Distributed network of geomagnetic observations data storage in the system of World Data Centers (WDC)

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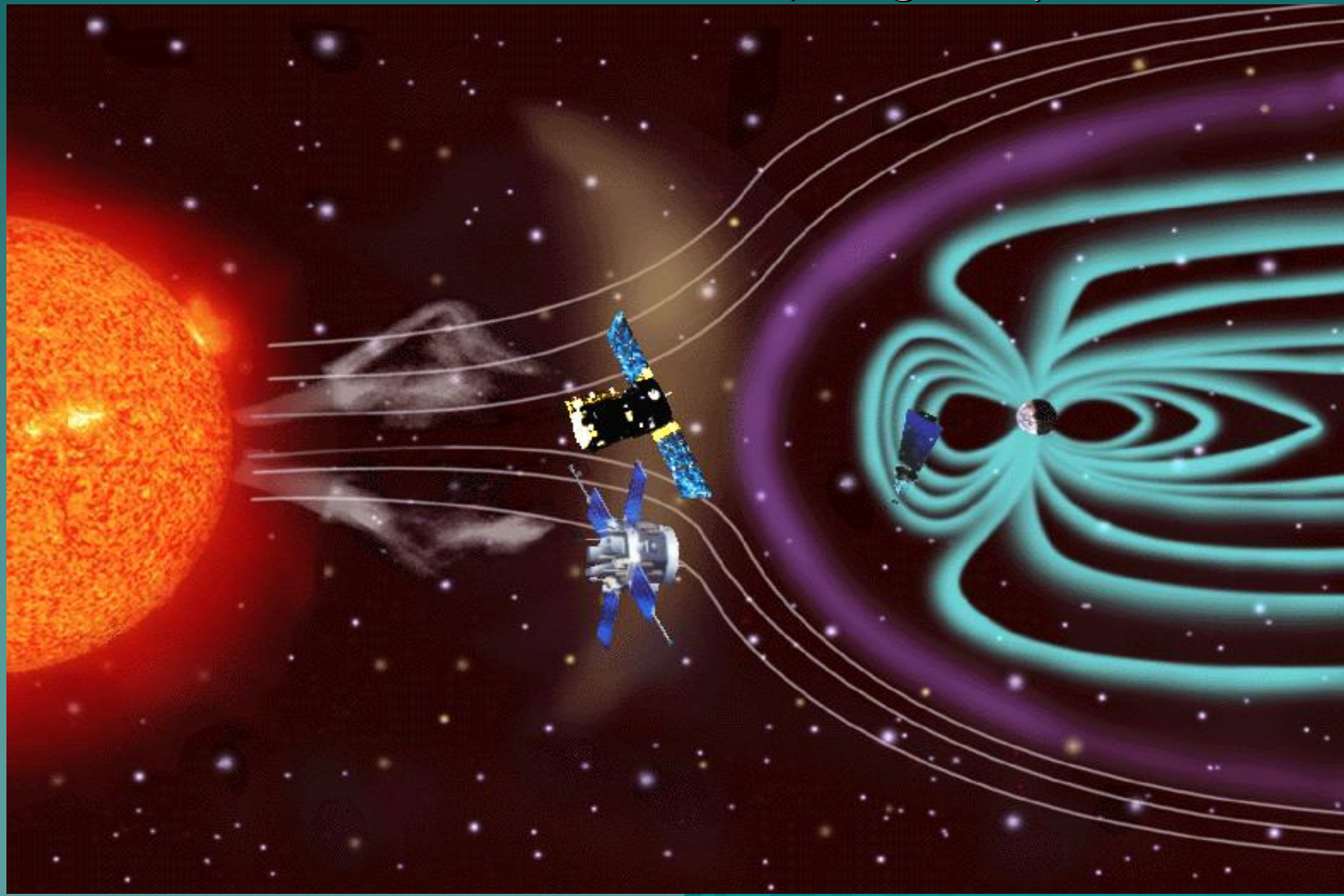

In the report, the analysis is given of changes in the kind, form and formats of data registration and presentation in the system of WDC beginning with the International Geophysical Year 1957 – 1958 (IGY 1957 – 1958) in the context of the progress of registration computer technologies and new possibilities of digital data collection and exchange.

The whole time period is subdivided into several stages with intervals that are rather conventional because technology does not show simultaneous progress in different countries.

Stage 1 - 1957-1970.

- Stage 1 - 1957-1970. This stage comprises analog magnetograms and hand processing of data to make tables of mean hourly values and to calculate various indexes of geomagnetic activity. Data are stored in the centers in the form of microfilms, analog magnetograms and tables of mean hourly values and indexes and in the form of the publications of tables and geomagnetic activity indexes.


Высокая Дубрава
1957 г.
М-ф Якутск
1-2-I-57 г
3h
6h
9h
12h
15h
18h
fix H
H
D
Z
17.0
16.8
16.6
16.4
16.3
16.2
16.0
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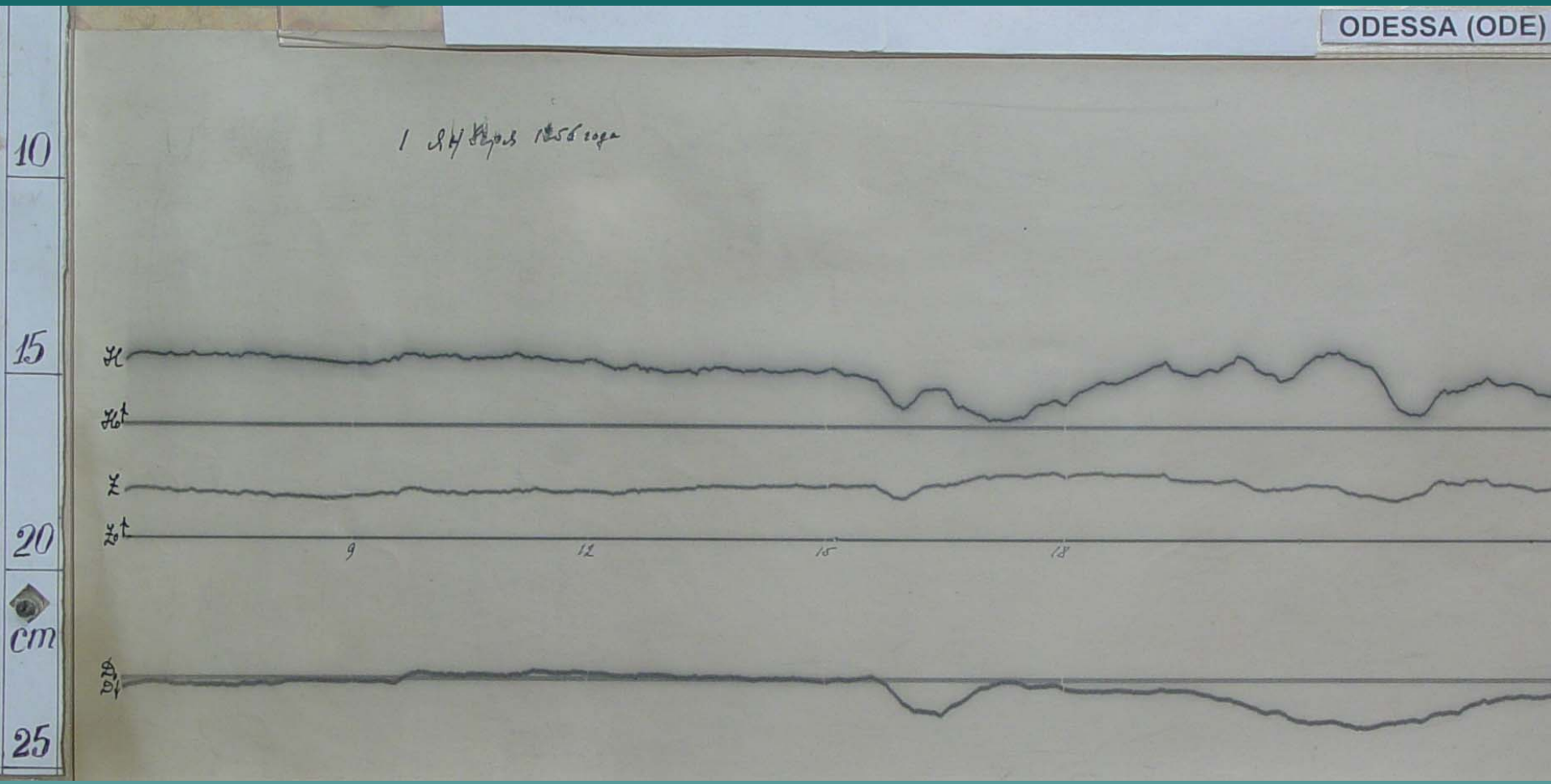
ODESSA (ODE)
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cm
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18

Ведомство Сибгидромет Широта Долгота

Обсерватория Иркутск

Месяц январь Год 1991

Время наблюдения / Дни	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	63	57	62	56	53	50	50	49	48	53	57	60	60	64	66	67	73	74
2	84	78	68	57	68	66	64	60	68	67	66	63	56	58	60	56	59	64
3	82	77	72	60	60	60	63	62	57	44	34	50	47	51	70	72	74	78
4	84	84	76	59	52	52	68	68	74	72	71	70	72	77	78	76	72	80
5	72	76	72	72	70	82	87	86	86	83	76	76	80	71	78	78	80	82
6 Q	83	78	70	66	66	70	76	78	82	82	81	80	80	83	83	83	83	84
7 Q	82	78	72	66	65	70	80	88	89	88	86	86	84	85	82	82	82	82
8	80	82	81	71	65	64	70	72	87	78	70	70	77	90	82	78	77	80
9	90	88	82	78	78	84	89	90	82	80	82	88	88	86	80	78	90	90
10	96	90	82	75	74	82	88	90	84	80	78	77	84	82	76	79	71	80
11	92	94	84	78	82	84	82	84	86	82	68	72	68	77	86	80	78	78
12 D	82	84	94	89	88	91	85	85	85	84	74	84	83	82	79	78	66	89
13	77	80	71	65	56	55	50	49	56	64	66	66	65	70	70	72	74	90
14 Q	80	80	72	66	61	59	62	70	76	80	82	86	86	86	85	82	82	90
15 D	91	87	86	74	62	62	70	72	71	82	83	84	73	76	81	84	84	86
16	76	78	74	66	65	70	74	77	73	74	75	72	82	83	76	80	79	83
17	76	77	66	60	59	65	74	77	80	76	66	57	66	68	67	77	94	72
18	80	76	61	53	50	54	66	74	79	78	77	78	78	77	72	78	81	90
19 Q	66	62	58	55	57	63	66	75	76	75	72	76	78	80	77	71	68	68
20	75	68	59	54	53	60	71	80	88	87	83	86	86	86	82	84	85	79
21	80	77	64	54	53	63	71	78	84	84	77	80	76	77	78	74	80	

63457 а 54.

ведомство АН УССР Широта 49°54′ Долгота 23°45′

бсерватория

есяц Январь Год 1979

Время мировое / дни	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	7.9	8.1	7.7	8.3	6.9	7.9	8.6	9.5	9.4	8.6	7.4	5.5	5.6	5.8	7.4	7.1	7.2	7.7
2	9.2	8.2	8.0	7.9	7.7	7.6	8.1	8.7	8.7	8.1	6.0	4.8	4.8	4.4	4.8	5.6	4.6	12.2
3	14.2	14.3	11.9	10.6	9.8	9.3	9.2	9.1	8.6	8.5	6.6	5.8	5.0	5.0	5.8	7.2	5.0	6.3
4	12.6	11.1	13.0	13.0	9.8	9.0	8.5	9.9	6.9	6.4	6.3	4.6	5.8	10.3	6.3	7.4	8.2	7.4
5	13.3	14.8	13.0	10.3	9.4	9.8	10.3	10.0	9.8	9.8	8.2	6.9	6.1	7.2	7.6	7.4	8.2	12.2
6	10.0	10.6	7.4	9.4	9.2	9.7	9.3	9.4	9.5	9.3	6.7	4.5	6.2	6.2	5.7	5.0	8.9	9.8
7	8.0	8.3	8.3	8.5	8.6	8.9	9.5	9.3	9.2	8.8	6.6	6.7	5.6	6.1	4.8	6.6	15.9	4.2
8	12.7	11.8	10.9	10.0	10.0	10.0	9.9	9.9	10.6	10.1	8.5	7.2	6.9	7.4	8.2	8.2	8.2	7.9
9	11.1	10.0	9.3	8.0	7.4	7.7	8.5	9.5	9.1	9.0	8.9	6.9	6.2	5.9	6.3	6.6	6.6	7.4
10	8.2	8.2	8.8	8.1	8.5	8.8	9.8	11.1	11.0	9.7	7.4	5.6	5.1	6.0	6.9	7.3	7.2	7.4
11	8.5	8.9	8.8	8.3	8.5	8.2	9.1	9.9	9.3	7.9	7.2	5.1	6.2	6.3	6.2	6.3	6.3	7.2
12	7.9	8.1	8.3	7.7	8.2	8.8	9.3	9.3	9.3	8.9	6.6	4.2	4.5	4.8	6.1	5.8	6.2	6.7
13	8.8	7.7	7.7	7.9	8.0	8.5	9.3	10.9	10.3	9.0	7.4	4.5	4.2	4.8	6.1	6.6	7.2	7.2
14	7.7	7.4	7.4	6.9	7.4	8.2	9.3	10.0	8.9	8.8	7.7	5.5	4.5	5.1	5.8	6.9	6.9	7.4
15	7.6	7.9	7.4	7.2	7.7	8.0	9.0	9.9	9.7	9.0	7.4	5.0	3.9	4.2	5.6	6.3	7.0	9.5
16	8.9	8.8	8.2	7.9	6.3	7.7	9.3	11.1	11.1	10.0	7.9	6.3	5.6	6.7	8.3	7.7	7.4	7.9
17	8.3	8.8	8.5	8.5	8.6	9.2	9.7	10.3	10.6	9.3	7.2	4.8	4.5	5.6	6.6	7.4	7.7	7.7
18	9.8	11.7	10.3	9.8	8.0	8.2	8.6	9.8	9.5	7.9	6.3	4.8	3.0	5.1	6.0	6.9	8.1	7.4
19	8.5	10.9	9.8	8.2	5.5	6.2	9.3	10.3	9.5	8.2	5.0	4.2	5.2	6.0	7.4	9.6	8.1	8.8
20	8.5	8.3	8.5	7.9	7.4	7.4	9.0	9.8	10.0	8.5	7.4	6.3	5.7	6.6	7.3	7.8	7.9	11.0
21	8.9	7.9	5.3	7.1	6.9	7.3	8.6	11.0	11.6	10.0	8.0	6.2	5.2	3.7	5.6	7.4	6.7	10.3
22	7.9	7.7	7.4	7.4	7.4	7.7	8.3	9.5	9.7	9.1	9.3	5.8	4.2	5.4	6.1	6.7	6.7	7.3
23	10.0	8.8	7.9	7.4	7.4	7.4	8.9	9.3	10.0	10.2	8.3	7.4	5.1	5.3	8.5	8.0	9.3	10.2
24	20.4	18.2	19.1	12.7	9.5	9.4	9.5	10.3	10.3	8.9	7.4	6.7	5.2	5.8	6.4	7.4	7.4	7.4
25	8.8	10.6	12.2	16.4	14.8	10.9	11.1	10.6	10.6	9.8	8.8	7.4	5.1	5.1	4.9	8.5	6.4	10.0
26	15.9	12.2	10.8	9.0	9.5	9.5	8.8	8.8	9.3	7.6	9.0	6.4	5.3	4.2	5.3	7.7	10.2	8.5
27	12.2	11.7	11.1	9.8	10.1	9.3	9.0	10.0	10.4	10.8	10.6	8.5	7.3	7.4	7.0	7.3	8.5	7.4
28	10.7	10.3	10.0	9.5	9.1	9.0	9.3	10.6	10.3	9.3	6.9	5.8	6.6	6.4	5.8	6.6	7.2	6.6
29	10.7	10.4	10.8	9.3	9.5	8.2	9.5	9.7	10.4	9.3	7.2	5.8	6.3	6.1	6.9	6.3	6.6	7.4
30	13.8	12.7	10.3	10.3	9.0	9.1	9.0	9.0	8.5	7.6	6.3	5.3	3.9	5.1	5.3	5.6	6.2	6.2
31	11.4	9.1	8.2	9.4	9.0	9.0	9.7	9.5	8.8	7.7	6.2	6.1	5.1	4.8	5.1	5.8	6.5	6.9
среднее всем дням	10.4	10.1	9.6	9.1	8.6	8.6	9.2	9.9	9.7	8.9	7.4	5.8	5.3	5.8	6.3	7.0	7.6	8.1

овные обозначения: △—погасла лампа, >или<—запись вышла за бумагу; □ — остановились часы; △ иные
чины отсутств. записи. Величины, взятые приближенно с магнитограммы — ( ).

Stage 2 - 1970-1980.

This stage is characterized by analog magnetograms and hand processing of data to compile tables of mean hourly values. In the centers, data are stored in the form of microfilms and microfiches of analog magnetograms and tables of mean hourly values and geomagnetic activity indexes as well as in the form of publications of tables and magnetic activity indexes and a part of the tables is put into machine readable form by hand on magnetic tape.

A feature of this period was the missing single format of mean hourly values, so in catalog WDC B2 of 1982 various formats were given that were used in WDC A, WDC B2, WDC C1, in France and in England. The common feature was the record length of 120 bits and the number of records of 20.

Stage 3 - 1980 – 1990.

The major network of observatories continues to work with analog magnetograms and hand processing of data to compile tables of mean hourly values and indexes but observatories began to be set up that registered geomagnetic field variation in machine-readable form. In the centers, data are stored in the form of microfilms and microfiches of analog magnetograms and tables of mean hourly values as well as in the form of publications of tables and geomagnetic activity indexes; a part of the tables is transferred into machine readable form that is magnetic tapes and copies of observatory data in machine-readable form.

A feature of this period was the single format introduced to exchange mean hourly values and 2.5-minute values of geomagnetic field components in machine-readable form.

- DIGITAL WDC EXCHANGE FORMAT FOR OBSERVATORY
- HOURLY MEAN AND 2.5 MINUTE VALUES
- ==========
- 1-3 A3 OBSERVATORY 3-LETTER CODE
- 4-5 I2 YEAR (last 2 digits, 82=1982)
- 6-7 I2 MONTH (01-12)
- 8 I1 ELEMENT (D, H, F, X, Y, or Z)
- 9-10 I2 DAY OF MONTH (01-31)
- 11-12 I2 Blanks for hourly values. Values of hourly (00-23)
- for 2.5 minute values.
- 13-15 A3 Arbitrary
- 16 I1 Blank for data since 1900, 8 for data before.
- 17-20 I4 Tabular base, in degrees for D and I, hundreds
- of nanoTeslas (gammas) for the intensity elements.
- 21-116 24I4 24 Twenty-four 4-digit Hourly Values for the day.
- Values are in tenth-minutes for D and nanoTeslas
- (gammas)for the intensity elements. Or twenty-

Generally this single format was a continuation of the format elaborated for punched cards with an attempt to make maximum use of the memory.

It was not convenient for the user.

The combined catalog of geomagnetic data of WDC A (USA), WDC B2 (USSR), WDCB C1 (Great Britain and Denmark) and WDCB C2 (Japan and India) appeared in ***1985***. The catalog contained information on the availability of various kinds of data in the centers. It follows from the catalog that only 117 of 405 observatories had a small part of

The Example of the data prepared on observatory Arti (ARS)

- Observatory Arti(**ARS**), 1985 YEAR **(85**), (**01**), ELEMENT - Declination) (**D**), DAY OF MONTH (**01**), Tabular base in degrees for D and I) for the intensity elements базисное значение 11°(**011**), +24 Twenty-four Hourly Values for the day. Values are in tenth-minutes (**337….),** 25 – Daily Mean **(425)**

- **ARS8501D01 011 337** 336 330 391 394 387 401 412 413 414 455 454 428 423 424 529 475 451 463 475 465 410 472 454 **425**

Stage 4 - 1990-1995.

Large-scale transfer of data in machine-readable form started. Both WDC and individual organizations transferred analog and tabular data into machine-readable form. Data were stored in magnetic tapes and diskettes and CDROMs.

In the context of memory capacity increase, computer technology progress and wider use of data in MRF, formats for mean-hourly and one-minute values became user-friendlier.

DIGITAL WDC OBSERVATORY EXCHANGE FORMAT
HOURLY VALUES

COLUMNS FMT DESCRIPTION 1-3 A3 OBSERVATORY 3-LETTER CODE, left adjused 4-5 I2 YEAR (last 2 digits, 82 = 1982) 6-7 I2 MONTH (01-12) 8 A1 ELEMENT(D,H,X,Y,Z,or F) 9-10 I2 DAY OF MONTH (01-31) 11-12 A2 Blanks 13-14 A2 Arbitrary 15 A1 INTERNATIONAL QUIET or DISTURBED DAYS, Q=1,D=2 16 I1 Blank for data since 1900,8 for data before 17-20 I4 Tabular base, in degrees for D and I, hundreds of nanoTeslas (gammas) for the intensity elements. The bases are right adjusted and signed if negative. Negative values are identified with a minus sign either adjacent to the first significant digit or in the high-order position of the field (position 17). NOTE: A blank digit will not appear between a (-) sign and the first significant digit. For example, a base may appear as -050 or b-50 but not as -b50(b=blank). 21-116 24I4 Twenty-four 4-digit Hourly Values for the day. The values are in tenth-minutes for D and in nanoTeslas (gammas) for the intensity elements. The first hourly value represents the mean value between 00:00 UT and 01:00 UT, ..., the 24th value represents the mean between 23:00 UT and 24:00 UT. Rules for negative values are the same as those described for tabular bases. A missing value is identified by 9999.117-120 I4 Daily Mean. Rules for negative values are the same as those described for tabular bases. If any of the hourly mean values for the day are missing 9999 will appear as the daily mean. The 25 values in positions 21-120 will have the range -999 to 9998, with 9999reserved for missing values. To avoid a 4-digit negative value in positions21-116, the tabular base will be adjusted for that day; for example for D, onedegree is subtracted from the base and 600 units are added to each of thehourly values for the day - for the intensity elements, 500 nT are subtractedfrom the base and 500 nT are added to each of the hourly values for the day.Each tape

DIGITAL WDC OBSERVATORY EXCHANGE FORMAT

- 1-MIN VALUES
- The logical record length is 400 coded characters containing header information, blank spaces, and data for one element for one hour. Each logical record contains header information and data in the following format:

****

Characters: 1 - 6 Geographic Co-Latitude in 0.001 degree 7 - 12 East Geographic Longitude in 0.001 degree 13 - 14 Year (98) 15 - 16 Month (01 - 12) 17 - 18 Day (01 - 31) 19 Component of the field (H,E,Z) 20 - 21 Hour (00 - 23) 22 - 24 Observatory's IAGA 3-letter code 25 Origin of data (D - digital, A - digitized) 26 - 34 Future Use (NOT USED HERE) 35 - 40 1-st 1 minute average 41 - 46 2-nd 1 minute average ... ... 388 - 394 60-th 1 minute average 394 - 400 Hourly mean value FORTRAN format statement would look like:

format (2i6,2i2,a1,i2,a3,a1,9a1,61(i6))

********** Comments: DATA-1 ... DATA-60 are 1-minute values of the given element for that hour. H, X, Y, Z, or F are given to the nearest nanoTesla (gamma). D is given to the nearest tenth-minute of arc (612 = l degree + 01.2 minutes East). Each value is in a 6-character field. Missing data spaces are padded with 99999. No alteration of logical record length is required for different types of computers. Codes for sources of digital magnetometer data in the WDC system not only indicate the source organization, but also show whether the data are average values or point data. For example, 1-minute point values scaled from analog magnetograms for the production of AE indices are coded with a "D" because they are "digitized". Typically, digital 1-minute values received by WDCs from organizations operating automatic magnetic observatory instruments are averages of more frequendy sampled values, e.g. 10-second point samples. Different organizations process their higher time resolution observations in different ways. Some may filter and smooth the observations. Some follow the practice recom- mended by IAGA of averaging higher time resolution samples from before and after the minute to obtain a 1-minute value centered exactly on the minute. Others average values from the beginning of a given minute to the beginning of the next minute, effectively centering the mean on the half-minute, in similar fashion to the processing of 1-minute values to obtain hourly means. If the method used to obtain 1-minute average values is important to a user, the WDC will assist in determining the exact procedure applied. In general, digital values from national networks are "absolute" and are tied to baselines determined by are operating institutions. Often only timely variations data are needed to support special research campaigns and digital values may be transmitted from regular observatory sites via satellite relay platforms. Such values are "flagged" with a "V" as noted below and eventually are replaced by the standard digital observatory output. Values from special networks such as the IMS chains are variations only. Attempts are made to check the absolute output of these instruments but usually no systematic absolute observations are possible or they are later replaced by adopted standard observatory digital values. ORG (data origin codes) A = Alaskan meridian magnetometer chain (includes Canadian sites) for IMS C = Canadian standard

The Example- **Minute Data Station ARTI** 1-minute point values scaled from analog magnetograms are coded with a "D" because they are "digitized".

Co-Latitude in 0.001 degree (**033570**), East GeographicLongitude in 0.001 degree (**058570**), 1990 YEAR (**90**), MONTH (**01**), DAY OF MONTH (**01**), ELEMENT (**H**),hour(**05**), Observatory's IAGA 3-letter code (**ARS**), DATA-60 are 1-minute values of the given element for that hour (**16454...**), Hourly mean value (**16465**).

033570058570900101H05ARSD 16454 16454
16455 16455 16455 16455 16455 16455 16455 16456 16456
16456 16456 16456 16456 16456 16456 16456 16456 16456
16456 16455 16455 16455 16454 16454 16454 16454 16454
16454 16454 16454 16455 16455 16456 16456 16456 16457
16456 16456 16456 16456 16456 16456 16456 16456 16456
16456 16456 16456 16456 16457 16457 16457 16457 16457
16456 16456 16455 16454 16456

The Example- **Minute Data Station DIXON (Element-Z)**1-minute point values scaled from analog magnetograms are coded with a "D" because they are "digitized".

- 0164500805809001O1Z00DIXD 58104 58099 58093 58088 58086 58089 58091 58091 58088 58088 58089 58092 58095 58096 58097 58097 58097 58098 58101 58105 58107 58110 58113 58114 58112 58110 58110 58111 58113 58116 58118 58119 58120 58120 58118 58117 58115 58115 58116 58117 58117 58115 58113 58112 58112 58114 58115 58117 58118 58117 58115 58114 58115 58117 58119 58121 58124 58126 58125 58121 58109
- 0164500805809001O1Z01DIXD 58119 58116 58114 58113 58113 58113 58114 58115 58116 58114 58110 58105 58103 58104 58106 58107 58108 58106 58104 58105 58107 58109 58110 58109 58107 58104 58104 58107 58111 58115 58118 58118 58115 58113 58114 58116 58117 58117 58118 58118 58117 58116 58115 58115 58116 58117 58116 58113 58113 58112 58112 58114 58115 58116 58115 58115 58115 58115 58116 58116 58112
- 0164500805809001O1Z02DIXD 58116 58117 58118 58119 58120 58120 58121 58121 58121 58121 58121 58121 58121 58121 58119 58118 58118 58117 58116 58116 58116 58117 58117 58118 58119 58119 58119 58120 58120 58120 58120 58120 58120 58120 58120 58120 58120 58120 58119 58119 58119 58120 58120 58121 58122 58123 58123 58122 58120 58118 58117 58117 58117 58117 58118 58119 58120 58120 58119 58118 58116 58119
- 0164500805809001O1Z03DIXD 58124 58124 58125 58125 58124 58122 58120 58120 58120 58121 58122 58123 58122 58122 58122 58122 58121 58120 58118 58118 58118 58120 58123 58125 58128 58130 58129 58127 58124 58123 58123 58124 58123 58121 58120 58121 58123 58124 58122 58120 58116 58116 58119 58121 58121 58120 58119 58119 58122 58125 58128 58132 58134 58130 58124

Stage 5_1 – 1995- up to now.

- A considerable part pf observatories record data in machine-readable form and send data to WDCs or give them in their site in the Internet. The major part of one-minute and mean hourly values of geomagnetic field components is stored in WDC in machine readable form in CD ROM and DVD discs and is available for users in the Internet with free access

The Example- **Minute Data Digitated Station IRKUTSK for May 5 1999**

05-05-1999

```
0  0 -13173 190355 572319   17.5 603145
0  1 -13189 190355 572319   17.5 603145
0  2 -13193 190356 572319   17.5 603145
```

The Example- Format IAGA-2002 for Minute Values for Obs. Narsarsuaq (NAQ)

13 November 2001 ., 00 hour, 0-min. (**2001-03-13 00:00:00.000 072**),1-min.(2001-03-13 00:01:00.000 072), 2-min.(2001-03-13 00:02:00.000 072) и 3-min.(2001-03-13 00:03:00.000 072) 72 day 2001 Y.

Elements -X **(10800.11**), -Y **(-6100.23**), - Z (**53381.51**),

-F (total force variations) (**54801.12**)

DATE	TIME	DAY	NAQX	NAQY	NAQZ	NAQF
2001-03-13	**00:00:00.000**	**072**	**10800.11**	**-6100.23**	**53381.51**	**54801.12**
2001-03-13	00:01:00.000	072	10800.31	-6100.20	53381.51	54801.12
2001-03-13	00:02:00.000	072	10801.11	-6101.23	99999.00	54801.12
2001-03-13	00:03:00.000	072	10803.12	-6100.23	99999.00	54801.12

Stage 5_2 – 1995- up to now.

- The major feature of this stage is the wide use of the Internet to create all kinds of sites with access to observatories data. Observatories, laboratories, institutes and WDCs on geomagnetism and solar-terrestrial physics create the sites

Stage 5_3 – 1995- up to now (SPIDR) -1.

The system of interactive data resource on solar-terrestrial physics (SPIDR) has been created, that is a distributed network of synchronous databases and application servers allowing us to select, visualize and model data on solar-terrestrial physics in the Internet and including the data of geomagnetic observatories network and geomagnetic indexes.

SPIDR-2

At present SPIDR servers have been installed in Russia, Japan, South African Republic, Australia, the United States, China and India. The Russian server address of **SPIDR** is http://clust1.wdcb.ru/spidr/

The Example of **SPIDR data output file in ASCII format** created at 2006-05-02 11:13

- #GMT time is used
- #
- #
- #--
- #>
- #Element: F
- #Table: Geom
- #Description: Geomagnetic field: total force variations
- #Measure units: nT
- #Origin:
- #Station code: KAK_min
- #Station name: KAKIOKA
- #Sampling: 1 minute
- #Missing value: 9999.0
- #>
- #yyyy-MM-dd HH:mm value qualifier description
- **1990-01-25 00:00 46140.0 "" ""**
- **1990-01-25 00:01 46140.0 "" ""**
- **1990-01-25 00:02 46141.0 "" ""**
- **1990-01-25 00:03 46141.0 "" ""**
- **1990-01-25 00:04 46140.0 "" "“**
- **1990-01-25 00:05 46140.0 "" ""**

INTERMAGNET

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

The most modern is the system INTERMAGNET that meets severe requirements of the accuracy of registering geomagnetic field components.

The idea of creating INTERMAGNET appeared after satellite GOES East was launched and successfully used to transfer geomagnetic data between two organizations. In 1991 the first Geomagnetic Information Node was organized and the first CDROM was issued. In INTERMAGNET network, 98 magnetic observatories of 39 countries work and their data are promptly collected at 5 Geomagnetic Information Nodes. It was accepted that all the observatories send their data in one-minute digital format. Actually INTERMAGNET network replaced the data collection system in MRF accepted for WDC and besides provided geomagnetic data for practical applications like space weather forecast, geophysical survey and others.

In Russia, only observatories Irkutsk and Novosibirsk are certified to work in INTERMAGNET system. In Ukraine, observatories L'vov and Vernadskogo (former English observatory Argentina Island in Antarctica) have certificates.

The Example of **IMFV1.22 INTERMAGNET GIN Dissemination Format for Minute Values 1-3**

- Magnetic data, with tenth-nanotesla resolution, are organized on a day file basis. One file contains 24 one-hour blocks, each containing 60 minutes worth of values. Blocks of 60 minutes of data are transmitted. Blocks are padded with 9's if incomplete. Information is coded in ASCII.
- File name: To remain compatible with all operating systems, the file name is limited to 8 characters and will contain the date and the three-letter code as an extension. eg: MAR1591.BOU for Boulder, March 15, 1991; and JUN2391.OTT for June 23, 1991 at Ottawa

The Example of the data prepared on observation Ari (ARI)

The Example of **IMFV1.22 INTERMAGNET GIN Dissemination Format for Minute Values 2-3**

- **Description of the block header (64 characters including CrLf)**
- IDC_DDDDDDD_DOY_HH_COMP_T_GIN_COLALONG_DECBAS_RRRRRRRRRRRRRRRCrLf
- IDC :Indicates the IAGA three letter observatory identification(ID) code eg: BOU for Boulder, OTT for Ottawa, LER for Lerwick, etc.DDDDDDD:Indicates the date, eg: FEB1591 for February 15, 1991. DOY :Indicates day of the year (1-366) HH:Indicates the Hour (0-23). The first line following the header will contain the values corresponding to minute 0 and 1 of this hour. The first value of the day file is hour 0 minute 0. COMP:Order in which the components are listed, can be HDZF, XYZF. All components excluding D must be in tenths of nT. D must be in hundredths of minutes, east. T:One-letter code for data type. R=Reported, A=Adjusted, D=Definitive data.
  Reported data are defined as: the raw data obtained from the IMO, either by satellite, computer link, or other means. It will be formatted in either version IMFV2.8N (binary) or IMFV1.2N (ASCII,) without any BRM (Baseline Reference Measurements), or other modifications applied to it.
  Adjusted data are defined as: the Reported data with BRM, spike removal, timeshifts, and/or other modifications applied to it. It is emphasized that only one (1) adjusted version of the data would be allowed, to be completed within 7 days of receipt of the Reported data to prevent the proliferation of multiple versions of

The Example of IMFV1.22 INTERMAGNET GIN Dissemination Format for Minute Values 1-3

The Example of **IMFV1.22 INTERMAGNET GIN Dissemination Format for Minute Values 3-3**

- GIN:Three-letter code for GIN responsible for processing the station (IMO) data eg: EDI(Edinburgh), GOL(Golden), OTT(Ottawa), PAR(Paris). COLALONG:Colatitude and east longitude of the observatory in tenths of degrees. DECBAS:Baseline declination value in tenths of minutes East (0-216,000). Declination baseline values to be provided annually. If components are X,Y,Z then DECBAS=000000. RRR..RRR:Reserved 16 bytes of R-characters for future use.:Indicates a space character. CrLf:Indicates a Carriage return, Line feed.**Description of data space (64 characters per line including CrLf)**
- Component values are coded as signed integers, right-justified with a field width of 7. Total field (F) values are coded as unsigned integers, right-justified with a field width of 6. The field widths must be maintained, either through zero-filling or space-filling. The '+' sign for positive values is optional.
- Two (2) minutes of data are concatenated on the same line
- AAAAAAA_BBBBBBB_CCCCCCC_FFFFFF__AAAAAAA_BBBBBBB_CCCCCCC_FFFFFFCrLf
- (values for minute 0) (values for minute 1)
- . .
- AAAAAAA_BBBBBBB_CCCCCCC_FFFFFF__AAAAAAA_BBBBBBB_CCCCCCC_FFFFFFCrLf
- (values for minute 58) (values for minute 59)
- AAAAAAA:Indicates Component 1 data field (H,X, etc.).BBBBBBB:Indicates Component 2 data field (D,Y, etc.).CCCCCCC:Indicates Component 3 data field (Z,I, etc.).FFFFFFF:Indicates Total Field data field._:Indicates space character.CrLf:Indicates Carriage Return and Line Feed. http://www.intermagnet.org/FormatData_e.html
- Comments:webmaster

List of Current WDCs-Geomagnetism-1-2

- WORLD DATA CENTER FOR GEOMAGNETISM, COPENHAGEN

  Dr. Ole Rasmussen, Director Tel: +45 39 157488WDC for GeomagnetismFax: +45 39 157460Lyngbyvej 100E-mail: or@dmi.dkDK-2100, Copenhagen Home Page: http://web.dmi.dk/projects/wdcc1DENMARK

- WORLD DATA CENTER FOR GEOMAGNETISM, EDINBURGH

  Dr. David Kerridge, Director Tel: +44 131 650 0234WDC for Geomagnetism Fax: +44 131 668 4368British Geological SurveyE-mail: d.kerridge@bgs.ac.ukMurchison House, West Mains RoadHome Page : http://www.geomag.bgs.ac.uk/gifs/on_line_gifs.htmlEdinburgh

- WORLD DATA CENTER FOR GEOMAGNETISM, KYOTO

  Dr. Toshihiko Iyemori, DirectorTel: +81 75 753 3929WDC for GeomagnetismTel: +81 75 753 3949Data Analysis Center for Geomagnetism and Space MagnetismFax: +81 75 722 7884Graduate School of ScienceE-mail: iyemori@kugi.kyoto-u.ac.jpKyoto UniversityHome Page : http://swdcwww.kugi.kyoto-u.ac.jp/catmap/index.html

  Kyoto, 606-8502JAPAN

- WORLD DATA CENTER FOR GEOMAGNETISM, MUMBAI

  Prof. Archana Bhattacharyya, DirectorTel: +91 22 215 0293 WDC

List of Current WDCs-Geomagnetism-2-2

- **WORLD DATA CENTER FOR GEOPHYSICS, BEIJING**

  Prof TANG Keyun, DirectorTel: +86 10 6200 7408WDC for Geophysics,Beijing Fax: +86 10 648 71 995 Institute of Geology and Geophysics Chinese Academy of SciencesE-mail: kytang@mail.igcas.ac.cn PO Box 9825
  19 Beitucheng West Road, Chaoyang DistrictHome Page: http://gp.wdc.cn Beijing, 100029

- **WORLD DATA CENTER FOR SOLAR-TERRESTRIAL PHYSICS, BOULDER**

  Dr. William Denig, DirectorTel: +1 303 497 6323WDC for Solar-Terrestrial PhysicsFax: +1 303 497 6513NOAA/NGDC E/GC2E-mail: William.Denig@noaa.gov 325 BroadwayHome Page: http://www.ngdc.noaa.gov/stp/WDC/wdcstp.htmlBoulder, CO

- **WORLD DATA CENTER FOR SOLAR-TERRESTRIAL PHYSICS, MOSCOW**

  Dr. Evgeny P. Kharin, DirectorTel: +7 095 930 5619WDC for Solar-Terrestrial PhysicsFax: +7 095 930 5509Molodezhnaya 3E-mail: kharin@wdcb.ruMoscow, 117296Home Page: http://

- **Space Physics Interactive Data Resource(SPIDR)**- http://clust1.wdcb.ru/spidr/

- **WORLD DATA CENTER FOR SOLAR-TERRESTRIAL SCIENCE, SYDNEY**

  Dr. David Cole, DirectorTel: +61 2 9213 8001WDC for Solar-Terrestrial Science, SydneyFax: +61 2 9213 8060IPS Radio and Space ServicesE-mail: david@ips.gov.au PO Box 1386Home Page:

In Russia, geomagnetic data are presented in the servers:

IZMIRAN, Moscow - variation data of stations: Moscow, Kaliningrad, Karpogoly, Baksan, Reno;

The Institute of Solar-Terrestrial Physics, Irkutsk – variation data of observatory Patrony;

Arctic and Antarctic Research Institute (AARI) , Saint Petersburg – Arctic stations: Pevek, Tiksi, Norilsk, Dikson, Cape Chelyuskin; Antarctic stations: Vostok, Mirnyi, Novolazarevskaya;

Polar Geophysical Institute, Apatity Branch – variation data of observatory Lavozero