data, indices and derived products for space weather and space climate research
- The referencing of geophysical data products: The role of DOIs

### **IUGG 2015, Prague, Czech Republic:**

- Geophysical and Geomagnetic Diagnosis of the Sun and Near-Earth Space
- Geomagnetic Observations under a Quiet Sun: the 50th Anniversary of the "International Year of the Quiet Sun"
- Use of Indices and Recovered Analogue Records in Geophysical Data Analysis

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