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GEOPHYSICAL OBSERVATORY REPORTS

1999/2001

OF THE GEODETIC AND GEOPHYSICAL
RESEARCH INSTITUTE OF THE HUNGARIAN
ACADEMY OF SCIENCES

+CD-ROM

YEAR

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NAGYCENK GEOPHYSICAL OBSERVATORY



SOPRON

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NAGYCENK GEOPHYSICAL OBSERVATORY

IAGA CODE: NCK

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2003

**MAGYAR
TUDOMÁNYOS AKADÉMIA
KÖNYVTÁRA**

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Preface

The Széchenyi István Geophysical Observatory of the Hungarian Academy of Sciences is pleased to present the 1999–2001 report in the Geophysical Observatory Report series.

Nagyecsk Geophysical Observatory has been supplying data since 1957. Geophysical Observatory Reports comprise earth current data from 1957 on, geomagnetic data from 1961 on, atmospheric electricity data from 1962 on and ionospheric data from 1967 on.

Further information and data including archived data are available by special arrangement at the institute:

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Sopron, March 2003

V. Wetztergom

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I. DESCRIPTION OF THE OBSERVATORY

V. WESZTERGOM

Nagycekn Geophysical Observatory was founded in 1956–1957 and it has been operated since then by the Geodetic and Geophysical Institute of the Earth Science Center, Hungarian Academy of Sciences.

The observatory is situated about 10 km to E of the city Sopron and 60 km SE of Vienna, on the southern shore of lake Fertő. The observatory lies on thick conductive sediment preserving the site from far industrial noise and it is surrounded by the Fertő-Hanság National Park which helps to shelter the long term measurements from any change caused by nearby manmade activity.

The co-ordinates of the observatory

3-character IAGA code: **NCK**

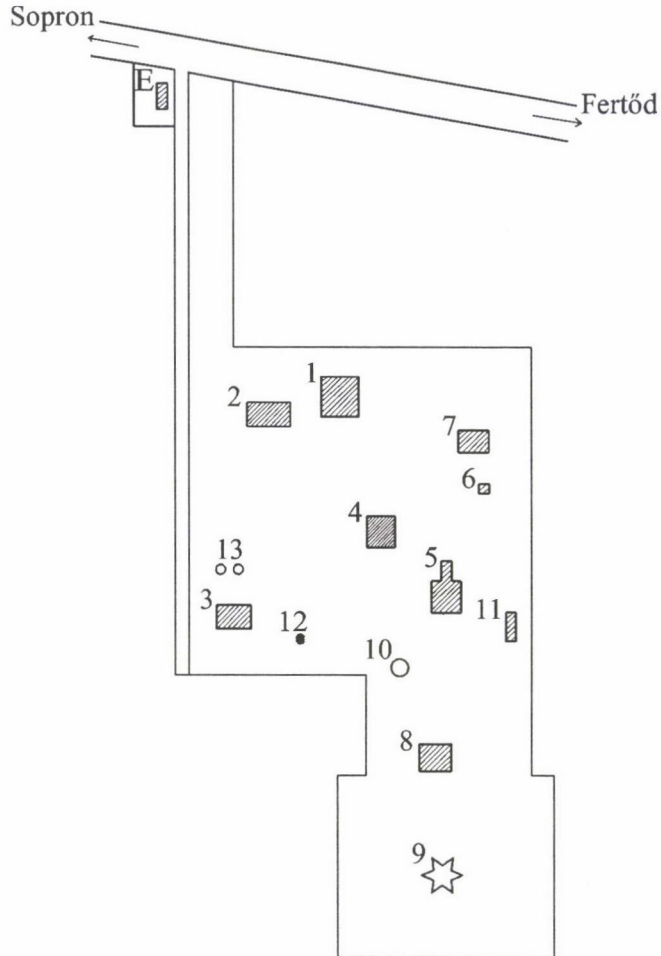
Geographic co-ordinates:

φ	=	47°38' (N)
λ	=	16°43' (E)
Altitude	=	153.70 m (magnetic house)
McIllwain L	=	1.9

Measurements and reports started in 1957 (International Geophysical Year) with earth current data. The potential differences are measured in N-S and E-W directions with electrode spacings of 500 m. Low polarization lead plate electrodes are buried about 2 m below the surface. Potential differences are recorded with 1 sec and 10 sec sampling rate.

Continuous observation of atmospheric electricity started in 1961. Slow variation (DC component of vertical atmospheric electric field) is measured between the ground and an electrode (at 1 m height) around which the potential is equalized by means of a radioactive collector. Potential gradient is recorded with 15 sec sampling rate. Point discharge is measured with stainless steel tip mounted on the roof of the atmospheric electricity building.

Table I. Observatory site diagram



E – Entrance, 1 – Main building with staff hostel and electronic laboratory, 2 – Telluric instruments and office, 3 – Atmospheric electricity centre (laboratory of Schumann resonance, potential gradient, point discharge and radio wave absorption measurements), 4 – Magnetic absolute house with four pillars, 5 – Underground magnetic variometer chambers, 6 – Proton magnetometer (DI/DD) hut, 7 – Computer centre (data loggers, server of local network, satellite transmitter) 8 – Ionosonde station, electric and mechanical workshop, 9 – Ionosonde D-antenna, 10 – Meteorological station, 11 – ELF induction coil chamber, 12 Ball antenna (Schumann resonance antenna), 13 – Potential gradient sensors

Continuous observation of geomagnetic elements with control of the absolute observations began in 1961. The observatory has belonged to the INTERMAGNET co-operation since 1993. Data are transmitted via METEOSAT satellite to geomagnetic information nodes and made also available to the international research community on CD ROM.

Since 1967 ionospheric measurements have also been carried out. Lower ionosphere is studied using A3 (oblique incidence, LF radiowave absorption) method.

The early nineties are to be considered as a transition period in the observatory again. Schumann resonance measurements started in 1993, an ionosonde station type IPS 42 works since 1996 and a scientific meteorological station was installed in 1996. The meteorological station is based on a Campbell CR10X measurement and control modul, temperature, humidity, wind speed, wind direction, rainfall and radiation sensors.

II. GEOMAGNETISM

ELECTRIC ACTIVITY INDICES

The 3-hour electric activity indices T for the E_x and E_y component, have a linear scale with a step of 1.8 mV/Km. The range of values is 0 to 9.

The index K_1 refers to complete days and expresses the activities in the period range 0–2 min (pulsations).

Limits between K1-values								
0–1	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9
2	4	7	13	18	23	29	41	54

These values are given in units of 10^{-5} V/km.

Values in brackets mean extrapolated data, where the lacking intervals were substituted by the average of recorded intervals.

Times are given in CET (i.e. UT + 1 h), nearly corresponding to LT (–7 min)

A detailed description of the processing and compilation is found in the Report of the Observatory for 1966 in German and *Ádám A, Verő J, Cz. Miletits J, Holló L, Wallner Á: The geophysical observatory near Nagycenk. I. Electromagnetic measurements and processing of data (Acta Geod. Geoph. Mont. Hung., 16, 1981, 333).*

See CD (program Seenck.exe, menu item Tellurics/Indices).

ELECTRIC ACTIVITY INDICES 1999

Date	T	Sum	Date	T	Sum
990101	01111112	8	990211	41123535	24
990102	10112210	8	990212	23244462	27
990103	11100101	5	990213	11121011	8
990104	00111111	6	990214	00112211	8
990105	31111111	10	990215	26334321	24
990106	11111432	14	990216	11111001	6
990107	01222221	12	990217	01255113	18
990108	12223246	22	990218	06989898	57
990109	22211112	12	990219	65358441	36
990110	10111011	6	990220	10110011	5
990111	11111021	8	990221	00000012	3
990112	10011012	6	990222	21211131	12
990113	20023589	29	990223	01222150	13
990114	41243446	28	990224	01122221	11
990115	33324533	26	990225	03111110	8
990116	12121111	10	990226	00000100	1
990117	32111001	9	990227	00110011	4
990118	00000132	6	990228	00112454	17
990119	20011001	5	990301	84226554	36
990120	10111133	11	990302	52312143	21
990121	01011000	3	990303	11131177	22
990122	01112534	17	990304	31346292	30
990123	21231335	20	990305	34232430	21
990124	43242351	24	990306	21121125	15
990125	31221111	12	990307	42421233	21
990126	10021001	5	990308	21121027	16
990127	11112221	11	990309	22225241	20
990128	00112111	7	990310	45434132	26
990129	11121202	10	990311	13235312	20
990130	20010001	4	990312	12133363	22
990131	01010000	2	990313	11013111	9
990201	00000000	0	990314	20112422	14
990202	00000001	1	990315	22322111	14
990203	10012112	8	990316	00121101	6
990204	01112221	10	990317	01021121	8
990205	22111221	12	990318	01121120	8
990206	12213521	17	990319	00122121	9
990207	21133313	17	990320	10000010	2
990208	11112020	8	990321	00013010	5
990209	10111000	4	990322	00000111	3
990210	10000122	6	990323	00122112	9

Date	T	Sum	Date	T	Sum
990324	10121001	6	990504	11111001	6
990325	00111332	11	990505	00012422	11
990326	21222110	11	990506	21222111	12
990327	11010102	6	990507	12101101	7
990328	21112102	10	990508	01111000	4
990329	32725373	32	990509	10111000	4
990330	22232242	19	990510	21110100	6
990331	11112213	12	990511	00000000	0
990401	73240111	19	990512	01102232	11
990402	11212221	12	990513	12623212	19
990403	01112142	12	990514	21111001	7
990404	31122142	16	990515	11112100	7
990405	22222230	15	990516	11111110	7
990406	12112111	10	990517	00111001	4
990407	21111122	11	990518	25433243	26
990408	10112521	13	990519	22312123	16
990409	11110111	7	990520	11213112	12
990410	11531244	21	990521	21111100	7
990411	22121201	11	990522	11101100	5
990412	40111000	7	990523	21123111	12
990413	00010110	3	990524	13411123	16
990414	11121000	6	990525	33232211	17
990415	00011000	2	990526	11212211	11
990416	11006653	22	990527	11122102	10
990417	68532141	30	990528	20111121	9
990418	11112010	7	990529	01002110	5
990419	01022113	10	990530	00122111	8
990420	22422332	20	990531	01000001	2
990421	11211623	17	990601	00102221	8
990422	11111111	8	990602	31121003	11
990423	10212120	9	990603	61121121	15
990424	21110110	7	990604	11211111	9
990425	00011112	6	990605	10011111	6
990426	20022211	10	990606	01111100	5
990427	00123435	18	990607	01201221	9
990428	21122126	17	990608	21232321	16
990429	21223333	19	990609	22112233	16
990430	43323233	23	990610	31110000	6
990501	31323332	20	990611	00101011	4
990502	21121222	13	990612	11100100	4
990503	12212120	11	990613	11100001	4

ELECTRIC ACTIVITY INDICES 1999

Date	T	Sum	Date	T	Sum
990614	11100001	4	990725	21211122	12
990615	00003321	9	990726	11311100	8
990616	01131120	9	990727	11111000	5
990617	11210101	7	990728	00011212	7
990618	01311101	8	990729	12101100	6
990619	21100100	5	990730	11213489	29
990620	00001100	2	990731	99971135	44
990621	00000000	0	990801	53120100	12
990622	00000011	2	990802	01301110	7
990623	11101102	7	990803	11010001	4
990624	00112000	4	990804	02232111	12
990625	11010101	5	990805	01001111	5
990626	37522293	33	990806	21132442	19
990627	23355534	30	990807	32211012	12
990628	39994311	39	990808	11011013	8
990629	11141100	9	990809	32331200	14
990630	02101010	5	990810	00101211	6
990701	01011131	8	990811	21111110	8
990702	75954668	50	990812	11112112	10
990703	14311111	13	990813	11321011	10
990704	00000000	0	990814	01221210	9
990705	00101111	5	990815	00136574	26
990706	21106132	16	990816	22322322	18
990707	22100121	9	990817	12112331	14
990708	11111112	9	990818	21212332	16
990709	01111101	6	990819	32223232	19
990710	02101120	7	990820	33232323	21
990711	01111112	8	990821	10111000	4
990712	23211111	12	990822	00001138	13
990713	01101100	4	990823	45223243	25
990714	00100242	9	990824	52336534	31
990715	22111211	11	990825	11111112	9
990716	01111001	5	990826	12102233	14
990717	00111100	4	990827	22322141	17
990718	01111111	7	990828	21222211	13
990719	11111100	6	990829	11111123	11
990720	11112111	9	990830	02246232	21
990721	10111530	12	990831	43332265	28
990722	23553432	27	990901	24323141	20
990723	22222222	16	990902	11113121	11
990724	13121131	13	990903	12222112	13

Date	T	Sum	Date	T	Sum
990904	22221221	14	991015	58846934	47
990905	12221012	11	991016	45474943	40
990906	01112221	10	991017	22735321	25
990907	11232236	20	991018	12132130	13
990908	11112212	11	991019	22200011	8
990909	02247121	19	991020	01221110	8
990910	22354252	25	991021	87332449	40
990911	32312021	14	991022	99985973	59
990912	24474396	39	991023	45439656	42
990913	73444667	41	991024	34666545	39
990914	54232311	21	991025	43344410	23
990915	22572371	29	991026	12322251	18
990916	45434432	29	991027	32323821	24
990917	22343421	21	991028	11114924	23
990918	12223100	11	991029	21231131	14
990919	11222121	12	991030	12222111	12
990920	21112141	13	991031	11282113	19
990921	11222154	18	991101	12333122	17
990922	11295599	41	991102	11310023	11
990923	86811111	27	991103	11211111	9
990924	12111101	8	991104	21121102	10
990925	11112010	7	991105	11110232	11
990926	00113593	22	991106	21311321	14
990927	59758875	54	991107	34499824	43
990928	35426465	35	991108	22467684	39
990929	34424445	30	991109	35644853	38
990930	44433141	24	991110	34563453	33
991001	11324152	19	991111	56662464	39
991002	22223133	18	991112	21222244	19
991003	12213121	13	991113	44467993	46
991004	12232234	19	991114	21212412	15
991005	12453334	25	991115	01110111	6
991006	13332110	14	991116	01232512	16
991007	12121011	9	991117	11332232	17
991008	22221022	13	991118	22452652	28
991009	01111143	12	991119	12211123	13
991010	45579784	49	991120	31231111	13
991011	64584659	47	991121	11111344	16
991012	53479976	50	991122	42553111	22
991013	44538843	39	991123	23332156	25
991014	35846566	43	991124	31446731	29

Date	T	Sum
991125	11256832	28
991126	10211000	5
991127	00131001	6
991128	11221221	12
991129	11110011	6
991130	12242121	15
991201	20121111	9
991202	10112122	10
991203	22473341	26
991204	43376933	38
991205	44644521	30
991206	33345323	26
991207	32222644	25
991208	21331342	19
991209	23231133	18
991210	11112531	15
991211	01112000	5
991212	10114654	22
991213	35463210	24
991214	11100100	4
991215	00000112	4
991216	11120112	9
991217	11111201	8
991218	01110211	7
991219	11111110	7
991220	00010011	3
991221	00110100	3
991222	00000000	0
991223	00000111	3
991224	26522111	20
991225	23334111	18
991226	00010012	4
991227	33110021	11
991228	11111121	9
991229	22101132	12
991230	21111289	25
991231	57665769	51

Date	T	Sum	Date	T	Sum
000101	45664394	41	000211	85322429	35
000102	34532653	31	000212	97999523	53
000103	22232434	22	000213	31464432	27
000104	32223653	26	000214	33689956	49
000105	22247662	31	000215	43423465	31
000106	11125222	16	000216	11121311	11
000107	11112120	9	000217	01222120	10
000108	20101111	7	000218	00000000	0
000109	10110143	11	000219	00110001	3
000110	10121233	13	000220	01120083	15
000111	32436576	36	000221	22156512	24
000112	32331111	15	000222	31124221	16
000113	12221211	12	000223	11266312	22
000114	12112121	11	000224	27687575	47
000115	11122111	10	000225	36453332	29
000116	11111211	9	000226	33431493	30
000117	00110000	2	000227	22535331	24
000118	00111000	3	000228	23466541	31
000119	00110122	7	000229	13432211	17
000120	11221161	15	000301	23343464	29
000121	10010000	2	000302	31321112	14
000122	12234599	35	000303	01211022	9
000123	53395311	30	000304	01111111	7
000124	12321124	16	000305	01111122	9
000125	01101111	6	000306	11132223	15
000126	11211013	10	000307	32242133	20
000127	11124377	26	000308	21242721	21
000128	65655646	43	000309	11111111	8
000129	45657836	44	000310	01232118	18
000130	22233632	23	000311	21125111	14
000131	22433111	17	000312	34384412	29
000201	12322222	16	000313	01100021	5
000202	10132221	12	000314	11111123	11
000203	11123231	14	000315	00111100	4
000204	11211102	9	000316	00000101	2
000205	00011777	23	000317	22112000	8
000206	47695476	48	000318	01122221	11
000207	54557964	45	000319	11133101	11
000208	22432651	25	000320	11233100	11
000209	13322511	18	000321	03222110	11
000210	11221212	12	000322	23334322	22

ELECTRIC ACTIVITY INDICES 2000

Date	T	Sum	Date	T	Sum
000323	34455211	25	000503	23213723	23
000324	22344211	19	000504	11211111	9
000325	12211320	12	000505	12212132	14
000326	01111111	7	000506	21212112	12
000327	12111100	7	000507	12111110	8
000328	02110000	4	000508	10111221	9
000329	00111165	15	000509	13111423	16
000330	33212263	22	000510	11100121	7
000331	74534244	33	000511	11001111	6
000401	11221325	17	000512	12411144	18
000402	42432121	19	000513	32423322	21
000403	11211113	11	000514	41211122	14
000404	43323533	26	000515	53211112	16
000405	33111111	12	000516	36425225	29
000406	31222999	37	000517	97331124	30
000407	99946743	51	000518	22112111	11
000408	12221122	13	000519	11232111	12
000409	11242532	20	000520	12101111	8
000410	12321352	19	000521	11211011	8
000411	12211130	11	000522	12221121	12
000412	11211112	10	000523	23214999	39
000413	31210100	8	000524	99999776	65
000414	00100110	3	000525	34533436	31
000415	11121141	12	000526	13331411	17
000416	35434112	23	000527	22112221	13
000417	32312201	14	000528	11121122	11
000418	11101131	9	000529	11224645	25
000419	42115921	25	000530	23434363	28
000420	24522311	20	000531	33212112	15
000421	12232111	13	000601	23211111	12
000422	11221111	10	000602	11211121	10
000423	11221111	10	000603	11332120	13
000424	15655211	26	000604	12218352	24
000425	11121120	9	000605	37656375	42
000426	00111113	8	000606	45469921	40
000427	21332235	21	000607	12443193	27
000428	41121211	13	000608	24999893	53
000429	12221213	14	000609	12231003	12
000430	32102221	13	000610	42432311	20
000501	23236423	25	000611	12444991	34
000502	32447423	29	000612	35613324	27

Date	T	Sum	Date	T	Sum
000613	12223111	13	000724	12100001	5
000614	33358959	45	000725	01112101	7
000615	33343361	26	000726	11322484	25
000616	11111001	6	000727	31001111	8
000617	11111111	8	000728	29779622	44
000618	10011231	9	000729	54394422	33
000619	31001211	9	000730	23222121	15
000620	22122001	10	000731	11212486	25
000621	11111124	12	000801	11111424	15
000622	33373151	26	000802	23111221	13
000623	24119558	35	000803	11222211	12
000624	68441131	28	000804	42323414	23
000625	11111021	8	000805	25533429	33
000626	24567685	43	000806	39333233	29
000627	34323225	24	000807	12121111	10
000628	32211121	13	000808	12111111	9
000629	32211101	11	000809	11111011	7
000630	00010011	3	000810	15442247	29
000701	11211232	13	000811	86424275	38
000702	21001111	7	000812	99999999	72
000703	21222943	25	000813	99433222	34
000704	11014111	10	000814	11113249	22
000705	12223110	12	000815	43321111	16
000706	11112110	8	000816	11211121	10
000707	11100	3	000817	11111111	8
000708	112100	5	000818	11000000	2
000709	11211111	9	000819	10001100	3
000710	19469442	39	000820	00022110	6
000711	89799257	56	000821	12211154	17
000712	44321111	17	000822	01000000	1
000713	13999223	38	000823	00222410	11
000714	33449996	47	000824	21311100	9
000715	46659999	57	000825	00011010	3
000716	99999122	50	000826	01111101	6
000717	46333111	22	000827	11112122	11
000718	22228332	24	000828	13333937	32
000719	11119734	27	000829	44633533	31
000720	67353322	31	000830	44333122	22
000721	11213111	11	000831	22342223	20
000722	11222322	15	000901	22332254	23
000723	12128891	32	000902	32456412	27

ELECTRIC ACTIVITY INDICES 2000

Date	T	Sum	Date	T	Sum
000903	01111132	10	001014	34668649	46
000904	11214492	24	001015	22223113	16
000905	11211221	11	001016	32431212	18
000906	11111954	23	001017	32322132	18
000907	22222243	19	001018	22333122	18
000908	12235434	24	001019	12225111	15
000909	12221100	9	001020	11210101	7
000910	00120110	5	001021	00111000	3
000911	00013311	9	001022	11433642	24
000912	13324162	22	001023	43641121	22
000913	22112212	13	001024	11322111	12
000914	01101110	5	001025	00312101	8
000915	02122193	20	001026	12221011	10
000916	31222588	31	001027	11110012	7
000917	53445999	48	001028	01563066	27
000918	99999443	56	001029	75462452	35
000919	44799424	43	001030	52242111	18
000920	22232211	15	001031	32321834	26
000921	12222111	12	001101	22210111	10
000922	12211111	10	001102	10101000	3
000923	11221100	8	001103	00101041	7
000924	11111483	20	001104	45543563	35
000925	22334454	27	001105	64113533	26
000926	42334331	23	001106	23898999	57
000927	12322213	16	001107	97542982	46
000928	22233210	15	001108	69694111	37
000929	11141121	12	001109	12214225	19
000930	43569488	47	001110	59993423	44
001001	63221111	17	001111	35234942	32
001002	01334433	21	001112	22685431	31
001003	63335411	26	001113	22342221	18
001004	13549998	48	001114	21111021	9
001005	69999997	67	001115	01112130	9
001006	11111010	6	001116	00110020	4
001007	01112200	7	001117	00110000	2
001008	01110001	4	001118	00011222	8
001009	01111112	8	001119	21211111	10
001010	11221112	11	001120	11112110	8
001011	34121332	19	001121	21122221	13
001012	01211006	11	001122	11121101	8
001013	88459322	41	001123	11121100	7

Date	T	Sum
001124	02241234	18
001125	11110211	8
001126	01767999	48
001127	96999736	58
001128	29975534	44
001129	99975423	48
001130	11111111	8
001201	00011110	4
001202	00010100	2
001203	11213251	16
001204	11111012	8
001205	21021100	7
001206	10121213	11
001207	12333225	21
001208	34447433	32
001209	33443434	28
001210	33241122	18
001211	12231112	13
001212	01122111	9
001213	13110001	7
001214	00110100	3
001215	10011000	3
001216	00000111	3
001217	11113231	13
001218	01121221	10
001219	11121010	7
001220	00010011	3
001221	01012101	6
001222	00110014	7
001223	45422111	20
001224	11011010	5
001225	21116201	14
001226	11011032	9
001227	11111321	11
001228	11113110	9
001229	12110011	7
001230	11011001	5
001231	00011000	2

ELECTRIC ACTIVITY INDICES 2001

Date	T	Sum	Date	T	Sum
010101	00000000	0	010211	11111002	7
010102	00000014	5	010212	10111213	10
010103	22112111	11	010213	33434476	34
010104	21134543	23	010214	22224463	25
010105	01000012	4	010215	10121111	8
010106	11110001	5	010216	00011111	5
010107	01010002	4	010217	10000010	2
010108	11110015	10	010218	10000000	1
010109	11121111	9	010219	00111110	5
010110	00111313	10	010220	01123111	10
010111	11011231	10	010221	11121011	8
010112	21111000	6	010222	00111011	5
010113	01121000	5	010223	22112211	12
010114	11121002	8	010224	00112100	5
010115	01111014	9	010225	00110010	3
010116	11121100	7	010226	11111323	13
010117	21210421	13	010227	45231110	17
010118	00131003	8	010228	00043331	14
010119	22101011	8	010301	21111011	8
010120	00122123	11	010302	10122233	14
010121	11143244	20	010303	21127252	22
010122	32242211	17	010304	25522347	30
010123	11179375	34	010305	65552112	27
010124	12123592	25	010306	12222141	15
010125	22210032	12	010307	11222321	14
010126	11221124	14	010308	11121123	12
010127	11000000	2	010309	21122301	12
010128	00112141	10	010310	01232010	9
010129	15221112	15	010311	01121000	5
010130	21110000	5	010312	00133333	16
010131	00055654	25	010313	32143111	16
010201	12112112	11	010314	31121011	10
010202	22111001	8	010315	00001001	2
010203	10000000	1	010316	10001101	4
010204	00000000	0	010317	00011132	8
010205	00010010	2	010318	23221013	14
010206	22221232	16	010319	11125697	32
010207	22231111	13	010320	57659984	53
010208	01110112	7	010321	52121000	11
010209	00012111	6	010322	00129833	26
010210	11121110	8	010323	25445455	34

Date	T	Sum	Date	T	Sum
010324	11522441	20	010504	11211111	9
010325	01122011	8	010505	01110010	4
010326	00111010	4	010506	01221112	10
010327	53232279	33	010507	02222121	12
010328	32599992	48	010508	01122355	19
010329	23787623	38	010509	55435875	42
010330	21343242	21	010510	64222132	22
010331	99999999	72	010511	10110013	7
010401	98846369	53	010512	31238688	39
010402	64432432	28	010513	63733497	42
010403	11321111	11	010514	43311110	14
010404	22232983	31	010515	11211252	15
010405	11342333	20	010516	21221101	10
010406	21223223	17	010517	21111112	10
010407	23231142	18	010518	23112102	12
010408	21329949	39	010519	24211011	12
010409	23353622	26	010520	11111101	7
010410	32222222	17	010521	01121000	5
010411	31126999	40	010522	11122115	14
010412	97699511	47	010523	23212322	17
010413	11999999	56	010524	23110011	9
010414	43533231	24	010525	10111121	8
010415	21129221	20	010526	12110000	5
010416	32111111	11	010527	01110932	17
010417	11111129	17	010528	22234754	29
010418	99722111	32	010529	41213311	16
010419	11211012	9	010530	00001010	2
010420	11111001	6	010531	00000010	1
010421	11011516	16	010601	00022237	16
010422	12438823	31	010602	55443224	29
010423	53212111	16	010603	22222111	13
010424	11222111	11	010604	21122111	11
010425	10121112	9	010605	12211101	9
010426	11224002	12	010606	10121212	10
010427	01121110	7	010607	12221111	11
010428	02945948	41	010608	12221222	14
010429	64424331	27	010609	13344449	32
010430	00000000	0	010610	97552233	36
010501	10001000	2	010611	12112211	11
010502	01121110	7	010612	11111100	6
010503	11111121	9	010613	12211110	9

ELECTRIC ACTIVITY INDICES 2001

Date	T	Sum	Date	T	Sum
010614	11100115	10	010725	12333331	19
010615	23220010	10	010726	33322111	16
010616	21310011	9	010727	11111211	9
010617	11124311	14	010728	01001001	3
010618	14763458	38	010729	01101210	6
010619	51110334	18	010730	11111153	14
010620	23332210	16	010731	43624555	34
010621	12222321	15	010801	22233321	18
010622	02111101	7	010802	11222213	14
010623	01111111	7	010803	21933321	24
010624	12221211	12	010804	01121211	9
010625	11111111	8	010805	11227633	25
010626	11122235	17	010806	24433333	25
010627	22221100	10	010807	23211101	11
010628	00110101	4	010808	12111011	8
010629	10110111	6	010809	02211103	10
010630	12111021	9	010810	44211232	19
010701	21100112	8	010811	10000002	3
010702	01111011	6	010812	11112334	16
010703	12122110	10	010813	25543143	27
010704	11111121	9	010814	22322211	15
010705	22222342	19	010815	11111122	10
010706	11211211	10	010816	10011001	4
010707	11111111	8	010817	11119799	38
010708	22221238	22	010818	92711845	37
010709	45210112	16	010819	11562230	20
010710	01111231	10	010820	10113333	15
010711	22111110	9	010821	13231342	19
010712	02111111	8	010822	12323245	22
010713	11120011	7	010823	24322111	16
010714	59421211	25	010824	01312100	8
010715	01112233	13	010825	01114524	18
010716	12222135	18	010826	23331112	16
010717	23232221	17	010827	11112259	22
010718	12312321	15	010828	44221120	16
010719	11111211	9	010829	11211121	10
010720	11111100	6	010830	01221631	16
010721	11111101	7	010831	12132151	16
010722	11211012	9	010901	12110010	6
010723	21111211	10	010902	00112111	7
010724	11112322	13	010903	22233346	25

Date	T	Sum	Date	T	Sum
010904	32222222	17	011015	32251311	18
010905	12111120	9	011016	32122111	13
010906	11111001	6	011017	11121011	8
010907	00001011	3	011018	00002121	6
010908	32111100	9	011019	00133421	14
010909	11121100	7	011020	01332211	13
010910	01111010	5	011021	21121999	34
010911	01012422	12	011022	93499999	61
010912	22231115	17	011023	53552111	23
010913	15342121	19	011024	01000000	1
010914	06323211	18	011025	00141112	10
010915	42446556	36	011026	01120012	7
010916	11113222	13	011027	12122100	9
010917	01122112	10	011028	29655344	38
010918	12111172	16	011029	22233322	19
010919	14121211	13	011030	21122100	9
010920	00011001	3	011031	10125134	17
010921	20011101	6	011101	65424211	25
010922	20162310	15	011102	10213100	8
010923	01499996	47	011103	00001000	1
010924	52122310	16	011104	00122100	6
010925	02121129	18	011105	00135978	33
010926	95862121	34	011106	99999899	71
010927	11132342	17	011107	94122132	24
010928	21332223	18	011108	21211011	9
010929	22274349	33	011109	10111112	8
010930	61222499	35	011110	11111011	7
011001	67975323	42	011111	22020000	6
011002	53343399	39	011112	00112100	5
011003	72999866	56	011113	01011021	6
011004	61342332	24	011114	00111000	3
011005	00131252	14	011115	00011162	11
011006	11221011	9	011116	12122101	10
011007	00122001	6	011117	11122423	16
011008	11236425	24	011118	11131211	11
011009	42345311	23	011119	2222375	25
011010	11221112	11	011120	21211000	7
011011	31222295	26	011121	11111010	6
011012	59853243	39	011122	11121121	10
011013	12332011	13	011123	11424312	18
011014	01233134	17	011124	12999944	47

ELECTRIC ACTIVITY INDICES 2001

Date	T	Sum
011125	12453110	17
011126	12120000	6
011127	00110100	3
011128	00000001	1
011129	01011000	3
011130	00000010	1
011201	00123212	11
011202	11022111	9
011203	00113123	11
011204	12123122	14
011205	33121223	17
011206	21122322	15
011207	12112210	10
011208	11111100	6
011209	00011001	3
011210	00111001	4
011211	00011110	4
011212	12122123	14
011213	11110100	5
011214	00011111	5
011215	11124212	14
011216	23942111	23
011217	12223321	16
011218	42112111	13
011219	21121112	11
011220	00011102	5
011221	01111243	13
011222	32120010	9
011223	00021100	4
011224	12457632	30
011225	11231112	12
011226	11111012	8
011227	21011123	11
011228	00123111	9
011229	10534223	20
011230	23332419	27
011231	43321356	27

MAGNETIC MEASUREMENTS AND DATA PROCESSING

V. WESZTERGOM

Recording of geomagnetic variations

Geomagnetic variations are recorded by the ARGOS system. ARGOS (developed by the Geomagnetism Group of British Geological Survey) is a PC based automatic observatory equipped with triaxial fluxgate and a proton magnetometer in a DD/DI configuration. The fluxgate variometer sensors are aligned in X, Y, Z directions. 10 second samples are used to provide minute values centred on the minute by means of a 7-point cosine filter. Reported elements are: H (horizontal), Z (vertical), D (declination) and F (total force). From the year 1993 on the minute values are transmitted through the METEOSAT satellite to the Edinburgh Geomagnetic Information Node.

Table I. Main specifications of ARGOS used in Nagycenk Observatory

Device	Resolution	Dynamic range	Temperature coeff.
Triaxial Fluxgate			
Magnetometer	0.1 nT	± 500 nT/ ± 400 nT	~ 1 nT/ $^{\circ}$ C
Proton Magnetometer (ELSEC 820)	0.1 nT	10000–90000 nT	–

DI/DD coil system consists of two orthogonal sets of Helmholtz coils (proton head is mounted at the centre). Coils orientated so that one provides bias fields approximately perpendicular to F vector in the magnetic meridian and the other provides bias fields approximately perpendicular to F in the horizontal plane. DD and DI relative to the initial values (D_0 , I_0) are calculated. DD/DI proton magnetometer is used in every tenth minutes from which F and almost absolute values of D and I are obtained.

Satellite transmitter, 6800 Series of Data Collection Platform, was supplied by Space Technology Systems. Power output to antenna (two linearly-polarised Yagi arranged to give circular polarisation) is 4 watts at 402 MHz. Data storage capacity is 2×40 kbytes.

Timing is produced by the IBM clock corrected by the high stability crystal built in the Proton Magnetometer.

To ensure continuous recording a high stability torsion photoelectric magnetometer (type PSM-8711) has been run from 1 January 1998. Data along with telluric data are logged by a DR-02 type digital recording system. The PSM magnetometer records the H, D and Z component with an exceptionally high parameter stability. The baseline variation has never exceeded 1.5 nT/year. Maximum resolution is 3 pT, sampling rate applied is 10 s. Frequency response: 0.3 Hz to DC. Sensitivity to tilting: less than 10 nT/''.

Data are stored in the internal memory of the digital data logger DR-02. Both the PSM and the DR-02 was developed and provided by the Institute of Geophysics Polish Academy of Sciences.

Absolute control, baselines

Baselines of the variometer systems are derived from absolute observations. Prior to 1989 the baseline was controlled by two QHM, one declinometer and one BMZ. From 1989 till the end of 1994 the standard instrument for absolute measurements was the vector proton magnetometer (NVP) constructed in Niemegk Observatory. In 1994 an Overhauser proton magnetometer (type: GSM 19 of GEM Systems) and a fluxgate theodolite (developed by the Danish Meteorological Institute) was purchased. Since then the standard instruments are the fluxgate theodolite for I and D and the Overhauser effect proton magnetometer for F.

To determine the momentary angle of declination four observations (four null positions in the horizontal plane) are taken and it is repeated at least two times. Generally the closer azimuth mark is used but it is checked regularly with the far azimuth mark. Inclination angle is determined in the plain of the momentary magnetic meridian in the same way as D. Total intensity is measured simultaneously with I-measurements on the next (F) pillar with the Overhauser magnetometer. Absolute values of all geomagnetic elements are referred to the same pillar of the absolute hut. Observation is made weekly, occasionally more often.

Absolute measurements are supplemented by quasi absolute baseline reference measurements. Declination, inclination and total intensity are determined by means of a proton vector magnetometer in every ten minutes.

Data processing and availability

Sampling rate of magnetic variation data is 10s both for ARGOS and PSM. Minute mean values are produced with digital filter from the raw sampled data. According to the IAGA recommendation minute mean values are stored. Hourly means are calculated from minute means, yearly means are derived from hourly means. Final absolute values of H, D and Z field component are obtained from smoothed baselines.

ARGOS data are compared continuously to PSM data and gaps are filled.

Data are logged on floppy disk too. In addition to logging data to disk INTER-MAGNET V2.8 format satellite transmission packets are sent to DCP.

Presentation of the results

- plot of hourly mean values of H, D, Z
- plot of daily mean values of H, D, Z
- tables of geomagnetic activity indices, K
- table of annual mean values of geomagnetic elements
- special phenomena: SSC, sfe

See CD (program Seenck.exe, menu item Magnetics).

GEOMAGNETIC DATA

Hourly mean values of H, D, Z and F

Hourly means are derived from minute means corrected using absolute observations. The units of the elements are 0.1 nT, Declination is also scaled to 0.1 nT. Minute means of F are calculated from H and Z. F values are checked by comparing them with proton magnetometer readings taken at every 10 minutes.

Daily mean values of H, D, Z and F

Daily mean values are calculated from hourly mean values.

Geomagnetic activity indices: K-index

The K-index is determined from the amplitude ranges of H and D components for each three-hour Universal Time interval. Limit for K=9 is 350 nT in Nagycenk.

Special phenomena

List of special events is based on both magnetic and earth current records. Tables are given for SSC-s and sfe.

Annual mean values of geomagnetic elements

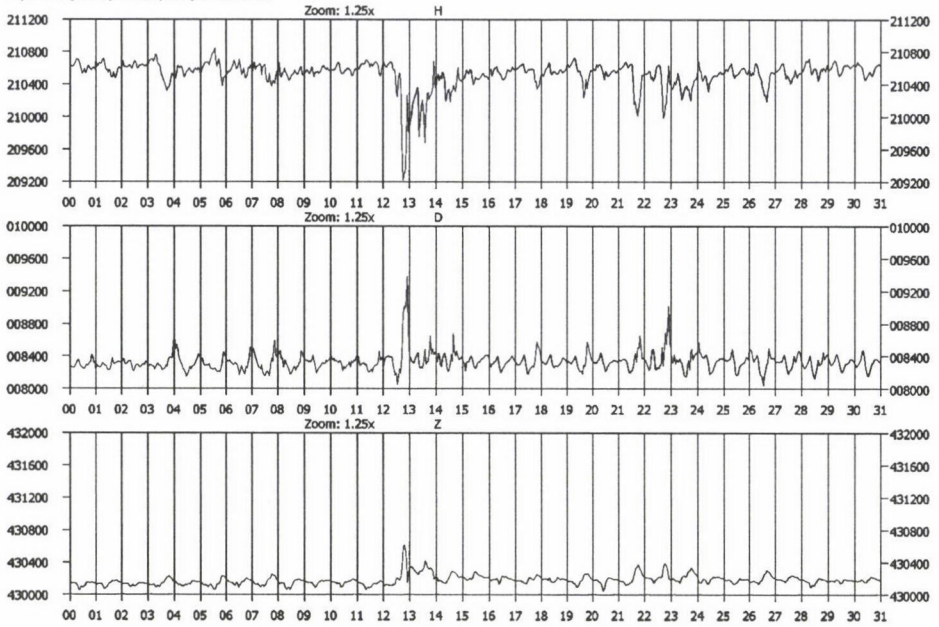
Table contains yearly means of the geomagnetic elements 1961 to 1993 in nT. These values are the results of a reevaluation of previously published data, including corrections eliminating disturbances caused by construction works in the observatory. Corrected values are noted by asterisk.

Times in this section are given in UT!

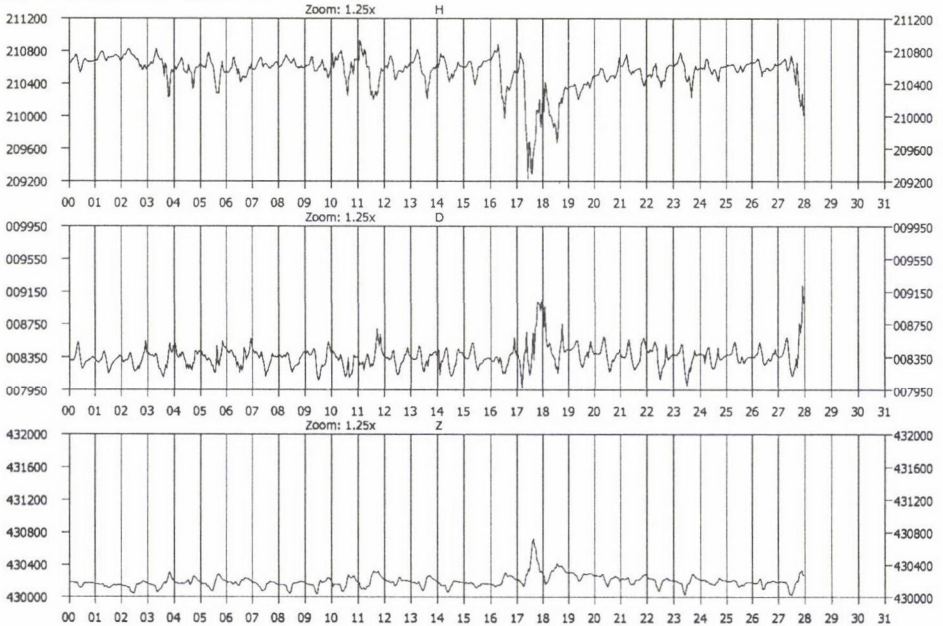
See CD (program Seenck.exe, menu item Magnetics).

Hourly mean values of H, D, Z
1999-2001

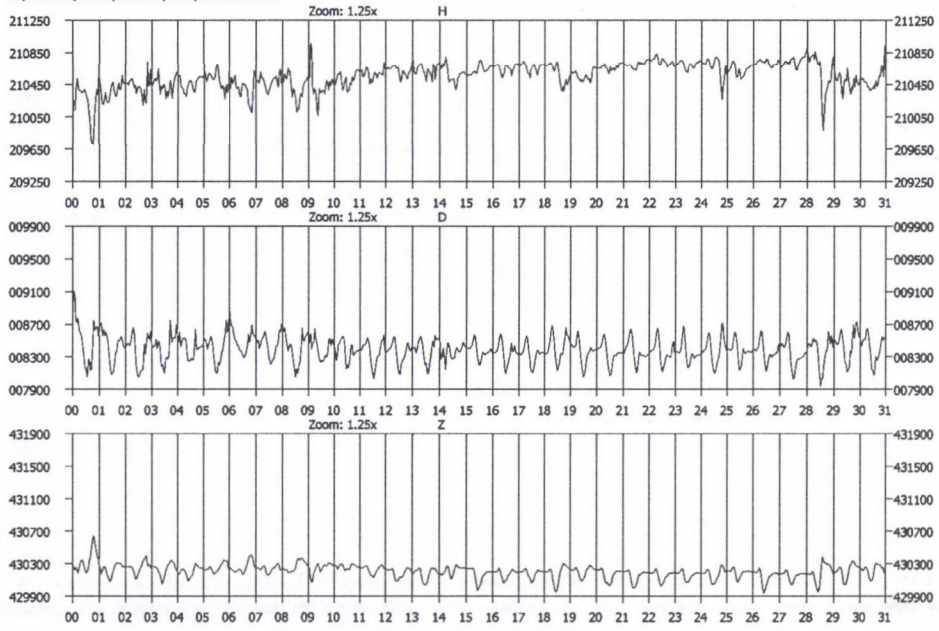
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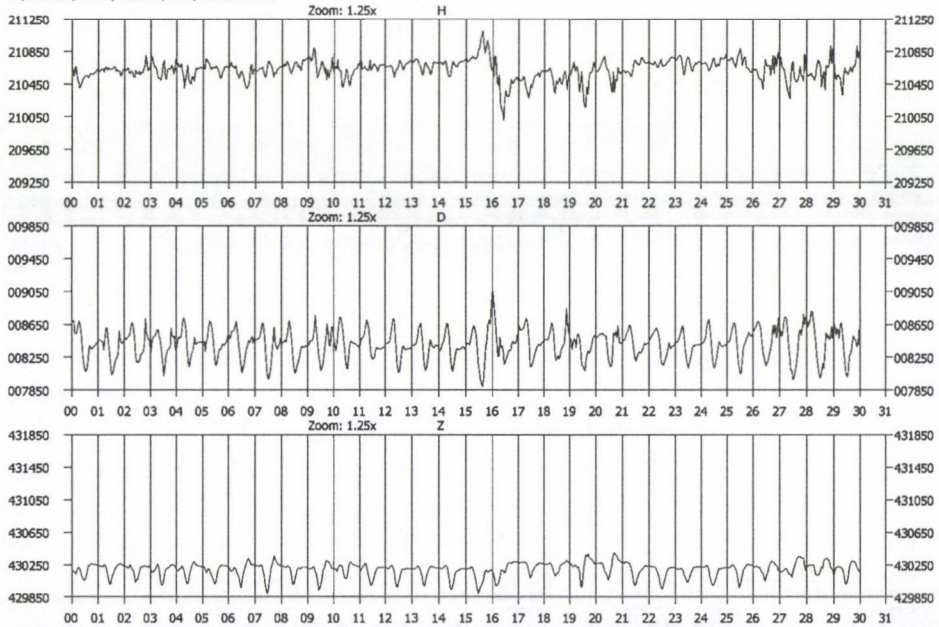
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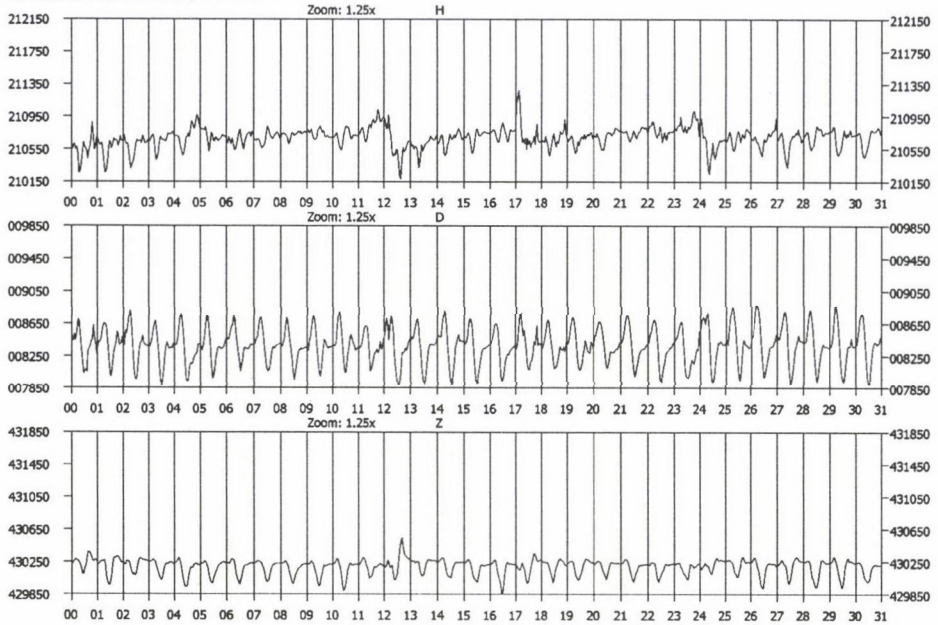
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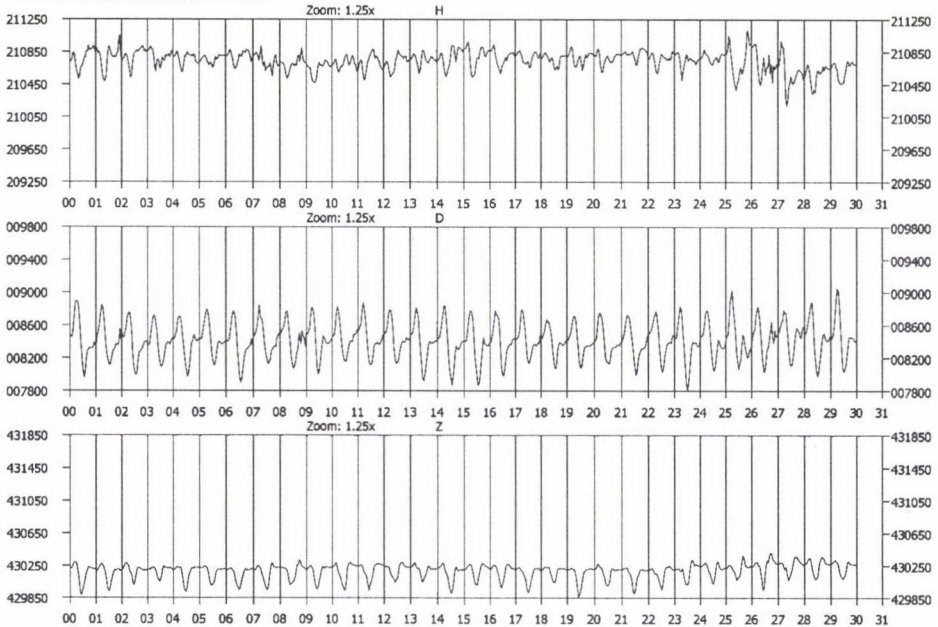
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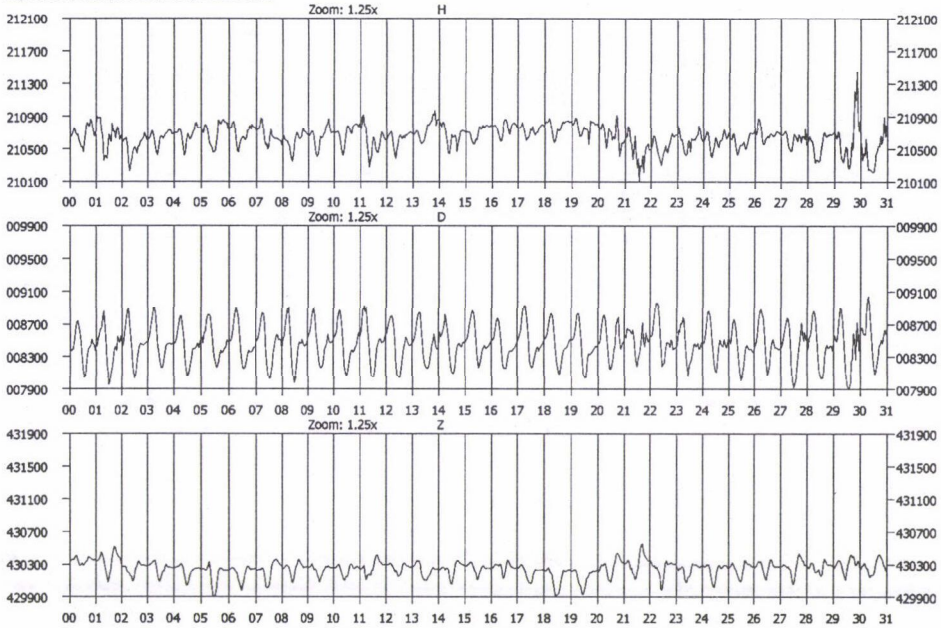
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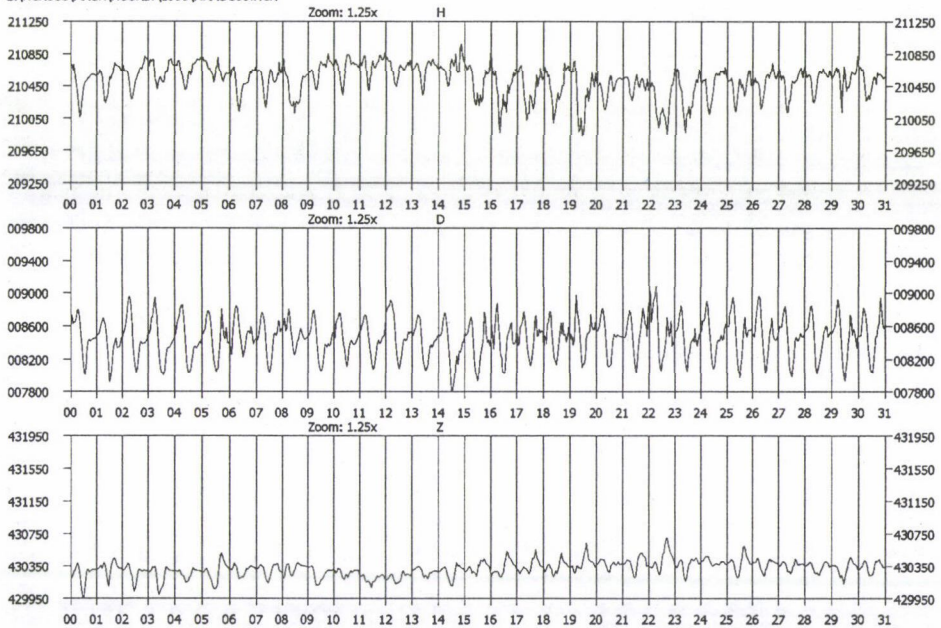
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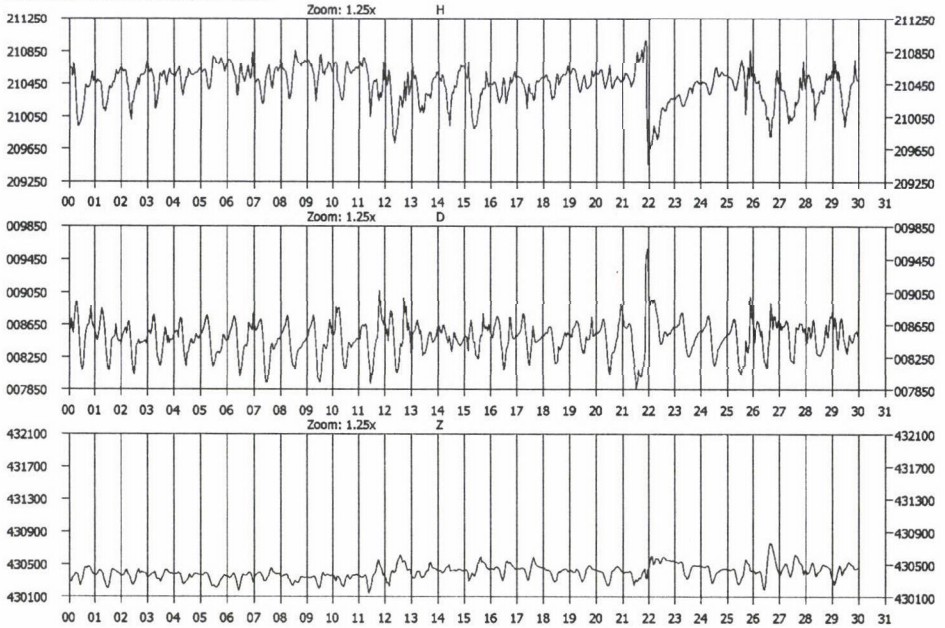
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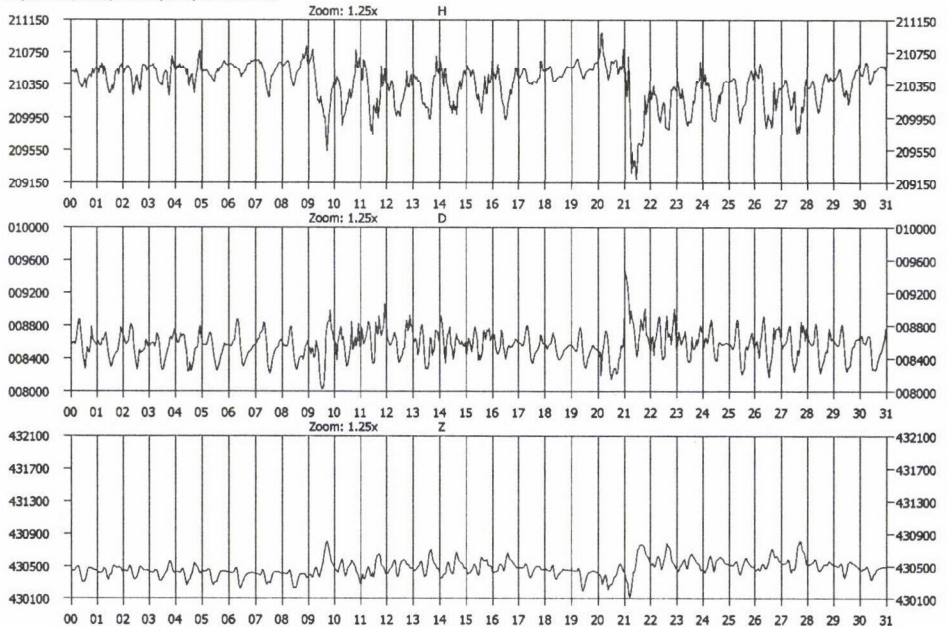
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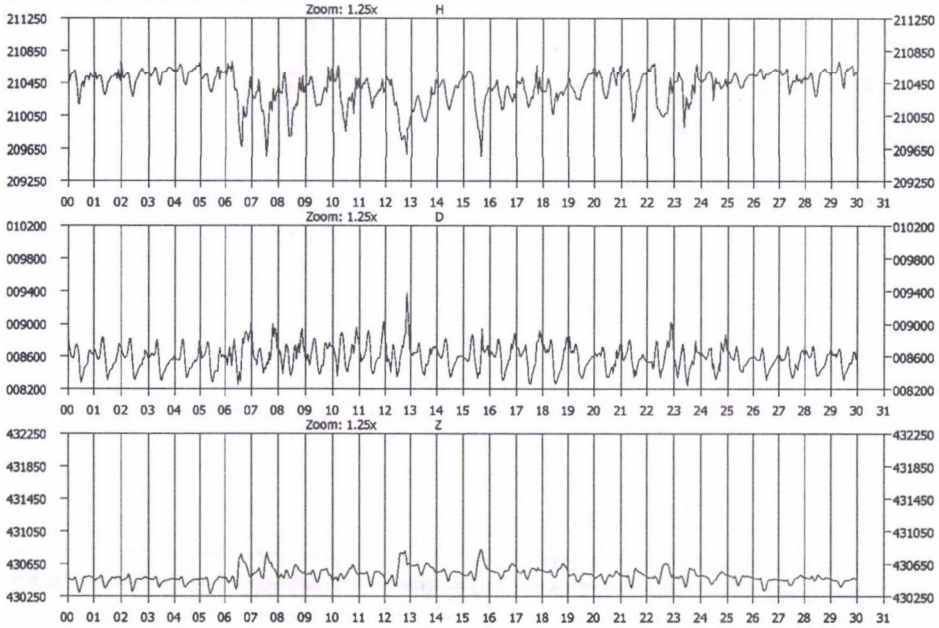
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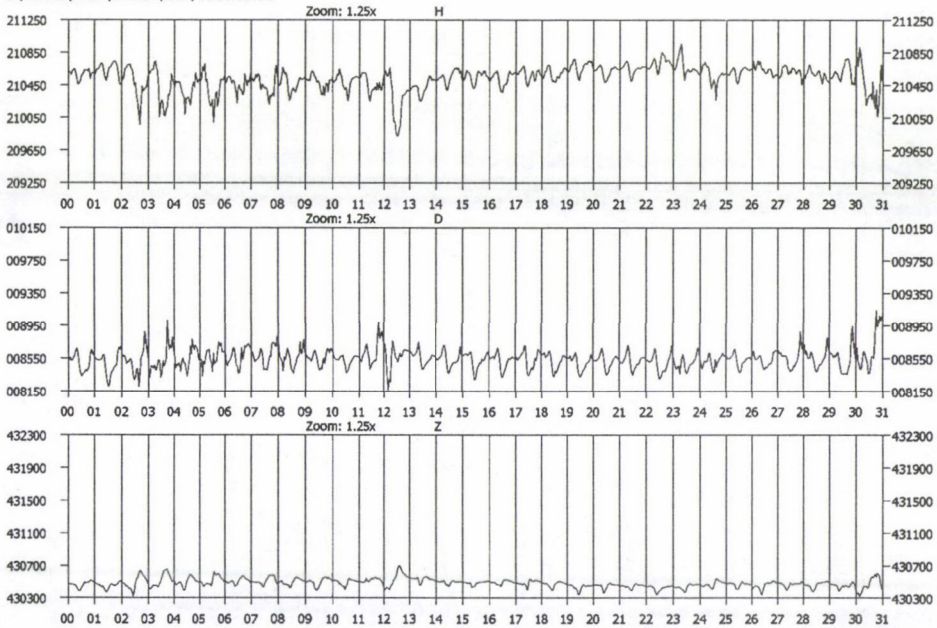
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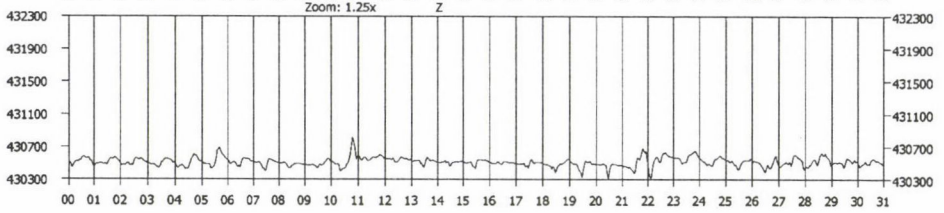
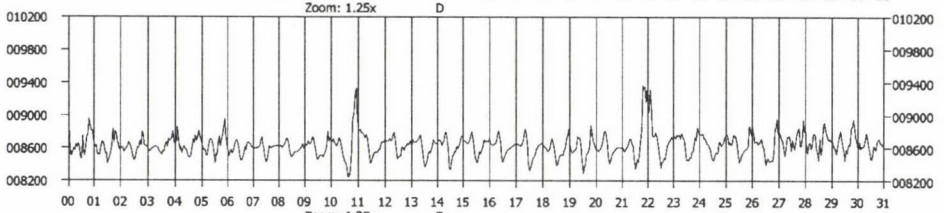
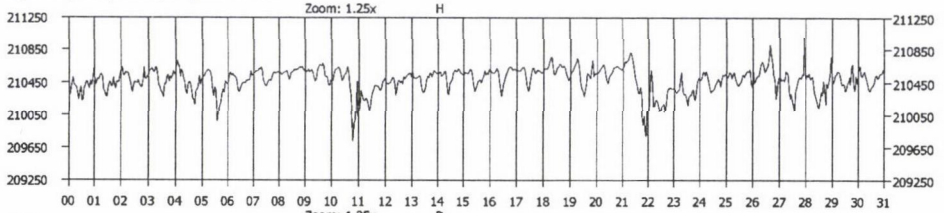
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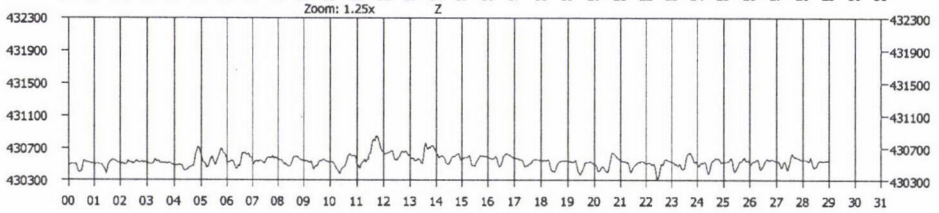
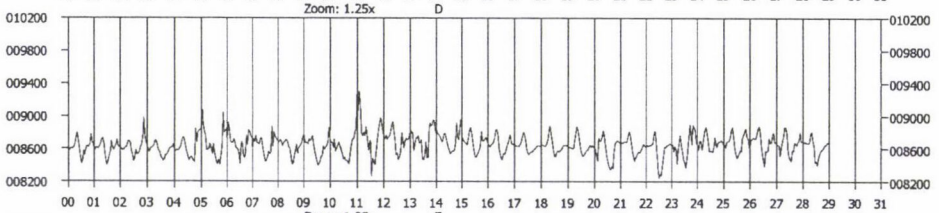
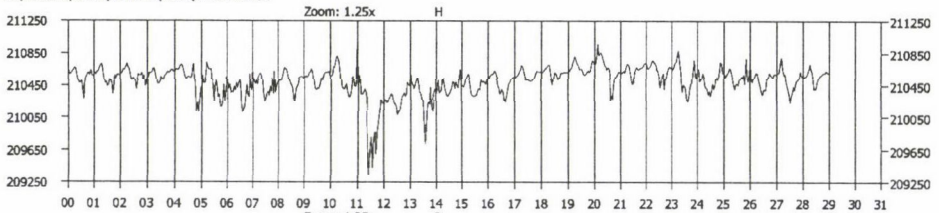
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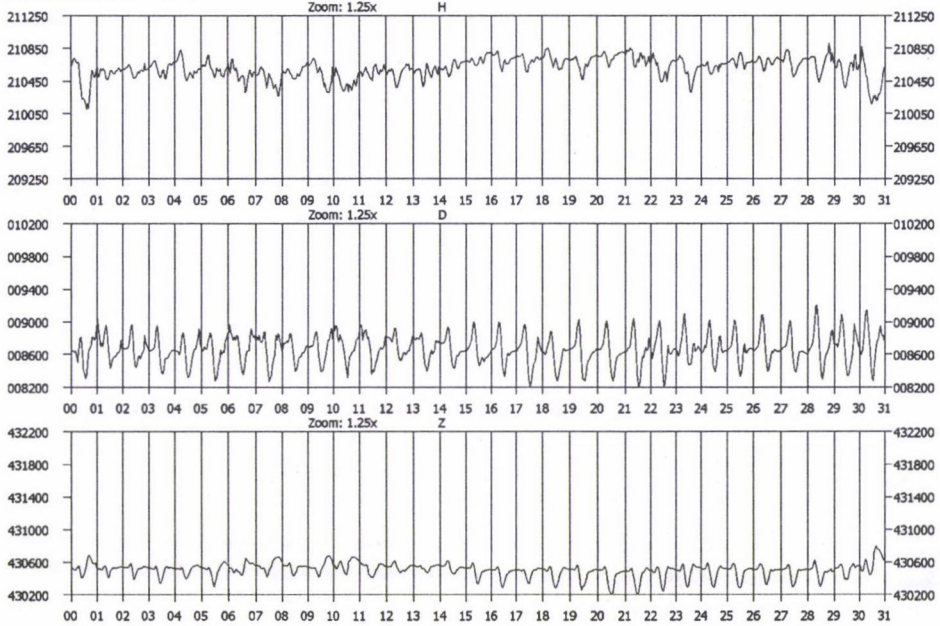
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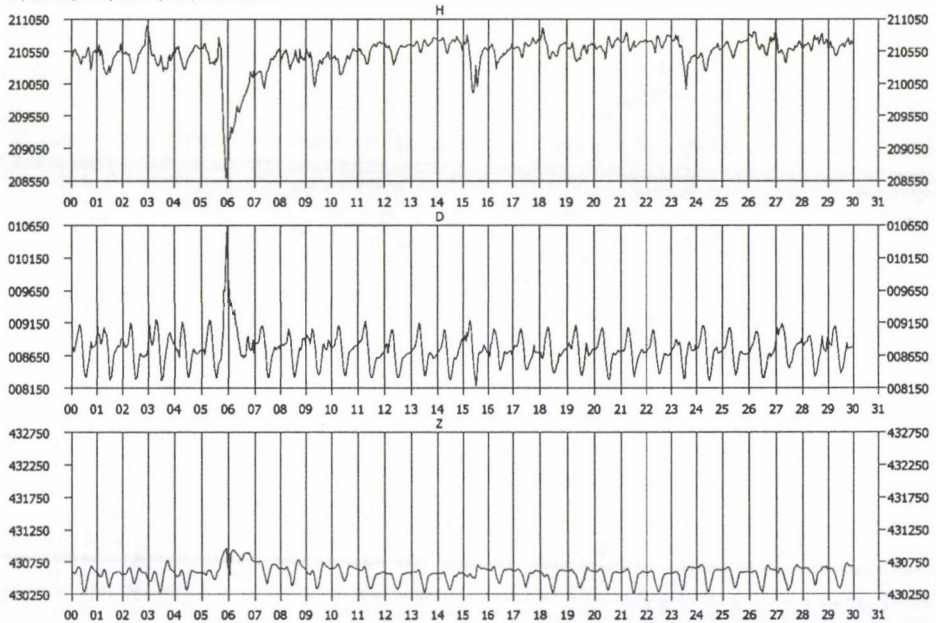
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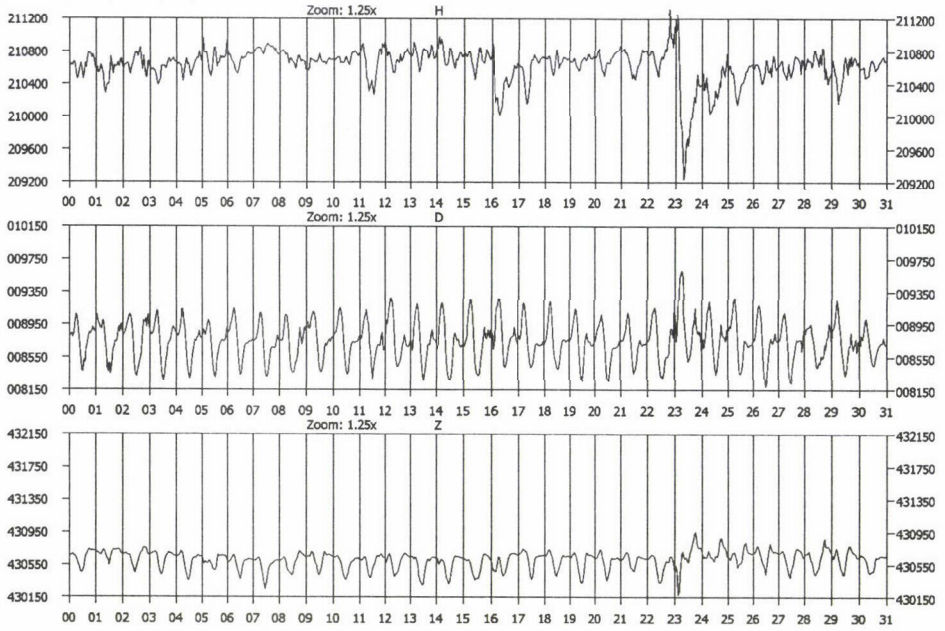
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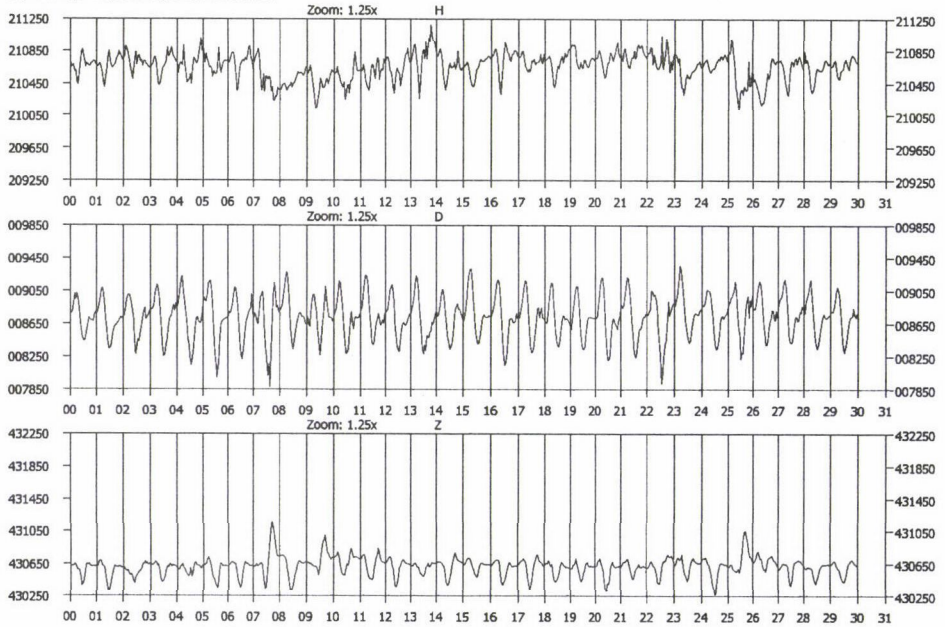
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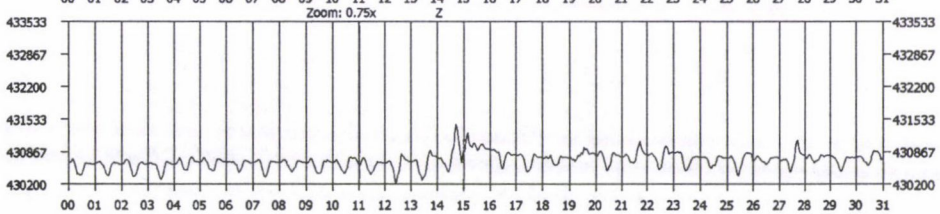
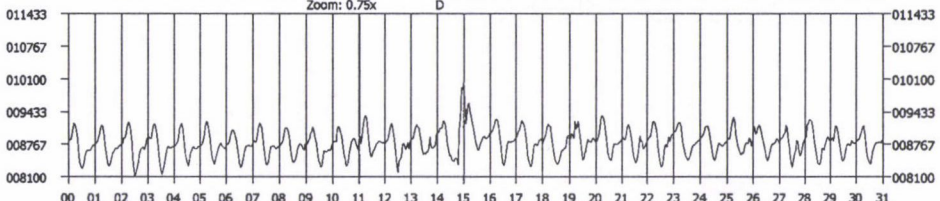
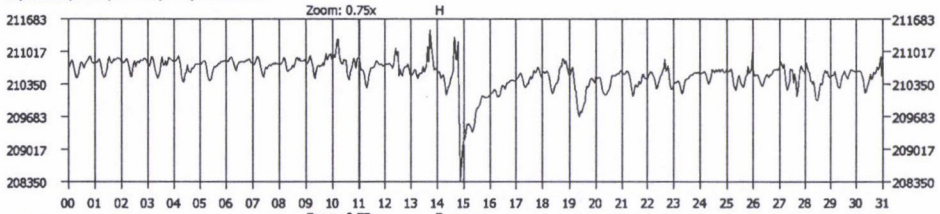
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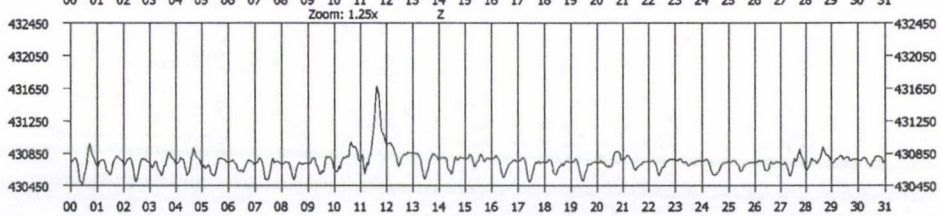
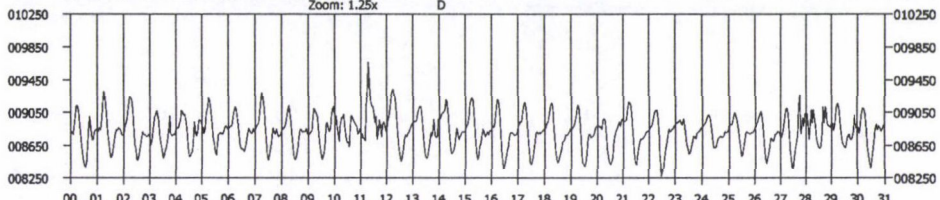
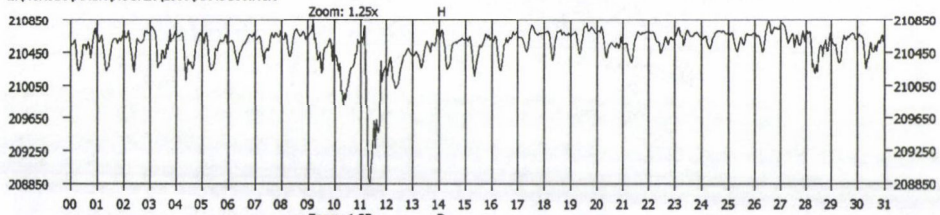
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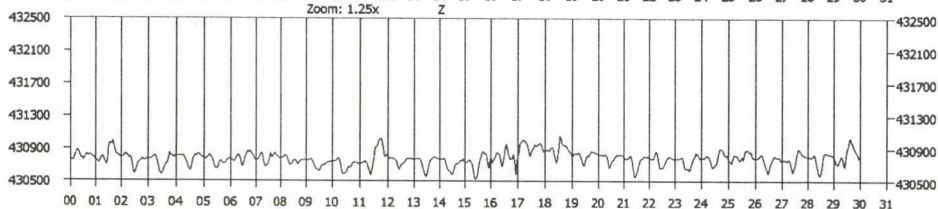
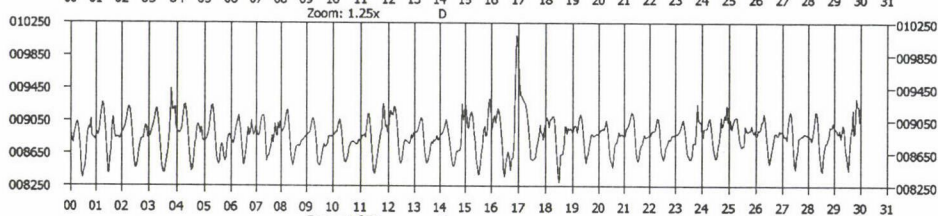
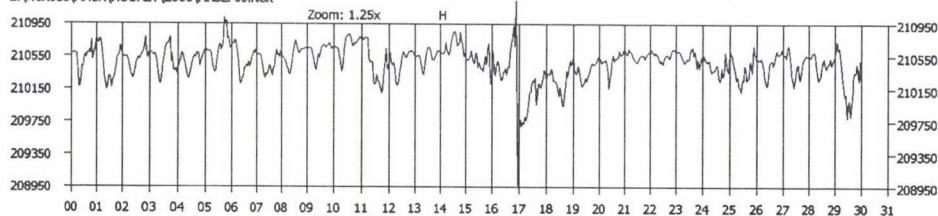
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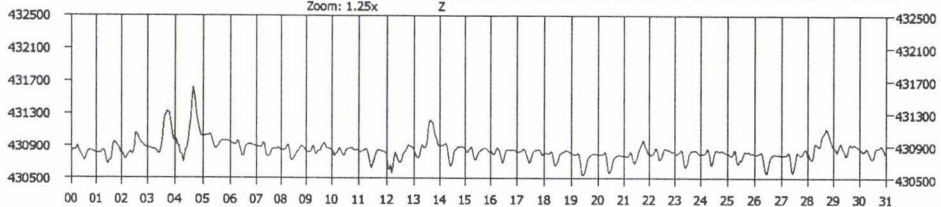
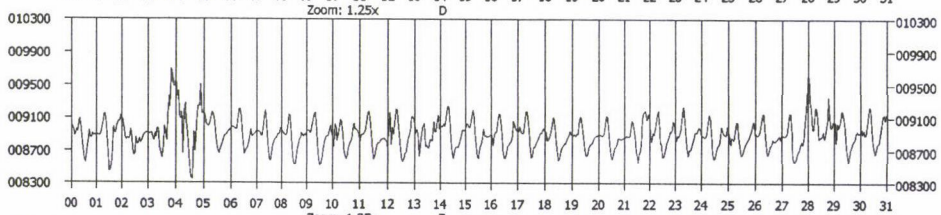
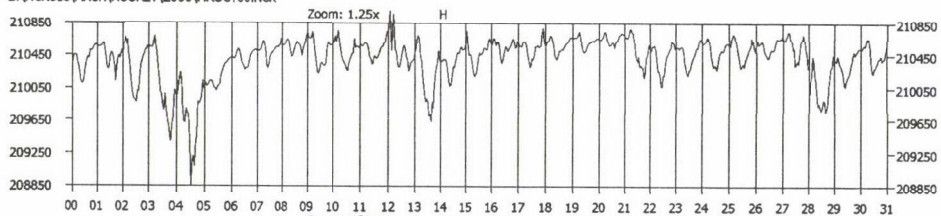
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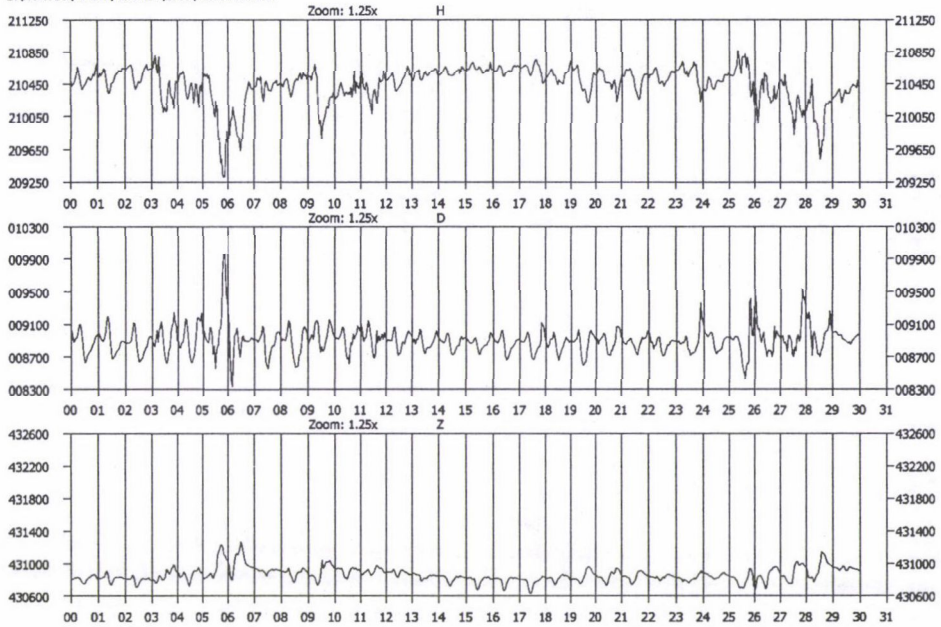
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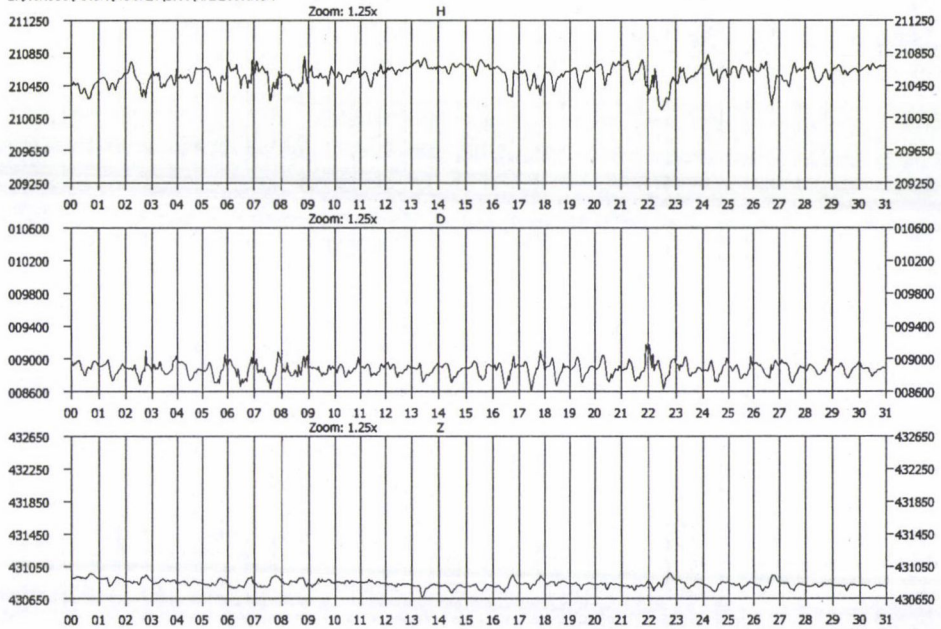
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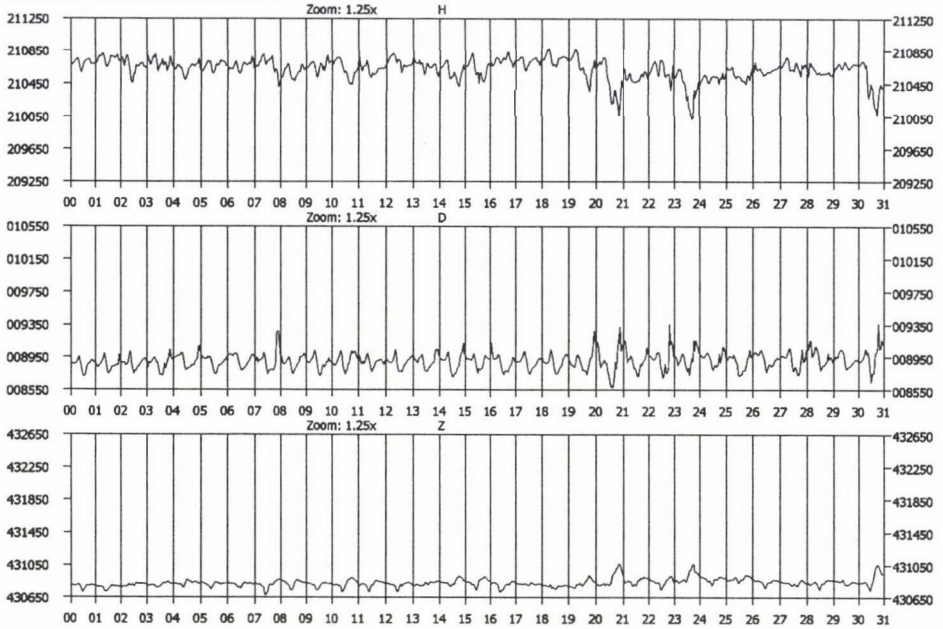
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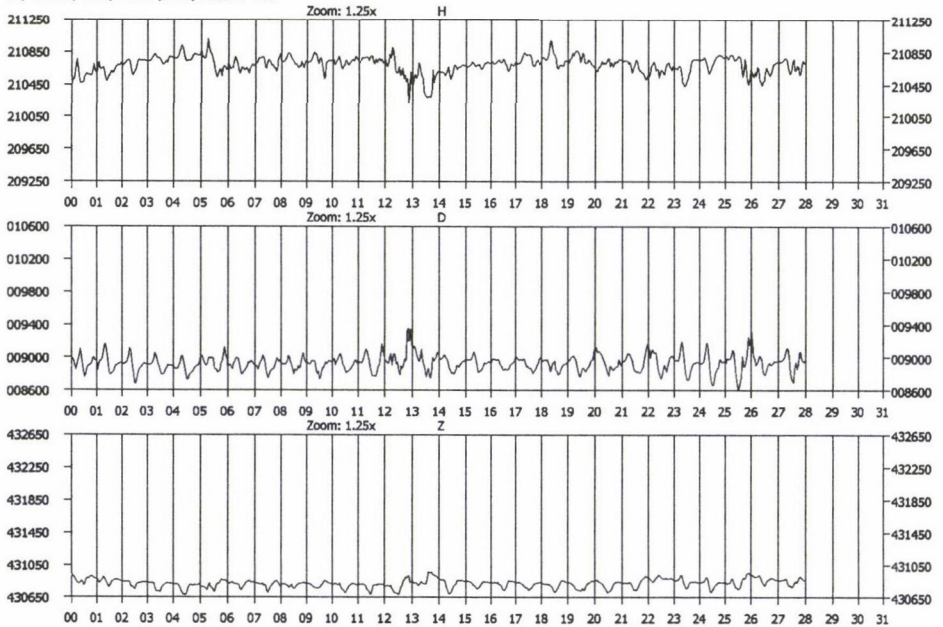
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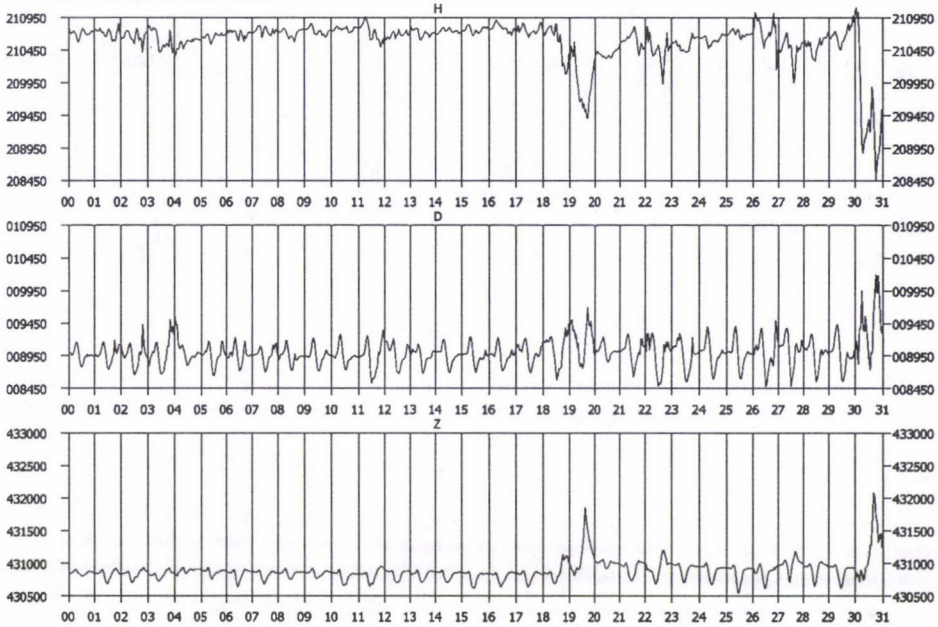
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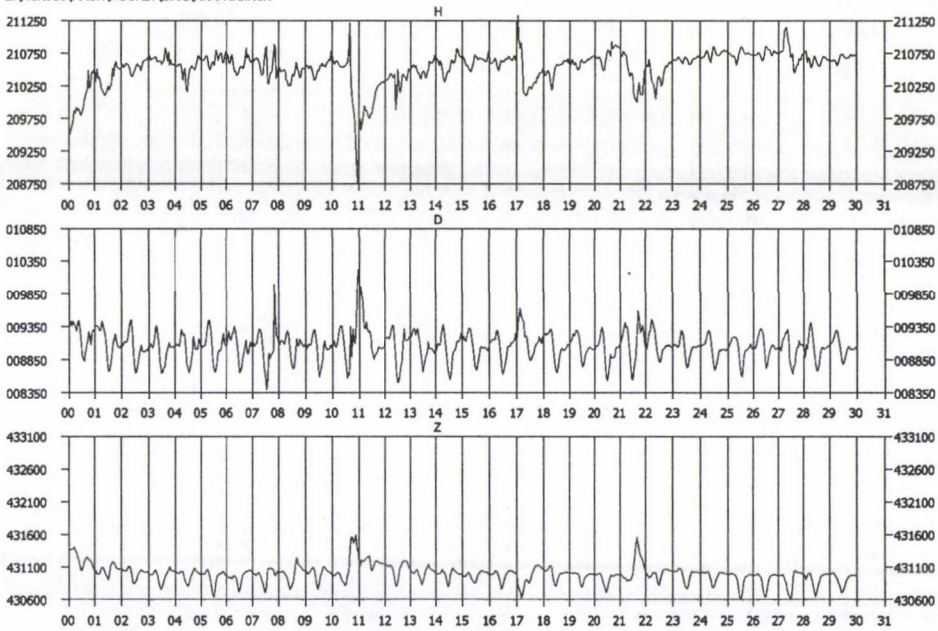
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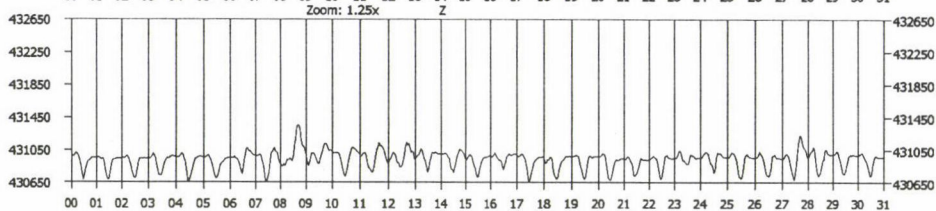
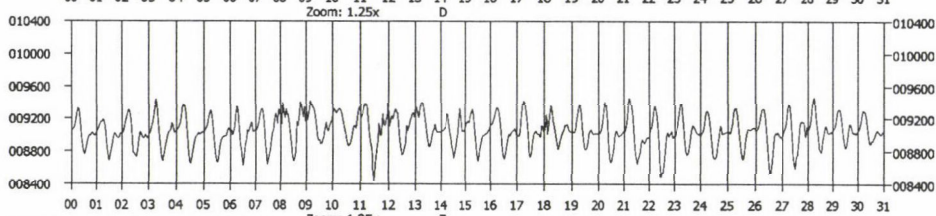
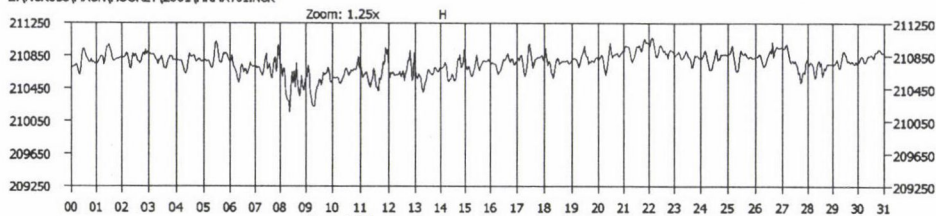
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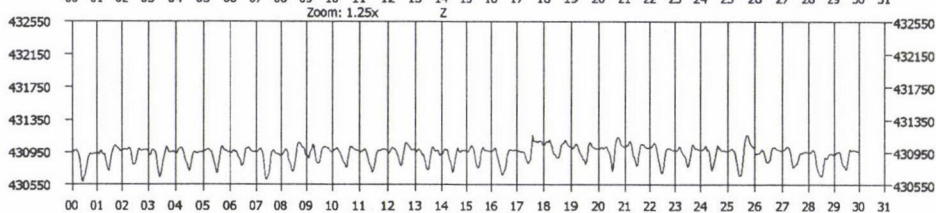
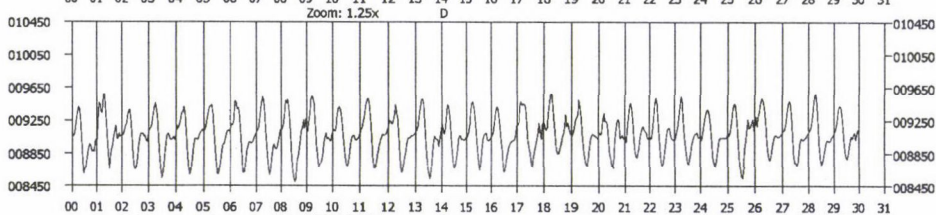
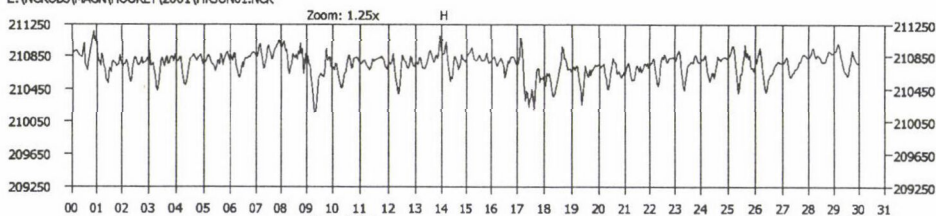
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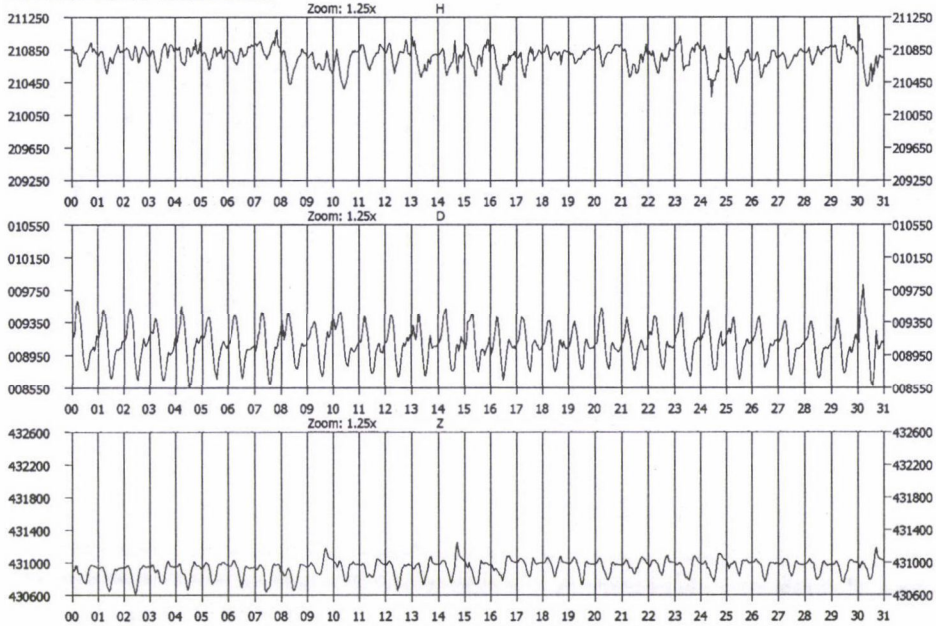
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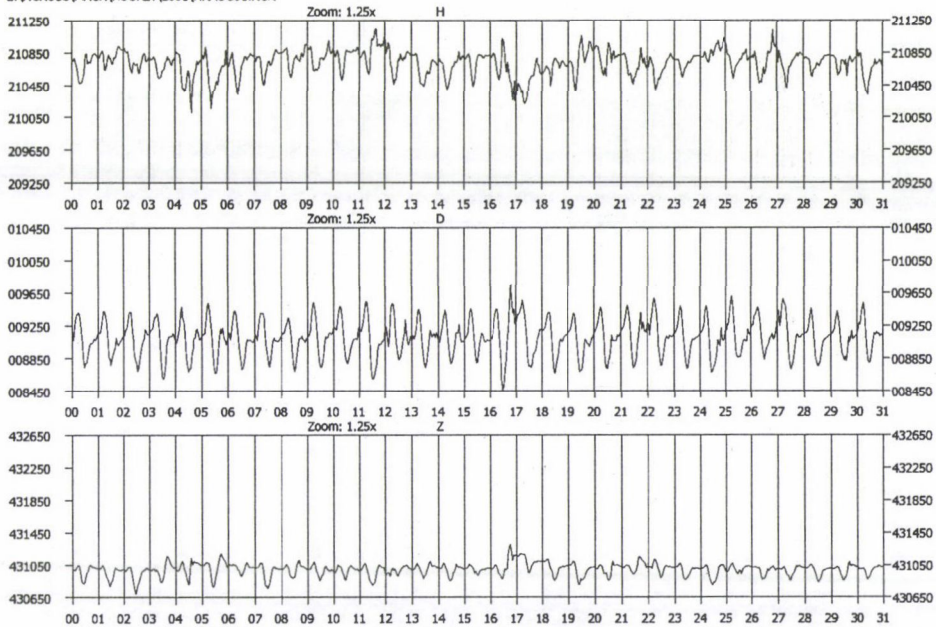
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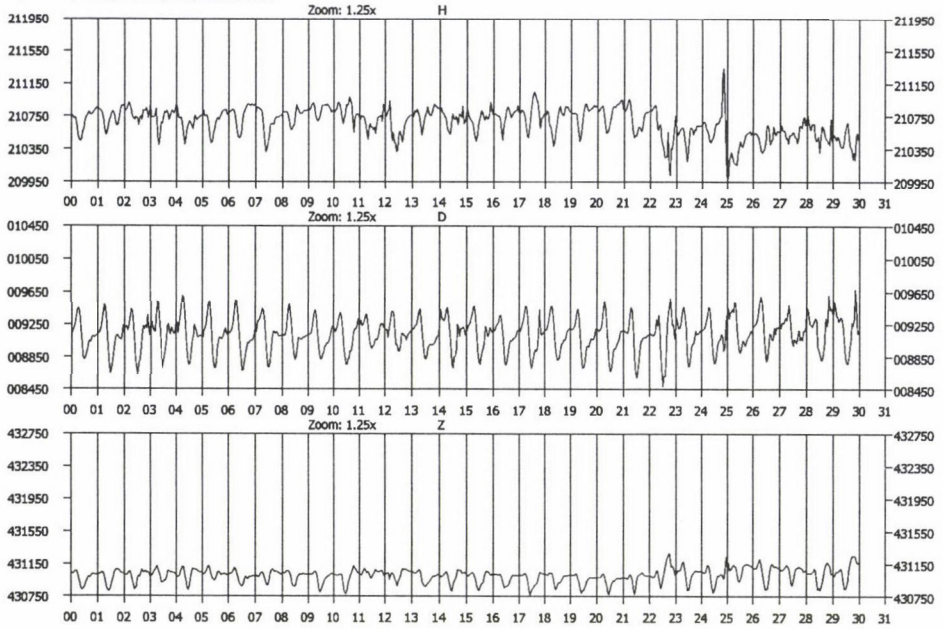
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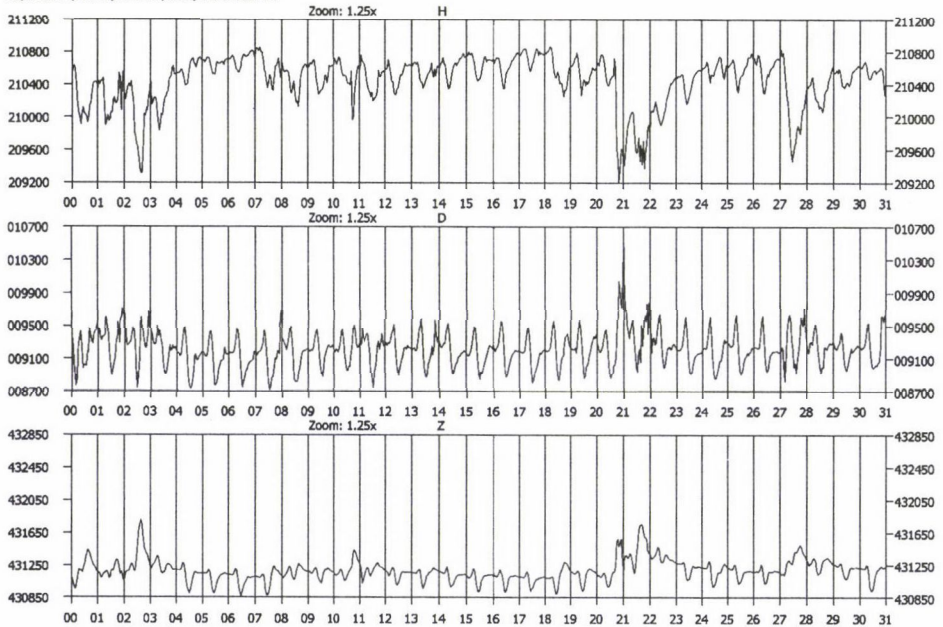
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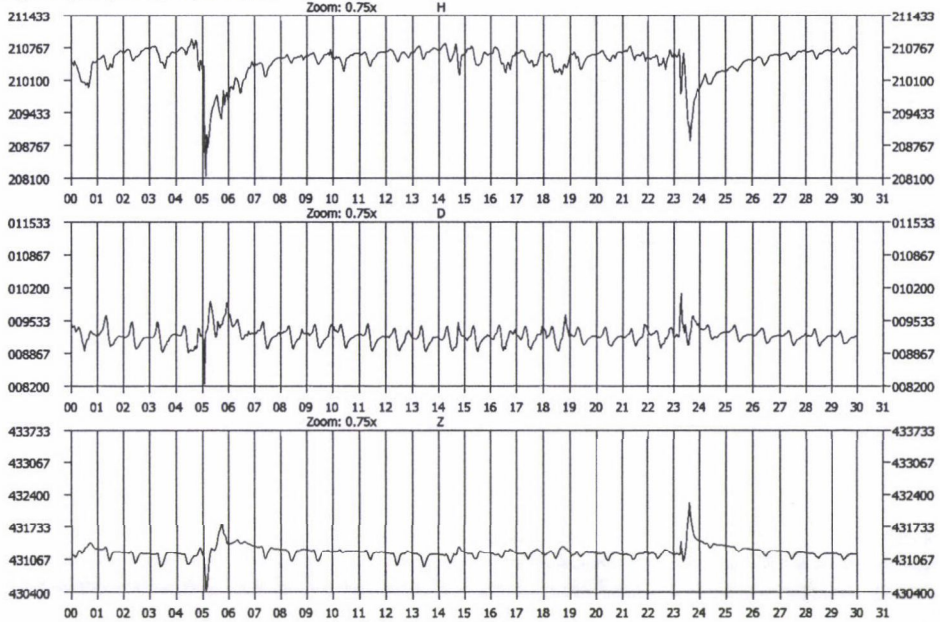
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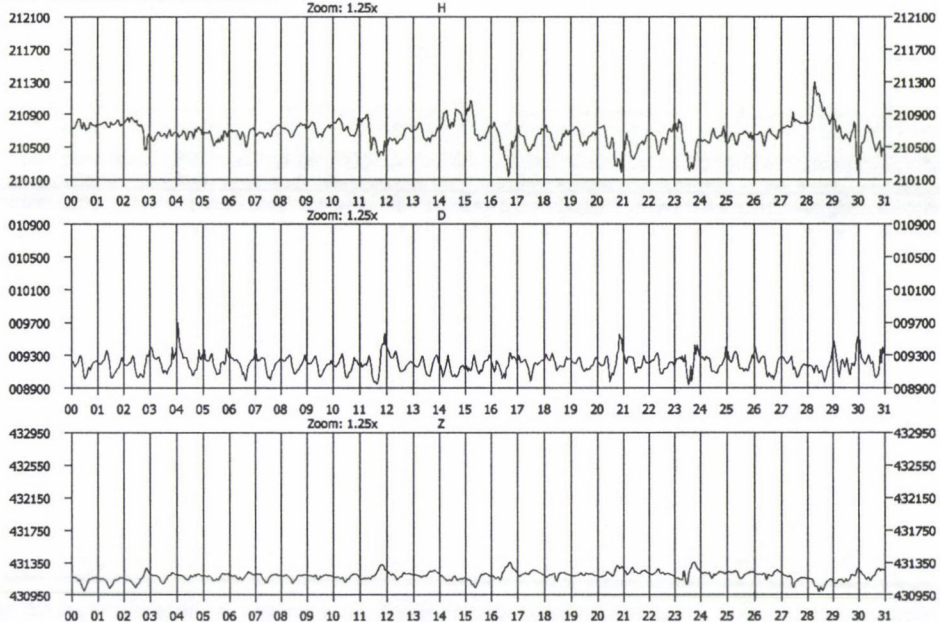
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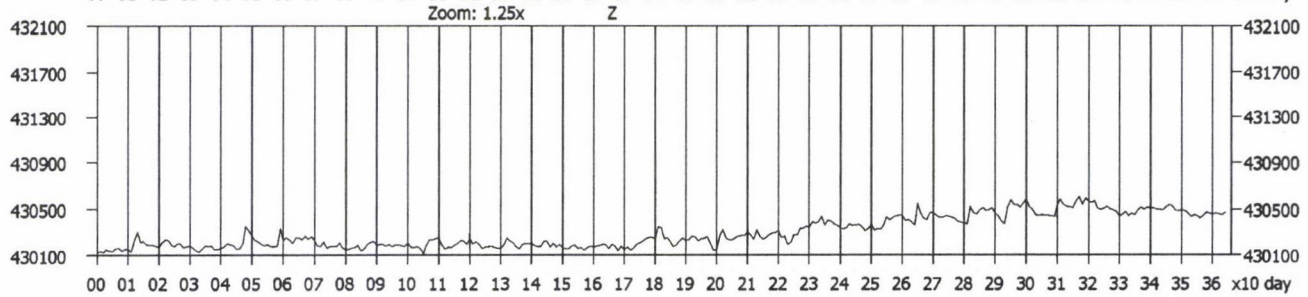
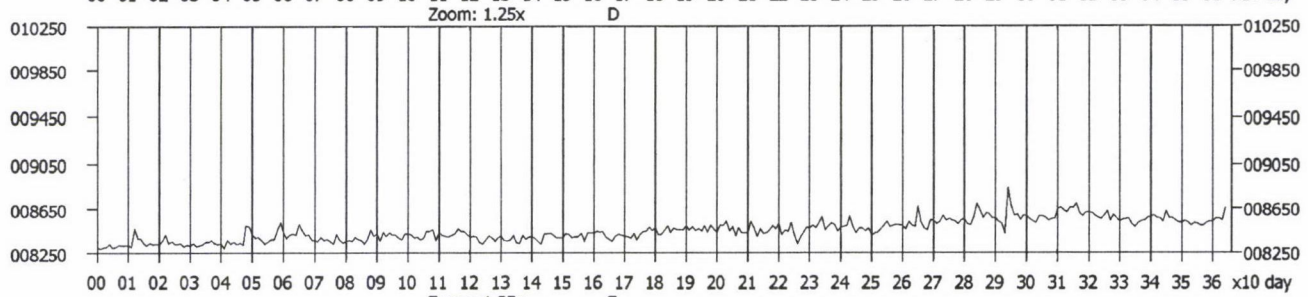
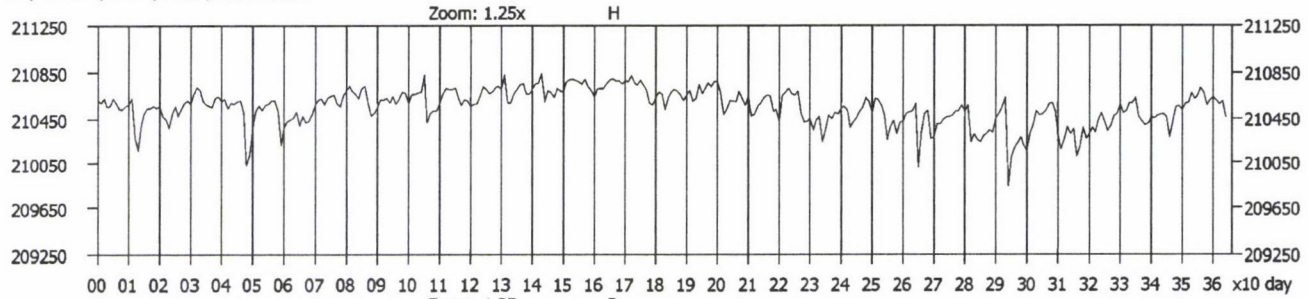


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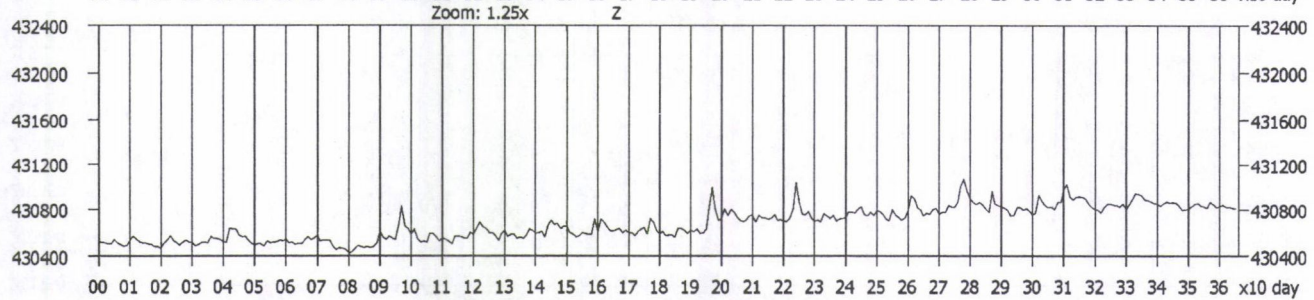
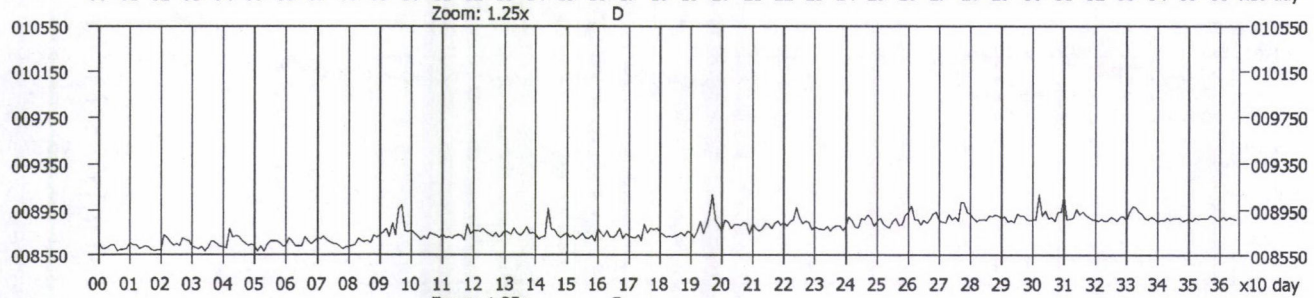
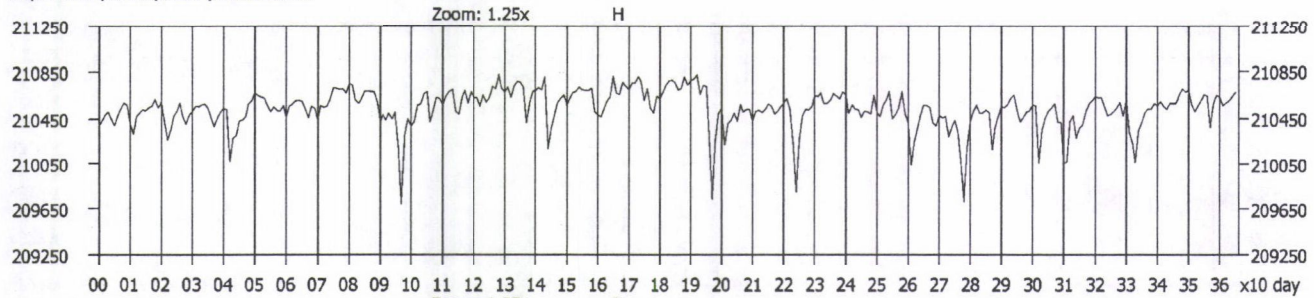
Daily mean values of H, D, Z
1999–2001

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Daily mean values 1999

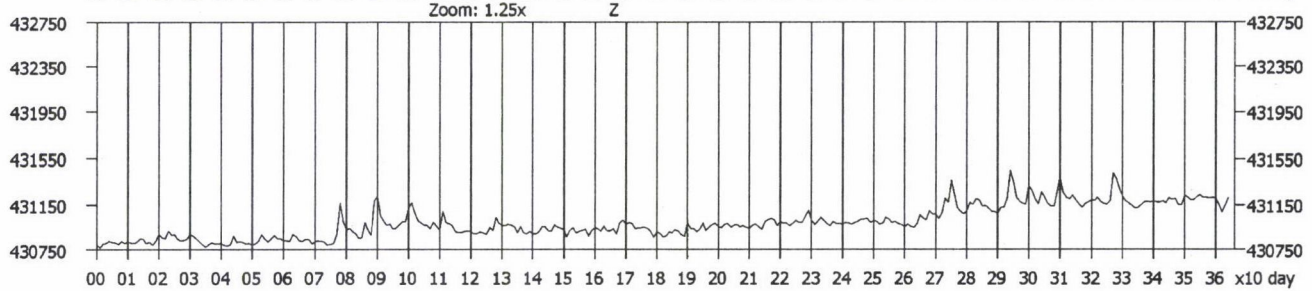
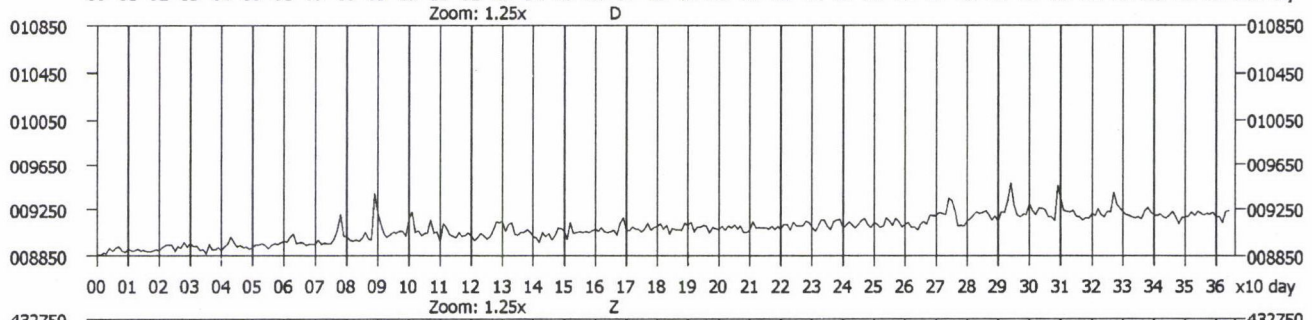
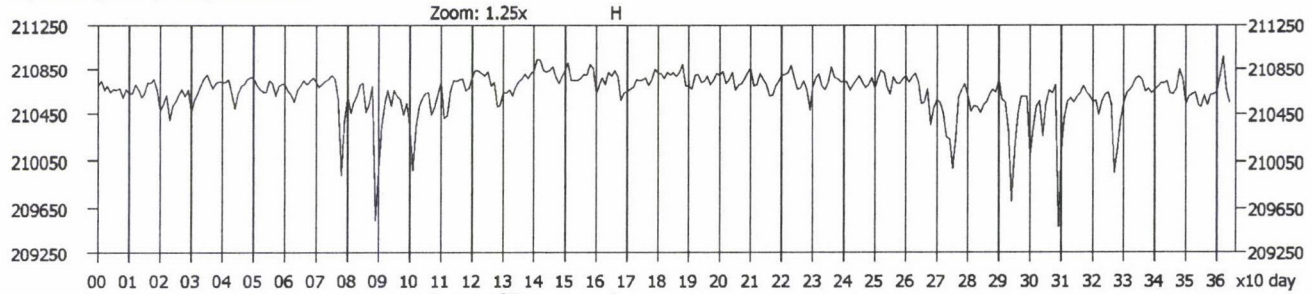
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Daily mean values 2000

DAILY MEAN VALUES 2000

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Daily mean values 2001

Geomagnetic K indices
1999-2001

Date	K	Sum	Date	K	Sum
990101	01122133	13	990212	43443552	30
990102	21123320	14	990213	22231021	13
990103	21101102	8	990214	10113322	13
990104	11111224	13	990215	53233232	23
990105	32211103	13	990216	11120001	6
990106	31214332	19	990217	01344224	20
990107	11223333	18	990218	55666675	46
990108	32333454	27	990219	63345542	32
990109	43221223	19	990220	00100221	6
990110	21131021	11	990221	00001123	7
990111	21121232	14	990222	21321032	14
990112	11112031	10	990223	12322410	15
990113	11044757	29	990224	10123431	15
990114	21455545	31	990225	03121320	12
990115	43245543	30	990226	00011000	2
990116	23211111	12	990227	10121111	8
990117	21110001	6	990228	00212555	20
990118	00000232	7	990301	55235555	35
990119	20010011	5	990302	53313433	25
990120	21011342	14	990303	12132554	23
990121	12131000	8	990304	23434654	31
990122	11115444	21	990305	43232420	20
990123	12232556	26	990306	23132344	22
990124	33221451	21	990307	33441444	27
990125	41121011	11	990308	23222335	22
990126	20121002	8	990309	33334352	26
990127	13123342	19	990310	66453344	35
990128	01122332	14	990311	43344432	27
990129	12122332	16	990312	12232344	21
990130	21110010	6	990313	10023122	11
990131	02111100	6	990314	30134344	22
990201	00000000	0	990315	34432212	21
990202	01000011	3	990316	00221202	9
990203	21112223	14	990317	20121331	13
990204	21133334	20	990318	10332320	14
990205	43223442	24	990319	10212342	15
990206	22222442	20	990320	10001120	5
990207	31333424	23	990321	10123120	10
990208	11122231	13	990322	00001222	7
990209	11000121	6	990323	11122223	14
990210	10100222	8	990324	10131101	8
990211	42234443	26	990325	00121343	14

Date	K	Sum	Date	K	Sum
990326	12332101	13	990507	22213222	16
990327	11001013	7	990508	12112122	12
990328	21212222	14	990509	21121122	12
990329	32444454	30	990510	32021210	11
990330	42434443	28	990511	00000000	0
990331	22223235	21	990512	02233432	19
990401	34111311	15	990513	35434433	29
990402	13123341	18	990514	31231212	15
990403	21032243	17	990515	22132221	15
990404	31223243	20	990516	11102200	7
990405	22343401	19	990517	01000120	4
990406	34222222	19	990518	55444452	33
990407	42312143	20	990519	32112334	19
990408	00113432	14	990520	22122223	16
990409	22011221	11	990521	31002212	11
990410	11433444	24	990522	01011101	5
990411	23333412	21	990523	21034231	16
990412	41131011	12	990524	13233334	22
990413	00010111	4	990525	43343332	25
990414	11232021	12	990526	21112322	14
990415	10230111	9	990527	21132213	15
990416	21134435	23	990528	11101232	11
990417	56542332	30	990529	12102200	8
990418	22022232	15	990530	00121331	11
990419	12132242	17	990531	11010002	5
990420	33444533	29	990601	00111212	8
990421	21222542	20	990602	31021114	13
990422	21111222	12	990603	31122223	16
990423	12222321	15	990604	23323223	20
990424	32121221	14	990605	30110121	9
990425	00012223	10	990606	02011310	8
990426	20133331	16	990607	12101323	13
990427	01233444	21	990608	23333432	23
990428	32243445	27	990609	33223443	24
990429	33244545	30	990610	22111100	8
990430	43444344	30	990611	00111023	8
990501	43433442	27	990612	21011211	9
990502	21234243	21	990613	11011022	8
990503	33233241	21	990614	11000001	3
990504	11110021	7	990615	00103421	11
990505	10011333	12	990616	11142112	13
990506	22333112	17	990617	23211213	15

Date	K	Sum	Date	K	Sum
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990619	22110211	10	990731	45522255	30
990620	10002110	5	990801	43221200	14
990621	00001100	2	990802	02202332	14
990622	00011202	6	990803	31001123	11
990623	13021213	13	990804	34333312	22
990624	01022111	8	990805	21123223	16
990625	22000101	6	990806	12243534	24
990626	24433354	28	990807	42222133	19
990627	33235554	30	990808	21001134	12
990628	36541122	24	990809	43343311	22
990629	22222331	17	990810	10012333	13
990630	12211010	8	990811	42022233	18
990701	10021232	11	990812	22312123	16
990702	43453445	32	990813	22331133	18
990703	33410302	16	990814	12121221	12
990704	00000010	1	990815	12034554	24
990705	00100122	6	990816	32444544	30
990706	32101433	17	990817	45544442	32
990707	12100222	10	990818	44434544	32
990708	22123222	16	990819	54443433	30
990709	30001111	7	990820	35446544	35
990710	01002230	8	990821	11223010	10
990711	00001112	5	990822	01101445	16
990712	33322132	19	990823	54333445	31
990713	11012221	10	990824	33454533	30
990714	00010233	9	990825	22111234	16
990715	32222332	19	990826	34113534	24
990716	10111212	9	990827	22323342	21
990717	11012210	8	990828	32232432	21
990718	11122222	13	990829	11211323	14
990719	21112212	12	990830	13343444	26
990720	11013322	13	990831	32232356	26
990721	10122542	17	990901	34333243	25
990722	33455443	31	990902	32213242	19
990723	32233332	21	990903	12333212	17
990724	43133233	22	990904	12221232	15
990725	32221133	17	990905	12221122	13
990726	11133322	16	990906	11111221	10
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Date	K	Sum	Date	K	Sum
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990911	33222112	16	991023	44336554	34
990912	23243466	30	991024	54435345	33
990913	55433553	33	991025	42335431	25
990914	53341332	24	991026	11222343	18
990915	33453232	25	991027	24123653	26
990916	25434433	28	991028	21225555	27
990917	32234432	23	991029	22132143	18
990918	12243311	17	991030	12232223	17
990919	21133123	16	991031	21252223	19
990920	22212152	17	991101	22242131	17
990921	21223144	19	991102	22222123	16
990922	22225468	31	991103	30011122	10
990923	45322112	20	991104	22222112	14
990924	12121101	9	991105	11000023	7
990925	00112111	7	991106	31221352	19
990926	10122555	21	991107	33545634	33
990927	44335664	35	991108	32445455	32
990928	43524445	31	991109	44435555	35
990929	53443435	31	991110	44233454	29
990930	44434243	28	991111	34434454	31
991001	22124244	21	991112	22112233	16
991002	23322234	21	991113	54234476	35
991003	22222323	18	991114	32223444	24
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991005	23244424	25	991116	12233643	24
991006	12223221	15	991117	22233344	23
991007	11221021	10	991118	23333454	27
991008	22222013	14	991119	22113234	18
991009	11121234	15	991120	32231011	13
991010	24443543	29	991121	22321343	20
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991012	54346665	39	991123	23532335	26
991013	42323444	26	991124	32454453	30
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000102	44442543	30	000213	32353544	29
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000104	32234345	26	000215	54333265	31
000105	54443455	34	000216	32223443	23
000106	34256645	35	000217	01243241	17
000107	53132343	24	000218	00111000	3
000108	20122300	10	000219	00131121	9
000109	11000003	5	000220	10121015	11
000110	21101325	15	000221	45333543	30
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000112	53342141	23	000223	20155522	22
000113	22132322	17	000224	35555566	40
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000115	22121122	13	000226	43343554	31
000116	12123242	17	000227	43344333	27
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000401	33233455	28	000513	52334443	28
000402	54433135	28	000514	52122241	19
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000416	45434232	27	000528	13232444	23
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000501	25233444	27	000612	34424435	29
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000718	13224444	24	000829	66453765	42
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000921	22343232	21	001102	31101000	6
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000923	32222211	15	001104	45544656	39
000924	12111464	20	001105	53313455	29
000925	32334656	32	001106	34466688	45
000926	55445344	34	001107	66543353	35
000927	32323324	22	001108	25564333	31
000928	24144422	23	001109	32212445	23
000929	32131242	18	001110	34664333	32
000930	44456666	41	001111	23125663	28
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001016	52233433	25	001127	66555363	39
001017	43332243	24	001128	34556664	39
001018	32234224	22	001129	76756535	44
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010621	13212332	17	010802	21222311	14
010622	21011211	9	010803	22422322	19
010623	12102211	10	010804	11122322	14
010624	21122322	15	010805	22235533	25
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010626	11132343	18	010807	32222221	16
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010707	11011221	9	010818	22314434	23
010708	23221345	22	010819	02342221	16
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010921	10101112	7	011102	00213001	7
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010927	12132343	19	011108	21111001	7
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011217	23122331	17
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011224	13443443	26
011225	22231204	16
011226	10111022	8
011227	21012231	12
011228	00223202	11
011229	14332223	20
011230	33222345	24
011231	23211344	20

Special phenomena

SSC-s 1999–2001

Date	CET (UT+1h)	Ampl. in H(nT)	Hx	Hy	Hz	Remark
990113	0900	11	+	-	-	-
990122	1409	6	+	-	-	-
990211	1217	12	+	-	-	-
990217	0805	14	+	-	-	-
990218	0341	31	+	-	+	-
990310	0228	15	+	-	+	-
990416	1225	22	+	-	+	-
990505	1643	24	+	-	+	-
990518	0156	35	+	-	+	-
990615	1408	16	+	-	+	-
990626	0419	18	+	-	+	-
990626	2116	54	+	-	-	-
990628	0611	73	+	-	+	in storm
990702	0156	24	+	-	+	-
990706	1608	33	+	-	+	-
990712	0316	10	+	-	+	-
990722	0347	6	+	-	+	-
990804	0319	21	+	-	+	-
990815	1143	25	+	-	+	-
990816	0741	8	+	-	+	-
990909	1356	31	+	-	+	-
990912	0458	15	+	-	+	-
990915	2117	28	+	-	-	-
990922	1322	36	+	-	+	-
991021	0327	9	+	-	-	-
991212	1651	9	+	+	-	sign in Hy unusual
000127	1552	22	+	-	-	-
000205	1643	9	+	-	+	-
000211	0358	15	+	-	+	-
000212	0050	75	+	-	-	-

Date	CET (UT+1h)	Ampl. in H(nT)	Hx	Hy	H _z	Remark
000220	2238	37	+	-	+	-
000323	2023	17	+	-	+	-
000406	1735	111	+	-	+	-
000523	1524	66	+	-	+	-
000523	1758	24	+	-	+	-
000604	1601	36	+	-	+	-
000605	2255	19	+	-	+	-
000608	1010	15	+	+	-	sign in Hy unusual
000623	1402	45	+	-	+	-
000710	1356	27	+	-	+	-
000713	1041	30	+	-	-	-
000714	1629	63	+	-	+	-
000715	1536	205	+	-	+	-
000719	1627	63	+	-	+	-
000726	1954	40	+	-	-	-
000810	0558	6	+	-	-	-
000814	2258	28	+	-	+	-
000904	1430	16	+	-	+	-
000906	1758	44	+	-	+	-
000915	2012	18	+	-	+	-
000917	1722	58	+	-	+	-
000918	1540	68	+	-	+	-
001003	0153	25	+	-	+	-
001012	2326	275	+	-	+	-
001028	1052	33	+	-	-	-
001104	0322	15	+	-	+	-
001108	0437	12	+	-	-	-
001126	1540	26	+	-	+	-
001128	0625	17	+	-	-	-
010117	1730	16	+	-	+	-
010118	2352	6	+	-	+	-

Date	CET (UT+1h)	Ampl. in H(nT)	Hx	Hy	Hz	Remark
010123	1147	31	+	-	+	-
010131	0902	24	+	-	+	-
010303	1219	15	+	-	+	-
010322	1438	26	+	-	+	-
010327	1840	30	+	-	+	-
010331	0148	214	+	-	-	-
010404	1549	65	+	-	+	-
010408	1201	19	+	-	+	-
010411	1616	46	+	-	+	-
010413	0836	10	+	-	+	-
010418	0143	67	+	-	+	-
010421	1700	32	+	-	+	-
010428	0600	51	+	-	+	-
010527	1557	46	+	-	+	-
010618	0359	19	+	-	+	-
010812	1234	53	+	-	+	-
010817	1203	32	+	-	+	-
010825	1158	10	+	-	+	-
010827	2049	46	+	-	-	-
010914	0305	27	+	-	+	-
010925	2117	90	+	-	-	-
010929	1039	13	+	-	-	-
011011	1758	45	+	-	+	-
011021	1748	73	+	-	-	-
011028	0417	10	+	-	+	-
011031	1447	19	+	-	+	-
011106	0253	107	+	-	+	-
011115	1608	19	+	-	-	-
011124	0655	61	+	-	+	-
011229	0636	38	+	-	-	-
011230	2108	42	+	-	+	-

Special phenomena
sfe 1999-2001

Date	Beginning	Maximum	End	Ampl. nT	Sign		
	GMT	GMT	GMT		Hx	Hy	Hz
990223	0745	0751	0756	21	-	+	-
990312	0258	0308	0314	18	-	+	-
990319	0741	0751	0853	9	-	+	-
990530	1046	1050	1058	10	-	+	-
990906	1610	1616	1623	8	-	+	-
991014	0855	0902	0908	21	-	+	-
991104	0108	0115	0124	14	-	+	-
991118	0948	0952	0957	17	-	+	-
991127	1209	1213	1220	14	-	-	+
991130	1226	1234	1245	25	-	+	-
000204	0745	0751	0755	12	-	+	-
000317	0116	0123	0133	11	-	+	-
000317	0648	0652	0656	9	-	+	-
000501	1508	1511	1516	23	-	+	-
000508	1427	1433	1440	7	-	+	-
000603	0947	0951	1005	9	-	+	+
000820	1526	1531	1539	10	-	+	+
001219	1207	1213	1218	5	-	+	-
010110	1014	1017	1022	7	-	+	-
010125	0412	0418	0423	11	-	+	-
010125	0506	0510	0515	10	-	+	-
010224	1014	1018	1027	6	-	+	0
010415	1344	1350	1359	70	-	-	+
010506	0643	0649	0655	8	-	+	-
010611	1402	1405	1408	12	-	-	-
011019	0938	0943	0950	8	-	+	-
011026	1026	1030	1036	11	-	+	-
011127	0856	0906	0911	7	-	+	-
011203	1023	1031	1041	12	-	+	-
011213	1424	1430	1438	8	-	-	+

Annual mean values of geomagnetic elements

Year	D	H nT	Z nT	I	X nT	Y nT	F nT
1961	-0° 23.6'	20816	42077	63° 40.7'	20816	-143	46944
1962	-0° 19.6'	20827	42093	63° 40.5'	20827	-119	46964
1963	-0° 14.3'	20839	42116	63° 40.4'	20839	-87	46990
1964	-0° 10.5'	20845	42126	63° 40.4'	20845	-64	47001
1965	-0° 08.1'	20877	42137	63° 38.6'	20877	-49	47025
1966	-0° 06.8'	20888	42156	63° 38.5'	20888	-41	47047
1967	-0° 06.0'	20903	42179	63° 38.3'	20903	-36	47074
1968	-0° 03.0'	20921	42196	63° 37.7'	20921	-18	47098
1969	0° 00.2'	20942	42214	63° 36.9'	20942	1	47123
1970	0° 02.8'	20964	42235	63° 36.1'	20964	17	47152
1971	0° 04.3'	20992	42262	63° 35.2'	20992	26	47188
1972	0° 06.5'	21011	42286	63° 34.7'	21011	40	47218
1973	0° 10.2'	21028	42317	63° 34.6'	21028	62	47254
1974	0° 13.6'	21046	42350	63° 34.5'	21046	83	47291
1975	0° 18.5'	21072	42380	63° 33.8'	21072	113	47330
1976	0° 23.8'	21084	42413	63° 34.0'	21084	146	47365
1977	0° 28.8'	21106	42443*	63° 33.6**	21105	177	47401*
1978	0° 34.6'	21108	42473*	63° 34.4**	21107	212	47429*
1979	0° 41.4'	21113*	42496*	63° 34.8**	21112*	254	47452*
1980	0° 46.3'	21107*	42512*	63° 35.8**	21105*	284	47463*
1981	0° 52.4'	21097*	42530*	63° 37.0**	21095*	322	47475*
1982	0° 57.5'	21078	42549	63° 38.8'	21075	353	47484
1983	1° 02.7'	21078	42581	63° 39.8'	21074	384	47512
1984	1° 08.1'	21075	42601	63° 40.7'	21071	417	47529
1985	1° 12.7'	21073	42625	63° 41.7'	21068	446	47550
1986	1° 17.8'	21065	42660	63° 43.1'	21060	477	47577
1987	1° 21.9'	21067	42689	63° 44.0'	21061	502	47604
1988	1° 26.6'	21052	42723	63° 46.0'	21045	530	47628
1989	1° 31.3'	21041	42761	63° 48.0'	21034	559	47657
1990	1° 35.5'	21044	42782	63° 48.3'	21036	584	47678
1991	1° 36.3'	21027	42816	63° 50.4'	21019	589	47701
1992	1° 38.1'	21037	42834	63° 50.4'	21028	600	47721
1993	1° 43.2'	21039	42853	63° 51.0'	21030	631	47739
1994	1° 48.4'	21037	42877	63° 52.0'	21026	663	47760
1995	1° 56.6'	21052	42898	63° 51.7'	21039	713	47785
1996	2° 02.0'	21062	42920	63° 51.7'	21048	747	47809
1997	2° 07.5'	21060	42955	63° 52.9'	21045	781	47839
1998	2° 13.7'	21053	42997	63° 54.7'	21037	819	47875
1999	2° 18.3'	21055	43030	63° 55.6'	21038	847	47905
2000	2° 23.7'	21054	43068	63° 56.9'	21035	880	47938
2001	2° 28.4'	21064	43099	63° 57.2'	21045	909	47972

III. ATMOSPHERIC ELECTRICITY AND THE IONOSPHERE

ATMOSPHERIC ELECTRICITY DATA

Hourly means of the potential gradient

Atmospheric electricity data have been published since 1962. This table contains the hourly average values of the potential gradient expressed in V/m. The date column gives year, month, day (e.g. 990101 indicates 1999 January 1). Hourly averages have been taken only from hours having a recording period of 30 minutes or more. If values were available only for part of an hour the average is entered in square brackets []. These data have been used in the determination of the daily means. Values uncertain for some reason are entered in round brackets () and have not been used in calculating daily means. Daily means of each day with 24 hours of recording are entered. However, loss of a maximum of one hour's data out of twelve (for example, on account of instrument maintenance or calibration) has not precluded entering this mean value. In hours marked by S the value of the potential gradient exceeded permanently or several times the measuring limits of the equipment making the determination of an hourly average impossible. The direction of the deviations is marked by signs. OBS indicates that the potential gradient exceeded the measuring limits of the equipment both in positive and negative directions. Gaps of some days are generally due to missing records. Data are presented in universal time (GMT).

Hourly means of quantities of positive and negative charges transported by point-discharge for each month

In this table the values are expressed in 10^{-6} Asec/hour. Data are presented in universal time (GMT).

Both the equipments and methods of measurements of potential gradient and point discharge have been described in the paper by BENCZE P and MÄRCZ F: "Atmosphärisch-elektrische und ionosphärische Messungen im Observatorium bei Nagycenk". Observatoriumsberichte des Geophysikalischen Forschungslaboratoriums der Ungarischen Akademie der Wissenschaften vom Jahre 1966, Sopron, 1967. Further information is given by BENCZE P and MÄRCZ F: "The Geophysical Observatory near Nagycenk. II. Atmospheric electricity and ionospheric measurements" (*Acta Geod. Geoph. Mont. Hung.*, 16, 1981, 353-357).

See CD (program Seenck.exe, menu item AtmElectr).

*Hourly means of the
1999*

Date	00	01	02	03	04	05	06	07	08	09	10	11
990101	-50	-40	-40	-30	-30	-20	-30	-40	[-30]	-20	-50	-70
990102	-80	-50	-40	-50	-70	-50	-50	[-50]	-50	-90	-100	-70
990103	10	30	20	0	10	40	60	30	[50]	50	70	60
990104	0	60	70	70	110	70	30	-	-	60	50	50
990105	20	30	50	50	60	50	70	[70]	-	80	80	70
990106	80	80	90	80	80	120	130	150	100	120	130	100
990107	130	130	130	140	120	120	[120]	70	80	80	70	80
990108	20	0	0	20	30	30	30	[40]	40	40	40	40
990109	0	-S	OBS	+S	20	20	40	[90]	70	40	40	50
990110	70	80	80	80	40	20	20	40	[70]	80	70	60
990111	-10	10	10	40	50	10	0	-	-	OBS	-10	0
990112	10	30	30	40	40	60	60	[40]	40	-	70	30
990113	0	-10	-10	10	20	40	20	-10	-20	30	80	70
990114	40	30	20	30	30	40	40	[60]	60	70	80	80
990115	30	30	30	30	30	40	40	[40]	60	60	60	60
990116	120	120	100	100	90	110	80	80	120	100	100	120
990117	100	140	100	80	60	80	90	130	110	140	140	120
990118	10	10	30	40	60	90	100	-	-	80	60	30
990119	50	50	50	60	50	40	40	-	-	70	70	60
990120	0	-30	30	-10	-10	60	30	30	40	30	-10	50
990121	-50	-40	-90	-20	-40	-60	-10	[-70]	-	-50	-60	-10
990122	70	30	40	40	30	30	40	30	40	20	40	40
990123	20	30	10	20	10	10	20	[30]	50	10	-10	-10
990124	-20	-30	20	10	20	20	0	-10	[10]	[-50]	0	-10
990125	-20	-10	10	0	0	-10	-20	-	-	-10	-10	-10
990126	-30	-10	-30	-30	-30	-10	-30	[10]	-40	-20	10	0
990127	OBS	-80	-10	20	10	10	[10]	10	10	10	0	10
990128	20	10	-20	10	20	30	40	[50]	60	50	50	40
990129	50	70	80	40	60	-S	OBS	[10]	-20	30	30	20
990130	40	40	40	40	40	40	50	50	[50]	50	60	70
990131	50	40	30	30	40	50	60	50	[60]	70	70	90

potential gradient

12	13	14	15	16	17	18	19	20	21	22	23	Means
-30	-50	-70	-60	-50	-40	-20	-10	-10	-70	-30	-60	-42
-70	-60	-30	-50	-40	0	0	30	10	-60	-50	-30	-46
50	50	50	40	40	20	0	20	30	0	10	-10	30
50	70	50	40	20	30	10	10	10	30	30	20	-
60	40	50	40	50	70	110	80	90	130	180	130	72
130	120	130	140	90	80	80	130	130	150	160	150	115
90	130	130	80	80	100	130	130	80	80	70	30	100
20	30	40	60	60	60	30	40	30	20	10	0	30
40	40	40	50	60	60	50	40	60	60	70	70	-
60	50	80	80	100	90	-30	20	-30	-10	10	-50	45
-20	-10	-20	-50	-60	-10	-10	-10	0	-20	-20	0	-
30	10	30	60	+S	+S	+S	220	+S	+S	120	30	-
70	60	[50]	50	40	30	20	30	10	30	30	40	28
80	80	50	80	80	90	120	130	80	40	40	20	61
60	60	60	70	80	80	90	90	130	130	120	120	67
110	110	[90]	80	110	130	120	120	130	140	130	130	110
110	90	70	20	80	150	130	80	40	30	30	10	89
30	40	40	20	50	70	60	40	40	30	40	40	-
60	50	50	30	90	30	30	20	70	50	10	40	-
10	30	10	0	-30	-40	-40	-50	-100	-90	-50	-50	-8
-50	-40	20	30	0	-20	-30	0	0	30	20	30	-22
40	30	40	60	70	50	80	80	50	40	40	40	45
10	30	0	-40	-10	10	-40	-30	-20	-40	-30	-10	1
-50	-10	-20	30	-10	0	10	-10	10	10	0	0	-6
-10	-10	-30	-40	-40	-10	20	20	10	-40	-40	-40	-
-20	-10	-10	-30	-20	0	0	-50	-20	30	20	0	-13
10	20	20	40	60	70	60	70	80	70	30	10	24
40	40	50	50	40	40	20	0	10	30	40	40	32
40	50	50	50	50	OBS	60	50	50	50	50	50	-
70	60	50	50	50	60	60	60	60	50	60	50	52
100	90	80	80	80	90	90	110	90	80	70	70	70

Date	00	01	02	03	04	05	06	07	08	09	10	11
990201	70	80	80	80	80	100	90	-	[90]	100	100	110
990202	20	-30	30	-10	-20	20	70	110	110	80	20	20
990203	30	30	30	40	30	40	70	[70]	40	40	30	40
990204	-20	-10	20	60	20	40	20	20	0	0	20	10
990205	-10	20	20	20	20	20	40	[50]	50	30	30	20
990206	30	30	20	20	30	30	30	30	40	40	30	30
990207	30	30	20	20	20	20	30	[30]	30	30	0	40
990208	30	40	40	40	40	50	70	-	[50]	60	50	50
990209	50	40	40	30	30	30	[30]	30	30	30	30	40
990210	-50	-50	-80	-50	0	20	20	[20]	30	40	40	40
990211	30	30	20	10	-30	-S	-S	-S	-S	-S	0	-50
990212	-S	-80	-50	10	20	-20	0	[0]	-140	10	60	70
990213	-140	-90	-S	-S	-S	-S	-30	[-50]	-150	-50	-70	-S
990214	-S	-60	-30	-10	-10	0	-20	[-50]	-10	0	0	30
990215	10	0	10	10	20	20	30	-	-	70	50	50
990216	30	40	40	40	40	100	130	[100]	110	60	80	80
990217	30	30	30	30	30	40	40	[40]	40	40	30	-20
990218	30	40	40	30	30	40	40	[40]	50	40	40	40
990219	40	20	30	10	10	-70	OBS	-40	-60	10	60	40
990220	-S	-50	+S	-90	90	110	140	170	170	140	110	50
990221	40	40	40	40	40	40	30	[10]	40	OBS	OBS	OBS
990222	50	50	40	50	60	OBS	60	-	[70]	50	70	50
990223	40	30	30	30	30	30	40	[50]	50	40	40	40
990224	30	30	30	-S	70	80	50	[40]	40	40	30	20
990225	40	50	40	40	40	40	50	[60]	50	40	40	50
990226	70	50	50	50	40	40	50	[70]	70	70	50	30
990227	60	90	70	70	70	80	80	110	[90]	[80]	80	90
990228	50	50	50	50	50	60	60	[60]	80	120	90	90

12	13	14	15	16	17	18	19	20	21	22	23	Means
110	100	100	100	100	60	60	70	60	20	20	20	78
20	30	30	20	[10]	20	50	50	50	60	30	30	34
20	-50	-40	20	20	20	0	-10	0	-10	-10	-10	20
0	20	20	20	20	20	60	70	70	70	60	0	25
40	20	30	40	OBS	-S	OBS	40	40	40	30	30	-
40	[30]	30	40	40	40	50	40	30	30	30	30	33
50	70	70	70	100	20	20	20	30	30	20	30	36
50	50	50	50	50	50	50	40	50	40	0	40	47
40	40	40	30	40	20	30	0	20	10	0	-50	28
40	50	50	50	40	20	10	20	30	50	50	40	18
-90	-160	-160	-140	-S	-170	-40	-20	-50	-80	-50	-110	-
90	170	140	70	70	90	60	+S	+S	90	90	0	-
-S	30	70	20	-50	-70	-50	-140	-S	-S	-50	-60	-
20	40	30	40	50	50	50	40	30	30	30	30	12
50	40	50	50	50	50	50	50	50	50	40	40	-
60	40	30	10	50	80	70	50	70	30	40	OBS	60
-S	OBS	-S	60	50	+S	+S	-S	40	50	50	40	-
40	40	40	40	40	50	50	50	40	40	40	40	40
50	120	30	-10	40	10	50	40	40	-S	-140	-100	8
-50	30	40	10	80	+S	-S	80	70	70	40	40	-
10	0	40	50	70	120	100	90	100	80	50	60	-
30	40	50	50	50	40	40	50	50	40	40	30	-
40	-S	OBS	OBS	40	50	50	50	OBS	OBS	OBS	30	-
30	0	50	50	50	50	70	70	70	50	40	40	45
50	50	60	70	70	80	80	90	120	90	70	70	60
50	50	60	50	70	70	70	110	110	90	100	80	64
90	90	80	70	60	60	70	80	70	60	50	50	75
80	70	80	60	50	40	40	40	40	30	40	30	59

Date	00	01	02	03	04	05	06	07	08	09	10	11
990301	30	20	30	40	40	30	10	-	-	30	40	50
990302	10	20	10	20	30	30	40	[40]	30	10	-50	10
990303	70	70	60	50	60	40	50	[50]	60	60	50	50
990304	10	0	0	10	20	20	20	[30]	40	40	40	50
990305	30	30	30	30	40	40	30	[20]	-20	-50	-70	10
990306	50	60	60	60	60	60	70	[70]	50	50	50	40
990307	60	70	30	40	30	40	20	[0]	[OBS]	OBS	-S	30
990308	90	80	60	50	40	40	40	-	[40]	40	50	40
990309	20	30	30	30	10	30	40	[50]	70	70	70	60
990310	40	50	30	40	50	50	70	[80]	70	60	60	60
990311	40	30	40	40	40	30	30	[40]	50	50	50	70
990312	40	40	40	40	30	40	50	[50]	50	50	50	50
990313	40	40	30	50	50	40	40	[50]	70	80	80	110
990314	60	50	30	30	40	30	30	[40]	[20]	20	30	40
990315	10	-30	30	10	OBS	OBS	30	[50]	-	-	40	60
990316	50	70	80	40	30	60	80	[80]	[60]	40	20	0
990317	20	20	40	40	40	50	40	[30]	50	40	50	30
990318	10	0	30	30	20	-50	-50	-10	[60]	80	70	80
990319	40	40	30	10	10	-10	-10	[30]	50	60	60	60
990320	20	-10	-10	-20	0	10	20	-10	0	[0]	20	OBS
990321	-10	20	20	30	40	30	30	[20]	20	20	10	30
990322	20	20	0	0	30	40	40	-	[40]	40	30	40
990323	0	30	0	0	0	0	30	[40]	40	40	30	30
990324	30	30	30	10	20	40	40	[40]	40	40	30	40
990325	10	10	10	0	0	0	30	[50]	50	50	40	40
990326	20	10	10	10	0	0	0	0	0	10	10	10
990327	-30	-30	-30	-10	-30	-20	[-10]	[10]	10	30	10	30
990328	-	-	-	-	-	-	-	-	-	-	-	-
990329	-	-	-	-	-	-	-	-	[20]	OBS	40	30
990330	10	10	20	10	0	20	[30]	30	10	0	0	10
990331	-80	-20	10	10	10	20	[0]	20	40	50	5	60

12	13	14	15	16	17	18	19	20	21	22	23	Means
50	50	50	50	40	50	5	50	40	-20	50	50	-
30	30	30	40	50	50	50	40	50	50	30	40	29
50	40	40	40	40	30	30	40	40	50	40	20	47
40	50	40	50	40	40	40	40	40	40	30	30	32
10	40	30	OBS	OBS	OBS	50	60	60	40	40	50	-
50	70	50	40	50	70	40	40	50	OBS	30	50	53
60	100	80	110	120	OBS	-S	190	170	140	120	110	-
40	30	40	40	40	50	40	50	40	40	30	10	44
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70	70	70	70	70	80	80	70	70	50	50	50	55
50	60	90	90	100	90	100	120	100	100	70	40	64
110	120	120	120	100	120	120	110	120	70	50	50	79
40	40	40	40	30	10	30	30	20	10	10	-10	30
40	30	40	40	30	20	20	60	80	70	70	60	-
10	40	60	40	30	10	30	20	0	30	20	10	38
50	70	60	60	60	40	-60	-70	-40	-20	-10	0	25
80	70	70	70	70	60	50	60	50	50	60	40	42
60	60	60	60	40	40	70	60	40	40	40	30	40
OBS	50	20	0	OBS	0	20	20	20	30	10	-10	-
40	40	40	40	40	60	70	70	50	40	30	20	33
60	50	50	40	30	30	20	10	10	10	10	10	27
30	30	30	30	30	50	30	-20	0	20	20	20	21
50	50	40	50	40	40	60	40	30	10	0	10	34
40	30	20	20	20	20	30	30	40	30	20	20	25
10	10	10	0	10	30	30	20	-10	-10	-40	-40	4
40	40	40	40	30	10	10	10	0	10	0	0	7
-	-	-	-	-	-	-	-	-	-	-	-	-
20	40	OBS	50	40	20	0	20	10	20	-	-	-
30	40	30	40	30	-10	-50	-40	-40	-50	-50	-60	1
50	50	50	60	70	60	40	40	30	10	10	10	27

Date	00	01	02	03	04	05	06	07	08	09	10	11
990401	30	10	-50	-50	-50	-60	[-50]	-30	30	0	40	50
990402	30	20	20	20	20	20	[30]	40	40	40	70	50
990403	40	40	40	40	40	50	[70]	70	80	70	80	60
990404	20	20	10	20	20	[30]	40	50	40	50	50	50
990405	30	10	10	10	20	30	-	40	30	30	40	40
990406	30	30	20	20	30	40	40	-	20	(30)	(40)	30
990407	+S	-S	10	10	10	-10	[20]	[50]	20	20	30	30
990408	0	0	10	20	30	0	[40]	40	40	30	20	20
990409	30	40	40	40	30	0	[40]	60	50	50	40	40
990410	30	30	20	20	30	30	[40]	40	50	60	60	70
990411	-50	-30	-40	OBS	OBS	OBS	-50	-	30	40	40	30
990412	40	30	30	40	40	40	[50]	-	50	40	40	20
990413	10	20	0	0	10	0	[-10]	10	10	-S	-S	-S
990414	30	30	30	40	40	5	[50]	40	40	40	40	40
990415	10	10	0	10	20	30	[10]	10	20	40	40	30
990416	30	10	20	10	0	10	0	[-90]	-60	-50	-90	-90
990417	-20	-80	-40	-10	-S	-50	[-50]	[-S]	-S	-40	-10	+S
990418	10	10	0	10	10	30	-	40	40	40	30	30
990419	20	20	10	20	30	40	-	-	40	30	30	40
990420	10	10	20	10	10	30	[20]	30	30	30	30	30
990421	10	10	10	10	10	20	[30]	40	40	50	50	50
990422	-50	-80	0	-10	-10	0	[10]	30	-	30	40	40
990423	40	40	30	40	30	20	[20]	40	30	0	0	-S
990424	30	30	-20	10	20	20	60	70	50	50	50	[60]
990425	30	30	60	50	40	-20	[0]	40	70	50	60	40
990426	40	40	40	20	40	50	-	-	60	60	60	60
990427	20	20	20	20	30	40	[40]	50	40	40	40	50
990428	60	20	-10	10	10	30	30	30	20	20	20	20
990429	30	20	30	30	[30]	[40]	60	50	[50]	40	40	40
990430	30	30	40	30	30	10	0	0	10	0	30	30

12	13	14	15	16	17	18	19	20	21	22	23	Means
50	60	60	50	60	60	40	30	40	30	30	30	19
50	50	40	50	30	-50	-50	20	30	30	40	50	23
50	40	40	60	70	70	40	70	60	40	30	20	53
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40	40	40	40	30	20	30	30	20	20	10	10	-
10	-10	-10	-10	OBS	OBS	OBS	OBS	OBS	-40	0	-10	-
40	40	-30	40	40	50	40	50	50	40	30	30	29
40	40	50	50	50	60	40	40	40	40	40	40	43
60	60	70	60	50	50	40	40	40	40	-90	-60	35
20	30	20	10	30	10	20	20	20	0	40	30	-
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20	30	40	40	40	50	50	40	40	40	30	40	29
-60	-30	-10	10	40	50	40	OBS	OBS	-30	0	40	-
-30	20	30	40	40	30	20	-10	-10	10	70	30	-
30	40	40	40	30	30	+S	10	40	30	30	20	27
40	40	40	30	20	+S	40	30	30	30	20	20	-
50	10	30	30	30	20	30	30	20	10	10	10	23
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10	40	40	40	40	40	60	40	40	40	20	30	19
OBS	OBS	OBS	OBS	40	60	70	60	50	40	20	20	-
50	20	-S	OBS	OBS	OBS	+S	30	40	60	60	50	-
60	60	30	70	80	60	40	50	50	50	40	40	45
0	70	70	60	60	70	70	50	60	60	30	30	-
OBS	OBS	OBS	OBS	OBS	OBS	OBS	50	-60	0	30	40	-
40	40	50	50	50	40	40	OBS	20	20	20	30	29
40	40	40	40	40	40	40	50	40	40	30	30	39
30	40	30	30	40	40	30	20	10	20	20	20	24

Date	00	01	02	03	04	05	06	07	08	09	10	11
990501	10	10	10	10	10	10	[20]	20	10	10	20	20
990502	0	-10	0	10	10	30	40	40	30	30	40	60
990503	20	10	30	40	40	50	-	[50]	40	50	40	50
990504	20	20	20	30	40	40	[50]	40	40	40	30	-20
990505	OBS	0	-20	OBS	-70	-20	0	50	30	20	20	40
990506	40	30	30	30	40	40	[30]	40	50	50	50	60
990507	30	20	30	10	10	-50	[-20]	0	0	10	30	40
990508	30	40	30	30	40	30	30	40	40	40	40	40
990509	-50	10	0	10	20	30	[60]	50	50	50	40	40
990510	40	30	20	30	30	40	-	-	40	40	40	40
990511	30	30	40	40	30	30	[10]	20	20	20	30	10
990512	40	50	40	40	20	40	[40]	70	60	7	50	50
990513	-10	0	10	20	20	10	[40]	70	60	40	40	40
990514	20	0	-30	20	30	20	10	-S	-S	20	50	30
990515	30	20	20	20	20	50	[40]	50	60	30	20	40
990516	40	80	40	40	50	60	[60]	70	60	60	40	50
990517	50	50	40	40	40	70	-	[60]	40	30	30	30
990518	10	10	10	10	10	10	[20]	20	2	20	20	20
990519	20	20	20	20	20	20	[20]	30	30	40	30	30
990520	20	20	20	20	20	20	[20]	20	20	30	30	40
990521	OBS	OBS	60	70	50	60	30	30	40	50	40	30
990522	20	20	20	30	30	[60]	70	60	40	50	60	50
990523	20	20	30	30	30	20	[20]	30	30	30	40	40
990524	20	20	20	20	10	20	[30]	-	60	70	70	70
990525	20	20	20	30	30	30	30	-	[50]	60	60	70
990526	20	30	20	20	10	10	[20]	20	30	50	60	70
990527	30	30	10	20	30	60	[40]	40	30	50	40	50
990528	30	30	30	30	40	60	[50]	40	40	50	50	50
990529	30	20	40	20	30	60	50	[40]	40	50	50	50
990530	20	20	10	20	30	30	30	[20]	20	40	40	60
990531	20	30	40	30	30	40	-	-	30	60	80	80

12	13	14	15	16	17	18	19	20	21	22	23	Means
30	50	40	10	30	10	10	20	30	10	-10	10	17
100	50	-10	10	40	30	40	40	30	20	30	30	29
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50	50	60	50	50	50	50	40	40	40	40	40	36
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20	10	20	20	30	30	30	20	10	20	30	30	24
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50	50	60	70	50	50	30	30	40	40	40	40	40
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30	30	30	30	30	30	20	20	20	20	20	10	33
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30	30	40	40	40	40	30	30	30	30	30	30	29
-S	-S	+S	0	20	10	-50	OBS	OBS	20	OBS	OBS	-
OBS	+S	-S	-S	OBS	60	30	40	30	30	30	30	-
40	50	60	60	50	30	20	20	20	20	30	30	39
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50	50	50	60	50	50	40	40	30	30	20	20	40
60	60	70	70	60	50	50	40	30	20	10	10	36
80	70	50	70	50	40	40	30	+S	OBS	OBS	OBS	-

Date	00	01	02	03	04	05	06	07	08	09	10	11
990601	-S	70	30	10	30	30	40	[40]	30	40	50	60
990602	10	10	20	30	30	30	30	30	[30]	30	40	40
990603	-60	-20	+S	30	30	30	[40]	40	30	40	40	40
990604	10	10	10	10	20	20	[20]	20	30	30	+S	40
990605	30	30	30	30	30	50	[80]	80	80	80	80	70
990606	30	30	20	20	30	30	20	[20]	10	20	30	40
990607	30	30	30	30	30	30	-	-	40	50	50	50
990608	+S	30	30	30	30	40	[20]	OBS	-S	50	40	30
990609	-	-	-	30	30	40	[60]	70	60	70	70	60
990610	40	40	30	30	40	40	[40]	50	60	80	80	80
990611	20	20	20	20	0	40	[40]	40	40	50	60	60
990612	+S	+S	20	20	40	60	80	[60]	50	50	50	50
990613	60	70	70	50	50	50	40	[40]	50	50	80	70
990614	50	50	40	40	40	40	-	-	-	50	50	60
990615	30	30	40	30	30	20	[20]	30	40	40	50	40
990616	OBS	OBS	+S	10	20	30	[40]	30	40	40	50	50
990617	30	20	30	30	30	20	[10]	20	20	20	30	20
990618	20	10	20	20	30	30	[40]	30	20	30	10	10
990619	50	50	50	50	50	50	[50]	50	50	50	50	50
990620	40	40	40	40	40	40	[30]	20	40	50	50	50
990621	30	30	20	30	20	30	-	OBS	-S	0	20	+S
990622	-	-	-	-	-	-	-	-	10	10	30	70
990623	40	30	30	20	40	40	[40]	50	40	40	40	40
990624	40	40	40	40	50	50	50	50	60	50	50	40
990625	30	30	30	20	30	40	[40]	40	40	50	50	60
990626	10	0	0	10	20	30	30	30	20	30	30	30
990627	10	20	30	30	30	20	30	[20]	30	40	40	40
990628	10	20	20	10	20	40	-	[30]	30	30	50	60
990629	20	30	30	30	30	30	30	[40]	3	60	60	70
990630	30	30	20	10	20	30	[30]	30	40	60	50	50

12	13	14	15	16	17	18	19	20	21	22	23	Means
80	70	60	70	50	40	40	30	30	20	10	10	41
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40	40	60	60	50	40	30	20	10	10	10	10	27
-S	OBS	OBS	OBS	OBS	-S	50	30	30	30	40	40	-
50	50	60	70	50	50	50	40	40	30	30	30	51
40	40	50	50	50	50	50	40	40	40	40	40	35
60	50	60	60	50	50	40	40	40	+S	OBS	OBS	-
40	40	0	OBS	OBS	OBS	OBS	+S	-	-	-	-	-
70	60	60	60	60	60	60	60	60	50	50	40	-
70	70	70	70	70	60	40	40	30	30	30	20	50
60	60	70	40	40	50	OBS	OBS	OBS	OBS	-S	+S	-
60	60	60	60	70	70	70	70	80	80	70	60	-
40	60	60	60	70	70	60	50	50	50	50	50	56
60	60	80	70	60	50	50	50	50	40	40	30	-
50	40	50	50	40	+S	-S	OBS	10	20	-10	-10	-
40	60	50	50	50	50	40	40	40	40	30	40	-
30	40	40	50	50	40	40	40	20	20	20	30	29
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50	50	50	50	50	50	40	40	40	30	20	20	40
OBS	-20	-10	-	-	-	-	-	-	-	-	-	-
-S	-S	10	10	40	10	20	40	40	40	30	40	-
40	40	40	40	50	50	50	40	50	70	40	40	42
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40	50	50	40	40	40	30	20	20	10	30	10	30
60	70	-S	OBS	70	40	30	30	30	30	10	10	-
60	60	70	80	70	40	30	30	40	30	30	30	43
50	50	50	50	40	40	40	30	30	30	30	30	36

Date	00	01	02	03	04	05	06	07	08	09	10	11
990701	20	20	20	20	30	30	[30]	20	30	30	30	30
990702	20	10	20	20	30	30	[30]	30	30	40	50	50
990703	10	10	20	20	30	40	[60]	60	60	70	80	80
990704	10	20	20	20	30	30	30	[30]	30	30	40	50
990705	30	30	30	30	30	30	[30]	-	20	30	40	40
990706	10	20	20	20	30	30	[40]	40	40	40	40	40
990707	10	10	10	10	-S	+S	-S	OBS	OBS	OBS	OBS	OBS
990708	30	0	0	30	40	70	[30]	30	40	30	30	40
990709	10	30	30	30	20	10	20	70	OBS	-S	50	OBS
990710	OBS	OBS	-S	OBS	OBS	OBS	OBS	+S	50	100	100	110
990711	20	20	50	OBS	10	20	50	[60]	80	60	40	50
990712	OBS	20	30	30	30	70	-	-	-	50	-	50
990713	20	10	10	30	30	20	[40]	30	40	40	40	40
990714	40	OBS	80	-S	-S	60	[40]	[40]	100	40	100	0
990715	20	10	10	20	40	50	[40]	30	30	40	40	40
990716	30	30	20	30	30	40	50	[40]	30	60	60	60
990717	30	30	30	40	40	40	[40]	50	50	70	70	80
990718	20	10	20	30	30	50	50	[40]	40	60	80	80
990719	20	20	20	20	30	50	40	-	[40]	50	50	50
990720	10	10	10	20	30	40	[40]	40	40	50	50	60
990721	20	10	30	20	20	30	[40]	40	40	50	60	60
990722	20	70	70	50	40	40	-	60	50	60	0	10
990723	-S	OBS	+S	20	30	70	[60]	80	60	50	40	40
990724	20	20	20	20	10	0	30	40	40	40	40	40
990725	40	30	20	30	30	20	20	[30]	4	50	50	50
990726	40	30	30	40	40	40	[40]	-	30	30	40	50
990727	20	30	30	30	40	30	[30]	30	30	30	40	40
990728	20	20	20	20	30	40	[40]	40	40	60	60	60
990729	40	30	30	30	30	40	[40]	50	40	40	60	50
990730	40	30	30	30	30	40	[50]	50	60	60	70	60
990731	20	30	30	30	40	40	[50]	40	50	60	70	70

12	13	14	15	16	17	18	19	20	21	22	23	Means
50	50	50	60	50	40	30	30	30	30	30	30	33
60	60	-S	OBS	-S	30	20	10	10	10	10	10	-
80	80	80	80	70	40	30	30	30	10	10	10	45
50	60	60	70	50	60	50	40	30	30	30	30	38
40	40	40	40	30	30	30	30	20	20	20	20	30
40	40	50	50	40	40	40	40	30	30	30	10	34
OBS	+S	120	50	40	30	10	20	30	20	10	10	-
50	40	30	40	40	30	-10	0	10	0	-10	-10	24
40	50	30	40	40	20	20	10	30	-S	OBS	OBS	-
-S	OBS	100	OBS	OBS	OBS	-10	OBS	-S	10	20	30	-
40	0	-S	OBS	40	50	40	40	40	50	30	-S	-
20	-20	-S	OBS	80	40	40	40	40	30	10	20	-
50	60	70	50	40	70	60	40	40	30	40	40	39
30	20	10	20	30	30	30	20	20	20	10	20	-
40	40	40	40	40	40	40	30	40	30	20	30	33
50	60	40	50	60	60	40	40	30	20	20	20	40
60	70	70	80	60	60	40	40	30	30	30	30	49
80	90	90	90	60	50	40	40	30	30	30	30	49
50	50	50	50	40	40	40	30	30	20	20	20	37
70	70	70	60	+S	40	50	40	40	40	40	30	41
50	40	50	40	40	+S	OBS	+S	20	20	10	10	-
20	10	0	30	0	OBS	OBS	OBS	-10	-40	-S	-10	-
40	40	30	10	0	20	30	20	10	30	30	30	-
40	[40]	40	40	40	40	50	40	40	40	40	40	35
50	50	50	40	50	50	50	40	40	40	40	40	40
50	60	50	50	60	40	40	40	50	60	40	30	43
40	50	70	60	60	50	40	40	40	40	40	30	39
60	70	60	60	50	40	40	30	40	40	40	50	43
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60	60	60	40	20	20	20	20	30	20	20	10	38

Date	00	01	02	03	04	05	06	07	08	09	10	11
990801	20	10	10	10	10	20	40	[30]	[40]	60	60	70
990802	20	10	10	10	20	30	-	-	40	50	50	50
990803	10	10	10	20	20	50	50	50	[50]	50	50	50
990804	20	20	10	10	10	30	[40]	40	50	50	60	60
990805	10	10	20	10	10	20	20	[30]	30	30	30	30
990806	10	10	10	20	30	30	[40]	40	40	50	50	60
990807	20	20	10	10	20	[30]	30	30	30	50	50	60
990808	10	30	30	20	10	20	[50]	[50]	30	30	50	40
990809	50	40	30	30	30	40	40	-	40	40	40	30
990810	40	30	10	10	20	40	50	[40]	40	40	50	50
990811	10	10	0	-10	10	20	30	40	[80]	50	40	50
990812	40	40	40	40	40	50	[50]	60	70	60	60	60
990813	50	40	40	30	20	20	[20]	30	40	40	40	40
990814	30	20	10	20	20	30	[40]	40	40	40	40	40
990815	30	40	40	20	30	40	[40]	50	50	50	50	50
990816	10	0	10	0	10	10	-	-	70	120	70	40
990817	30	40	70	50	70	70	[60]	80	70	60	50	50
990818	70	100	30	30	20	30	[40]	60	70	50	40	40
990819	40	40	40	50	40	40	[20]	40	30	40	50	50
990820	30	40	40	30	30	20	OBS	OBS	OBS	140	100	70
990821	40	50	20	30	20	80	[80]	80	80	40	40	40
990822	30	40	40	40	40	50	[60]	50	60	60	70	60
990823	40	40	40	40	40	40	[40]	-	60	70	50	50
990824	20	30	20	30	30	40	[40]	30	30	30	30	30
990825	20	20	20	20	30	40	[60]	40	30	40	40	50
990826	20	20	20	30	30	30	[30]	30	30	30	30	30
990827	40	40	30	20	10	0	[10]	30	10	40	70	30
990828	40	50	40	40	40	60	[50]	50	40	40	40	50
990829	30	20	0	10	30	30	20	10	50	30	30	40
990830	20	10	-	-	-	-	-	-	30	30	30	30
990831	30	30	30	40	40	60	[80]	[110]	90	50	40	30

Date	00	01	02	03	04	05	06	07	08	09	10	11
990901	30	30	40	30	30	[30]	[30]	40	40	40	40	0
990902	30	30	30	30	30	[20]	-S	-50	-80	-110	OBS	-S
990903	30	40	40	30	30	[30]	[-40]	-10	-10	30	60	50
990904	70	60	50	70	[110]	[70]	160	110	60	70	60	50
990905	40	60	60	60	60	50	70	[30]	0	20	-10	30
990906	40	40	30	30	20	30	[30]	-	40	40	40	40
990907	40	40	40	40	40	50	[60]	40	40	50	50	50
990908	30	30	40	30	40	50	[50]	40	40	40	40	40
990909	30	30	30	30	40	40	[70]	60	50	50	50	50
990910	40	30	30	40	40	50	[50]	50	50	50	60	50
990911	-	-	-	-	-	-	-	-	-	-	-	-
990912	-	-	-	-	-	-	-	-	-	60	90	70
990913	30	20	30	30	30	30	-	-	40	50	50	60
990914	20	30	30	30	30	30	[80]	60	40	30	30	50
990915	30	30	30	30	30	30	(60)	[60]	60	50	40	40
990916	30	30	40	30	30	50	[40]	50	30	30	40	50
990917	30	30	30	30	30	30	[30]	30	30	30	40	40
990918	10	10	10	20	20	30	[30]	40	40	40	30	30
990919	-S	20	30	30	30	30	30	[20]	10	30	30	30
990920	20	20	30	30	10	10	-	-	30	40	40	40
990921	20	10	10	20	10	30	+S	+S	OBS	OBS	OBS	0
990922	20	20	40	40	40	[40]	70	(70)	50	60	60	60
990923	60	60	50	70	90	90	[100]	60	50	40	40	30
990924	30	30	20	20	30	30	[40]	50	50	4	40	40
990925	30	30	30	40	40	40	[50]	50	40	40	50	40
990926	30	30	30	40	40	40	[40]	70	50	40	50	50
990927	40	40	40	40	40	40	-	-	40	40	40	40
990928	40	40	40	20	50	90	[110]	80	50	30	40	40
990929	40	50	30	30	30	40	[60]	70	50	50	50	50
990930	30	30	40	30	20	40	40	50	50	5	50	50

12	13	14	15	16	17	18	19	20	21	22	23	Means
20	-30	OBS	20	20	+S	+S	40	50	50	40	30	-
60	40	40	40	40	40	40	40	40	30	30	30	-
30	30	30	OBS	-S	-10	20	30	30	30	4	50	-
30	30	40	20	20	30	30	30	30	30	30	30	54
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50	50	50	40	50	50	40	40	40	40	40	40	40
60	70	70	70	40	40	50	50	50	40	30	30	48
40	40	-S	OBS	40	40	40	50	40	40	30	30	-
50	60	30	60	0	20	30	30	50	50	40	50	42
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
80	70	60	50	50	50	30	30	30	30	20	30	-
60	70	50	50	40	40	30	30	30	30	30	30	-
40	50	40	30	30	30	30	30	30	30	30	30	36
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60	70	70	60	60	50	40	40	30	30	30	30	43
40	40	50	40	30	30	30	30	20	20	20	20	31
30	30	30	30	30	30	30	30	30	30	10	OBS	27
30	30	30	30	30	30	30	30	30	30	30	20	28
40	30	40	30	40	40	40	40	40	30	20	30	-
-30	0	20	20	20	30	30	-S	OBS	30	40	30	-
70	70	60	70	60	60	50	50	40	40	50	50	51
40	50	40	40	50	50	50	50	40	40	20	30	52
50	60	60	50	50	50	40	40	40	30	20	30	39
40	40	40	40	40	40	60	50	50	50	40	30	42
50	60	50	60	50	40	40	30	-S	OBS	OBS	30	-
30	30	30	30	30	40	40	40	40	30	40	40	-
40	40	20	OBS	OBS	OBS	+S	0	20	30	30	30	-
50	50	40	40	40	40	40	50	50	50	40	50	45
[40]	40	30	20	30	20	20	20	10	30	30	20	33

Date	00	01	02	03	04	05	06	07	08	09	10	11
991001	20	10	10	30	30	10	[0]	40	20	30	50	50
991002	30	30	30	30	20	30	40	40	40	40	40	40
991003	20	30	20	30	40	[40]	40	50	40	40	40	40
991004	20	10	10	0	10	10	-	-	20	30	40	40
991005	30	30	30	20	30	30	[40]	40	40	40	40	40
991006	20	10	10	10	20	30	[30]	30	30	30	40	40
991007	30	30	30	30	30	40	[50]	50	40	30	40	40
991008	30	30	30	30	30	[30]	40	(40)	40	40	40	40
991009	40	40	30	30	30	[20]	-10	10	0	10	20	40
991010	20	20	30	20	30	40	[40]	30	40	20	30	40
991011	40	40	40	30	40	40	-	-	40	50	40	50
991012	40	30	30	30	20	30	40	[40]	40	40	40	40
991013	30	30	30	30	40	40	[30]	[40]	40	30	10	30
991014	40	40	40	30	30	40	[50]	60	60	40	40	50
991015	-10	OBS	-30	-10	-10	0	[30]	70	80	80	70	70
991016	40	50	40	40	40	50	[50]	50	60	60	60	50
991017	30	30	30	40	40	40	60	[60]	60	50	40	40
991018	20	30	30	30	30	30	-	-	40	40	50	50
991019	40	30	40	40	50	50	[60]	50	50	40	40	40
991020	40	40	40	40	40	40	[30]	30	40	40	40	40
991021	-10	0	10	-10	-10	0	[-10]	-20	-20	-20	-10	-10
991022	30	30	20	20	10	0	-	-10	-10	-10	-10	-10
991023	-30	-10	-10	-10	-10	-20	[-10]	0	0	-10	-10	-30
991024	0	-60	-S	-S	20	-10	[-10]	20	60	70	30	10
991025	30	20	30	30	30	40	-	-	40	50	50	40
991026	-30	-10	10	20	40	40	[40]	110	80	20	40	20
991027	10	10	20	20	30	30	[40]	50	40	40	40	40
991028	40	40	30	20	20	30	[40]	50	70	60	50	50
991029	50	30	-40	+S	-40	+S	[30]	10	-	40	70	50
991030	30	30	30	40	30	40	[30]	20	-10	-10	-10	-10
991031	-50	-40	-40	-30	-20	0	20	-20	[20]	60	50	40

12	13	14	15	16	17	18	19	20	21	22	23	Means
50	50	40	40	40	40	40	50	40	40	40	30	33
40	40	50	50	40	40	30	20	20	10	10	20	33
40	40	40	40	40	30	40	50	40	20	10	20	35
40	40	50	40	50	40	40	40	20	20	30	30	-
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40	-	-	40	40	50	50	50	40	50	40	40	-
50	60	50	40	40	50	40	40	40	40	40	40	-
50	50	60	40	40	30	40	40	40	40	40	30	38
30	40	50	60	60	70	60	60	50	40	40	60	42
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40	40	40	40	40	40	30	20	10	20	10	10	33
0	10	20	20	20	10	10	20	20	10	30	40	4
0	-10	0	20	-10	-30	-40	-30	-30	-40	-50	-40	-9
-10	0	10	20	30	30	30	10	0	-10	-10	-10	-3
10	30	40	50	30	30	40	40	40	30	30	40	-
50	50	40	50	50	50	40	40	40	40	20	0	-
20	20	30	30	60	60	60	60	40	OBS	-30	0	32
40	40	40	50	50	60	70	50	50	40	40	40	39
60	50	40	30	30	30	30	30	30	80	40	30	41
50	60	60	60	60	50	50	60	40	40	40	40	-
-10	-10	-10	-20	-10	-10	-20	-20	-40	-50	-40	-40	-3
40	40	30	40	40	40	40	50	50	40	40	40	20

Date	00	01	02	03	04	05	06	07	08	09	10	11
991101	40	20	20	10	10	10	10	-	-	30	30	30
991102	10	20	20	30	30	40	30	[40]	30	30	30	30
991103	20	20	20	40	60	[70]	30	40	30	20	0	-10
991104	20	30	30	20	20	20	10	[10]	0	0	10	20
991105	0	0	0	0	0	-10	-10	[-30]	-40	-50	-40	-30
991106	-30	-10	0	0	0	0	[-10]	-10	0	-10	0	20
991107	0	10	20	-20	-10	0	0	0	-10	10	10	10
991108	-20	-30	0	0	10	10	20	-	10	20	40	50
991109	20	20	20	20	0	-	-	-	[-S]	-S	-30	+S
991110	OBS	-S	-S	-S	-	-	-S	[-S]	-S	10	10	20
991111	10	20	20	20	20	20	20	[20]	30	30	20	-
991112	80	70	50	30	30	60	40	[30]	40	30	40	50
991113	30	30	40	20	30	30	30	[40]	40	30	40	40
991114	40	40	30	30	30	20	30	[30]	40	40	40	40
991115	40	20	10	20	30	30	60	-	[50]	50	50	40
991116	60	50	50	50	40	40	40	[40]	10	10	20	40
991117	40	40	30	40	20	30	50	[40]	50	50	40	40
991118	40	10	30	40	40	40	40	40	[50]	40	40	40
991119	40	20	30	40	40	30	50	[80]	30	+S	OBS	OBS
991120	20	20	30	40	40	40	40	50	50	70	60	50
991121	50	40	40	50	50	60	50	60	50	[50]	50	50
991122	50	30	30	40	40	30	40	-	-	30	40	50
991123	40	30	30	30	10	20	20	[20]	0	10	20	30
991124	30	20	10	10	10	0	-10	[-30]	-50	-50	10	40
991125	10	10	30	40	40	50	50	[50]	50	50	50	40
991126	40	30	40	50	50	60	60	[50]	50	70	60	70
991127	-40	-30	-20	0	10	20	10	0	-10	-10	-10	-10
991128	20	20	20	20	30	30	20	0	[20]	30	20	10
991129	-20	-50	-40	0	0	0	[0]	-	20	0	-30	-30
991130	30	20	40	50	40	30	50	[40]	(40)	30	30	40

12	13	14	15	16	17	18	19	20	21	22	23	Means
30	40	40	20	10	0	-10	0	20	20	20	10	-
30	30	20	20	20	20	70	60	50	40	30	30	32
-10	-10	-10	-10	10	10	0	10	20	20	20	20	17
20	30	20	20	20	10	20	20	20	10	10	10	17
-30	-30	-30	-30	-30	-30	-40	-20	-20	-30	-20	-20	-23
40	30	30	20	20	40	30	20	-50	-10	10	0	5
20	20	20	20	20	30	30	30	20	10	20	10	11
50	60	50	40	70	70	50	50	40	40	30	20	30
-S	OBS	-	-S	-S	-S	-S	-S	-	-	-	OBS	-
20	20	10	10	20	10	20	20	0	20	20	20	-
-	20	30	30	30	40	40	80	80	80	70	80	-
40	40	40	50	50	40	40	50	40	40	40	30	44
40	40	40	50	60	50	40	20	10	30	40	40	36
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40	50	60	60	50	60	70	70	70	60	70	70	49
50	50	50	50	60	50	50	50	30	OBS	OBS	10	-
40	40	30	OBS	+S	60	70	50	60	90	80	30	-
40	40	50	50	50	50	70	60	70	60	30	30	44
-S	50	+S	+S	+S	-S	70	-S	4	10	10	10	-
60	50	[70]	60	60	70	50	50	70	60	50	50	50
70	60	80	OBS	OBS	OBS	20	40	40	30	30	30	-
50	40	30	30	30	10	20	20	20	20	30	40	-
30	30	30	20	20	10	10	10	20	20	30	30	22
20	10	20	20	10	-40	40	50	20	0	0	10	6
40	40	30	40	40	30	50	40	30	40	40	40	39
70	70	50	50	40	30	20	30	30	20	0	-30	42
10	0	10	[20]	20	20	30	10	30	30	20	30	6
20	0	10	10	10	10	10	0	10	0	0	-10	13
-20	-30	-70	-70	-50	-40	-60	-40	-40	-50	-30	-30	-30
30	30	30	30	20	-50	-10	-10	0	0	-10	0	20

Date	00	01	02	03	04	05	06	07	08	09	10	11
991201	30	0	-10	0	30	10	-20	[-10]	30	0	30	40
991202	40	60	60	60	50	50	50	[70]	50	70	50	50
991203	-50	10	20	40	40	30	40	[40]	30	40	30	30
991204	40	30	40	40	50	50	40	40	50	50	50	70
991205	10	20	20	0	0	OBS	40	OBS	30	40	40	50
991206	40	50	40	40	40	40	40	-	-	50	50	50
991207	40	40	40	40	40	40	50	[30]	40	40	50	50
991208	40	50	40	50	40	30	40	[20]	40	50	50	50
991209	10	30	50	50	50	60	50	[70]	80	130	130	80
991210	10	30	10	20	30	50	40	[50]	50	50	50	-
991211	OBS	OBS	-S	-S	-S	-	-	-	70	90	70	30
991212	50	40	20	40	30	40	40	20	[30]	20	30	40
991213	-	-	-	-	-	-	-	-	-	-	50	50
991214	40	40	30	40	40	40	40	[50]	50	50	50	50
991215	40	40	40	40	40	40	40	[40]	(40)	70	60	50
991216	40	40	40	40	40	30	[40]	40	50	50	40	50
991217	50	50	50	50	40	60	50	50	50	[60]	[40]	40
991218	30	50	50	30	10	20	40	[40]	50	50	60	60
991219	70	50	40	70	60	70	60	[60]	-20	-20	40	30
991220	30	30	-10	30	10	20	10	-	-	50	50	50
991221	50	40	40	30	30	40	40	[40]	40	50	50	50
991222	70	60	50	50	50	50	70	[90]	70	70	60	70
991223	10	0	10	10	20	20	10	[0]	0	-10	10	30
991224	-50	-40	-60	-60	-30	-10	-10	-50	[-70]	-60	-50	-50
991225	-70	-50	-50	-60	-70	-60	[-60]	-70	-80	-70	-60	-50
991226	70	60	80	90	70	80	30	60	50	30	20	-50
991227	50	40	30	50	30	30	0	70	70	60	-	-
991228	40	50	50	40	OBS	-S	-S	[-S]	OBS	OBS	OBS	OBS
991229	40	30	30	30	30	30	30	[40]	[50]	50	50	50
991230	30	-10	10	20	20	20	40	3	[40]	40	50	+S
991231	40	40	30	20	30	20	30	[50]	60	60	70	50

12	13	14	15	16	17	18	19	20	21	22	23	Means
30	30	20	-20	30	60	80	100	50	40	30	50	26
50	70	60	60	50	40	40	40	40	0	0	10	47
20	-20	-10	-20	-30	-10	30	20	30	40	40	40	18
70	60	70	[40]	50	50	40	50	50	70	60	50	50
50	50	50	50	50	50	50	50	50	50	50	40	-
60	60	70	50	50	30	30	50	50	50	50	50	-
50	60	60	50	-30	-30	-40	0	30	30	30	40	31
50	40	50	40	60	60	40	50	40	20	0	10	40
30	30	20	20	30	40	40	40	30	30	10	0	46
50	50	70	70	60	50	50	50	-	-	-	OBS	-
40	30	30	50	50	30	30	50	40	40	40	50	-
50	50	50	60	40	40	50	-20	20	40	-	-	-
40	40	40	40	50	50	50	50	50	40	40	40	-
50	40	50	60	70	70	70	70	-50	30	50	50	45
50	60	60	60	80	60	60	50	60	40	40	40	50
60	50	50	50	70	80	90	90	90	70	60	50	55
50	60	50	50	40	50	60	50	70	70	60	50	52
50	70	50	80	80	80	80	80	90	80	80	70	58
20	30	50	50	OBS	100	50	40	50	50	60	40	46
60	50	50	60	60	70	60	50	50	40	40	40	-
40	40	40	40	40	50	60	70	80	110	80	90	52
70	70	70	60	90	7	80	70	60	30	10	0	60
50	50	50	20	-30	-20	-50	-70	-90	-80	50	-90	-8
-30	-30	-40	-50	-50	-50	-70	-60	-50	-50	-70	-50	-48
-50	-30	-20	30	10	-10	10	-10	OBS	-S	60	70	-
-	-30	-S	OBS	10	30	40	50	50	70	60	40	-
50	40	40	40	30	30	40	50	50	40	50	40	-
OBS	OBS	OBS	OBS	+S	+S	60	50	40	40	50	40	-
50	50	70	60	50	60	70	90	80	70	50	40	50
50	40	50	50	70	90	50	70	60	40	40	40	41
70	140	110	80	90	110	110	80	80	70	80	70	66

*Hourly means of the
2000*

Date	00	01	02	03	04	05	06	07	08	09	10	11
000101	70	70	60	60	50	40	50	[40]	60	80	80	130
000102	160	140	70	120	80	50	40	[70]	120	50	50	40
000103	20	20	20	10	30	70	130	170	-	80	90	120
000104	70	80	70	50	40	40	30	[50]	60	60	70	70
000105	80	110	80	60	70	80	60	[20]	70	70	70	70
000106	50	50	50	50	40	50	80	[120]	130	110	110	120
000107	80	70	80	110	130	140	110	[60]	70	70	70	80
000108	20	70	70	40	50	20	30	[10]	40	30	50	50
000109	-20	-20	-30	-40	-10	-10	-20	[0]	-20	10	40	20
000110	10	10	10	20	10	20	40	-	[50]	60	50	70
000111	50	80	50	40	40	40	30	[40]	50	60	70	70
000112	50	50	60	70	50	50	70	[60]	40	20	20	30
000113	-80	-100	-100	-20	-50	-10	-10	[10]	-20	20	40	50
000114	-50	-50	-60	-50	-40	-40	-40	[-30]	-30	-30	-20	0
000115	0	-10	-20	-40	-30	-20	-20	[-10]	30	20	20	30
000116	40	30	20	20	30	40	30	20	[30]	40	50	50
000117	50	40	30	20	30	40	20	-	-	30	40	40
000118	10	10	0	OBS	20	20	20	[0]	0	10	60	+S
000119	30	30	30	30	30	40	10	[40]	[-S]	30	40	40
000120	40	30	30	20	20	30	50	[70]	70	50	50	50
000121	30	30	30	30	40	30	30	[40]	[40]	40	40	OBS
000122	50	50	30	40	40	30	40	0	30	40	40	20
000123	40	20	30	30	30	30	20	[40]	40	60	120	110
000124	20	40	30	30	40	40	50	-	[50]	60	60	70
000125	10	30	20	20	20	30	40	[40]	50	50	50	40
000126	40	40	40	40	40	50	60	[80]	80	80	50	50
000127	40	30	30	20	30	40	50	[50]	50	60	60	60
000128	50	50	50	40	40	40	40	[40]	60	50	40	50
000129	30	30	30	10	10	10	20	30	[30]	50	50	60
000130	40	40	40	40	40	30	30	[-S]	OBS	OBS	OBS	OBS
000131	-50	10	30	50	70	80	100	90	-	-	-	-

potential gradient

12	13	14	15	16	17	18	19	20	21	22	23	Means
120	110	100	120	110	80	90	100	140	210	90	120	91
40	70	30	30	30	0	20	50	90	100	80	50	66
90	90	80	180	90	120	120	120	120	60	70	80	86
80	90	80	50	40	60	70	70	60	120	130	120	69
70	50	40	60	70	60	70	60	50	60	70	50	65
180	100	130	120	180	200	170	170	160	180	80	80	113
70	110	70	70	70	120	190	210	130	70	30	30	93
50	40	40	-10	-20	-30	30	30	-10	0	20	0	26
10	20	10	20	20	40	50	70	40	10	0	10	8
70	60	50	40	30	20	0	0	30	20	40	40	-
70	60	60	50	60	70	50	60	70	70	60	80	58
40	20	-40	-10	70	60	30	30	-110	-70	-30	-20	22
-30	-30	-30	-40	-10	-10	-30	-20	-10	-40	-50	-50	-35
-20	-10	30	40	30	-10	-10	40	40	50	20	30	-9
40	50	50	70	70	50	40	40	50	50	50	40	23
50	40	50	50	50	50	60	50	70	80	70	50	45
50	50	40	40	40	40	40	20	10	10	10	30	-
OBS	OBS	20	40	60	50	50	+S	50	+S	40	30	-
40	40	40	50	50	50	-S	30	40	40	40	40	37
40	40	40	40	50	50	70	60	40	40	20	20	43
OBS	OBS	40	OBS	40	OBS	60	60	70	60	50	60	-
[10]	30	20	20	30	40	50	50	40	50	40	50	35
90	90	70	80	100	50	20	40	50	50	10	10	51
70	70	60	50	50	50	50	50	50	30	20	0	45
50	50	60	60	50	70	70	70	70	70	50	40	46
50	50	60	70	70	50	40	50	40	40	40	40	52
70	70	70	50	70	90	80	80	80	80	60	70	58
50	50	60	60	70	70	70	70	50	40	30	30	50
60	50	0	30	50	-30	30	40	30	10	40	20	29
-50	20	10	30	30	30	40	30	70	30	-10	-10	-
40	40	50	50	50	50	40	50	40	40	50	40	-

Date	00	01	02	03	04	05	06	07	08	09	10	11
000201	30	30	20	20	40	40	50	[40]	50	40	-	50
000202	40	50	60	80	70	90	70	110	[80]	90	90	70
000203	30	20	30	40	40	40	50	[40]	40	40	40	40
000204	40	40	40	40	40	40	50	[60]	50	60	50	50
000205	30	40	40	40	40	40	[50]	60	70	60	50	40
000206	50	50	40	40	40	40	50	[50]	70	60	50	70
000207	90	70	60	60	50	30	70	-	120	110	120	100
000208	10	10	20	10	0	20	30	[30]	40	60	50	50
000209	30	30	40	30	20	-S	30	[40]	[40]	40	40	40
000210	40	40	40	40	40	40	40	[40]	50	50	50	50
000211	20	30	40	40	40	50	70	[110]	100	80	60	40
000212	50	50	50	40	40	50	50	[40]	50	60	60	50
000213	50	50	40	50	50	50	40	[40]	30	40	50	50
000214	40	40	30	40	50	50	50	-	[50]	40	50	40
000215	50	40	40	30	30	40	40	[30]	30	20	30	40
000216	70	70	50	40	40	40	40	[30]	30	30	40	50
000217	40	40	40	40	40	30	40	[40]	40	40	40	50
000218	50	40	40	40	40	50	50	[70]	50	50	50	40
000219	30	30	30	50	50	30	60	[70]	80	60	50	70
000220	OBS	30	60	70	90	60	60	[60]	70	60	50	40
000221	40	50	40	30	40	50	50	-	[50]	50	50	30
000222	50	50	40	40	50	40	50	[70]	70	60	60	50
000223	30	20	20	10	20	30	+S	[+S]	OBS	OBS	30	30
000224	60	50	30	50	40	60	60	[50]	40	40	40	30
000225	-30	0	10	10	40	50	60	[60]	60	50	50	50
000226	50	40	40	30	40	50	50	[50]	60	50	50	60
000227	60	50	40	40	40	40	50	[50]	50	50	50	50
000228	-20	-20	-30	-40	-30	-30	-20	-	-	-40	-20	30
000229	-10	0	-10	-20	-40	10	40	[70]	60	60	50	50

12	13	14	15	16	17	18	19	20	21	22	23	Means
50	60	60	60	70	80	70	70	90	70	70	60	53
60	70	70	70	50	60	60	70	60	70	20	30	66
40	30	30	50	40	OBS	OBS	50	40	40	50	40	-
40	40	40	20	20	30	40	40	40	40	50	50	42
50	40	40	50	50	60	60	70	50	70	50	50	50
50	50	70	60	50	50	60	70	70	70	90	100	58
110	120	130	120	140	120	80	50	30	10	30	20	80
50	50	50	50	50	50	20	-S	-S	-20	20	40	-
OBS	40	40	50	50	50	50	50	40	40	40	40	40
50	50	50	50	40	50	70	50	40	40	30	10	44
30	50	50	40	40	50	50	50	50	40	50	50	51
60	50	50	40	50	50	40	40	50	60	70	50	50
50	50	40	50	50	40	40	50	30	30	30	30	43
50	50	50	50	50	70	60	60	50	60	50	50	49
-S	30	50	60	70	70	70	60	50	50	70	70	47
40	+S	+S	30	40	30	50	50	50	50	50	50	-
50	60	60	60	50	50	60	60	50	50	40	40	46
50	50	60	50	50	40	40	40	50	40	40	30	46
50	70	50	60	60	60	50	70	40	40	40	40	52
30	30	40	50	30	30	30	40	40	50	30	30	47
20	70	70	50	60	70	70	80	80	70	60	70	54
50	60	70	60	50	70	70	70	40	40	30	20	53
60	70	0	110	40	50	30	60	70	110	80	60	-
30	40	40	40	30	30	30	30	0	-70	-150	-60	23
60	50	50	30	30	OBS	20	40	50	50	40	50	38
60	70	60	70	50	60	70	100	90	80	70	50	58
50	60	50	50	40	40	50	30	20	20	0	-10	40
50	50	50	50	50	50	40	40	40	40	30	10	-
40	40	40	30	20	30	-20	-60	-30	-10	10	20	15

Date	00	01	02	03	04	05	06	07	08	09	10	11
000301	20	10	0	0	-10	-30	-10	[20]	30	40	40	40
000302	-S	-10	-10	0	30	40	40	[40]	40	40	40	30
000303	30	30	30	30	20	30	40	[40]	40	50	50	50
000304	30	40	50	30	40	40	60	[70]	[60]	50	20	30
000305	10	-S	20	-30	OBS	OBS	OBS	OBS	OBS	-S	40	40
000306	50	40	50	50	30	40	30	-	-	40	50	50
000307	70	50	40	40	30	40	50	[70]	70	50	50	50
000308	20	20	10	10	20	40	40	[40]	50	20	10	10
000309	40	30	30	20	30	30	30	[40]	40	50	40	40
000310	OBS	50	OBS	OBS	OBS	OBS	OBS	[50]	50	50	50	50
000311	10	0	-10	-10	-10	10	+S	OBS	+S	-10	10	20
000312	30	30	30	20	30	30	-S	-S	[40]	50	50	70
000313	20	30	30	30	30	30	40	-	-	60	60	60
000314	30	30	40	40	40	40	40	[40]	40	40	30	20
000315	40	30	50	30	40	-30	20	[+S]	40	40	OBS	OBS
000316	0	-10	0	+S	+S	-100	OBS	[20]	40	OBS	OBS	OBS
000317	10	100	30	-110	-160	-50	-	OBS	+S	+S	OBS	OBS
000318	30	30	20	-10	20	30	40	[40]	40	40	50	50
000319	50	50	40	40	30	30	20	20	[30]	20	50	50
000320	50	40	40	40	40	40	40	-	-	40	40	50
000321	30	10	30	40	30	40	40	[40]	60	40	40	40
000322	40	50	40	40	50	50	50	[60]	50	50	50	50
000323	40	60	60	50	40	40	50	[70]	60	50	50	50
000324	50	50	40	30	30	30	50	[40]	70	70	70	80
000325	40	40	-10	0	-30	0	10	30	40	20	40	70
000326	30	40	120	150	90	120	130	120	50	50	60	60
000327	40	50	50	50	50	70	-	-	40	50	40	30
000328	OBS	20	30	30	40	40	[50]	40	30	-10	50	10
000329	30	20	30	40	40	40	[40]	40	50	50	50	50
000330	50	70	70	90	70	80	[60]	30	20	-10	-S	OBS
000331	50	50	50	50	50	50	[40]	20	0	10	10	0

	12	13	14	15	16	17	18	19	20	21	22	23	Means
	40	-10	20	30	30	20	-90	-110	-100	-S	-S	-S	-
	50	40	40	50	30	50	50	60	40	50	40	40	36
	50	50	50	50	40	30	40	30	30	40	40	30	38
	30	20	30	30	0	OBS	30	OBS	10	20	20	10	-
OBS	OBS	OBS	OBS	30	40	30	50	50	50	50	50	50	-
	50	50	40	40	40	40	40	40	40	50	60	70	-
	50	50	40	30	30	40	40	40	40	40	30	30	45
	30	30	30	40	0	-10	-10	40	30	40	20	30	23
	-10	-50	30	40	40	50	50	50	40	OBS	20	50	32
	50	60	60	70	60	70	50	50	50	40	40	20	-
	40	40	40	40	+S	OBS	-S	40	40	30	20	30	-
	70	70	70	60	50	60	50	50	50	40	40	40	-
	40	40	40	40	40	30	30	40	40	30	20	30	-
	20	30	50	50	40	50	50	40	30	10	30	40	36
OBS	OBS	70	50	OBS	20	70	OBS	40	-20	30	20	0	-
OBS	OBS	OBS	OBS	50	50	60	70	70	50	40	50	40	-
	80	80	OBS	+S	60	60	80	50	60	60	50	40	-
	50	40	40	50	50	60	80	80	60	40	50	50	43
	70	60	OBS	40	+S	40	OBS	OBS	50	0	60	60	-
	50	50	50	50	50	70	70	70	60	50	50	50	-
	50	80	60	70	60	60	50	50	50	50	50	40	46
	70	80	80	80	70	50	40	30	30	40	40	40	51
	50	40	40	40	40	30	50	40	40	30	40	40	46
	80	80	80	70	60	60	70	70	70	70	50	40	59
	70	50	40	30	40	40	30	50	50	40	30	30	31
	60	50	50	40	40	+S	OBS	10	40	50	50	50	-
	-S	OBS	40	50	50	40	70	70	60	60	50	0	-
	30	40	40	40	40	30	30	40	40	30	40	30	33
	10	30	10	20	40	20	-10	OBS	OBS	OBS	OBS	40	-
OBS	OBS	OBS	OBS	+S	OBS	OBS	OBS	-10	OBS	70	+S	OBS	-
	10	30	20	20	30	0	10	10	10	10	20	20	24

Date	00	01	02	03	04	05	06	07	08	09	10	11
000401	20	10	10	30	30	40	40	40	50	60	[60]	70
000402	110	60	70	80	50	40	40	[50]	50	50	50	50
000403	20	20	20	20	30	40	-	(40)	50	50	50	40
000404	40	30	30	20	0	-20	[0]	30	50	50	50	40
000405	40	30	30	OBS	OBS	-S	-S	-S	-	-S	70	40
000406	40	30	30	40	40	40	[40]	40	40	30	30	40
000407	30	30	40	40	50	50	[50]	40	40	40	40	50
000408	40	40	40	50	50	40	[40]	40	40	30	30	30
000409	20	10	20	10	10	20	30	30	10	20	[20]	30
000410	10	20	10	20	20	40	-	(30)	30	40	30	40
000411	30	20	20	20	20	30	[40]	40	30	50	50	40
000412	30	30	30	30	20	30	[30]	40	30	30	30	30
000413	10	30	20	30	20	30	[40]	40	30	30	30	30
000414	30	30	10	20	20	30	[50]	30	30	40	40	30
000415	30	30	30	30	30	[30]	40	60	50	30	30	30
000416	OBS	-S	OBS	OBS	10	30	30	[30]	30	30	30	40
000417	30	30	30	30	30	30	-	-	60	60	60	50
000418	40	40	30	30	10	30	[20]	30	30	40	50	50
000419	20	0	10	20	30	-	-	-	-	-	-	-
000420	10	0	-10	-10	-10	0	-	-	-	-	-	-
000421	10	10	-40	-30	20	30	[30]	30	50	60	80	70
000422	30	20	20	20	20	20	40	40	[40]	50	60	50
000423	40	60	30	20	20	[40]	[40]	40	30	40	50	50
000424	30	30	30	30	20	30	[40]	30	40	40	40	50
000425	OBS	OBS	OBS	-20	-10	10	-	-	10	-	10	10
000426	20	30	20	20	30	40	[30]	30	30	40	40	40
000427	20	20	30	30	30	(40)	20	[30]	30	40	40	40
000428	20	20	20	20	20	30	[20]	20	40	40	40	40
000429	10	20	20	30	30	30	[40]	40	30	40	40	40
000430	10	OBS	30	20	20	30	30	[40]	40	50	60	60

12	13	14	15	16	17	18	19	20	21	22	23	Means
60	50	40	0	+S	OBS	OBS	+S	-S	-S	-S	-S	-
50	40	40	40	40	50	40	40	40	50	40	20	50
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50	50	-S	OBS	OBS	OBS	40	40	30	30	40	40	-
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-	-	-	-	40	40	30	20	30	20	10	10	-
-	-	-	70	60	50	40	30	20	30	0	0	-
70	80	80	70	80	80	40	40	40	40	30	30	42
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40	40	40	40	30	30	30	30	20	20	20	10	28
40	50	50	50	50	40	40	30	30	20	-20	10	32
OBS	OBS	OBS	OBS	+S	30	30	40	20	10	10	10	-

Date	00	01	02	03	04	05	06	07	08	09	10	11
000501	20	20	10	10	10	30	[50]	40	40	40	-40	40
000502	10	40	20	30	40	-30	-	-	30	30	30	40
000503	20	20	20	10	20	40	[40]	50	50	50	50	50
000504	30	20	10	20	10	10	[20]	30	30	30	30	30
000505	10	20	10	10	20	30	[30]	[20]	20	20	30	30
000506	10	10	10	20	20	40	40	30	30	[30]	30	30
000507	10	10	10	20	20	30	[30]	40	40	40	40	40
000508	10	10	10	10	10	20	-	-	30	30	20	20
000509	10	20	10	30	40	30	[30]	40	40	30	50	50
000510	10	30	30	30	20	40	[40]	40	40	40	50	50
000511	10	10	10	10	10	40	[40]	40	50	50	60	50
000512	10	10	10	10	10	30	[40]	50	50	70	70	60
000513	40	40	40	40	40	50	[50]	50	50	60	50	60
000514	30	40	30	30	30	40	40	40	[40]	50	60	70
000515	30	20	20	20	20	40	-	-	50	60	50	50
000516	20	30	30	20	30	30	[30]	30	20	40	40	40
000517	10	10	10	10	20	30	[20]	[20]	20	30	40	40
000518	30	10	30	20	20	30	[30]	20	30	30	40	40
000519	20	10	10	10	+S	30	[0]	-40	-90	-50	OBS	OBS
000520	10	10	10	20	10	-S	OBS	OBS	+S	40	60	30
000521	10	10	10	10	10	20	[20]	20	30	30	30	30
000522	30	30	20	20	30	30	-	-	OBS	-50	30	OBS
000523	10	20	20	20	30	30	[30]	10	30	10	10	0
000524	10	10	10	10	20	30	[30]	30	20	20	30	30
000525	20	10	10	10	10	20	[20]	20	20	40	40	40
000526	20	40	40	30	40	40	40	[40]	40	40	50	50
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000529	40	10	10	OBS	OBS	10	+S	+S	50	20	OBS	-40
000530	0	10	10	20	30	40	[70]	70	-	80	50	40
000531	30	0	30	20	30	20	[30]	0	20	OBS	OBS	50

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50	50	-S	OBS	OBS	OBS	OBS	+S	50	40	30	60	-
40	50	0	40	40	40	40	40	40	30	20	20	-
50	50	50	40	40	40	30	30	30	30	40	30	37
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50	40	90	40	50	40	40	30	30	20	20	20	35
60	70	OBS	+S	90	40	20	30	30	20	10	20	-
60	60	60	40	30	30	20	20	20	10	10	10	31
70	60	50	50	+S	OBS	-S	50	40	30	30	30	-
60	70	70	70	50	60	50	40	40	30	20	20	48
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50	50	50	40	40	40	-10	10	10	30	40	20	29
+S	30	30	40	20	30	30	30	30	10	10	20	-
10	40	40	40	40	20	10	10	20	20	10	10	-
30	30	30	30	30	40	40	30	30	30	40	30	26
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80	-20	30	30	40	30	40	40	50	40	40	40	-

Date	00	01	02	03	04	05	06	07	08	09	10	11
000601	60	40	50	60	60	60	[60]	60	70	60	60	60
000602	20	20	20	10	20	30	[30]	40	30	30	40	40
000603	30	30	20	20	30	30	[40]	30	40	40	40	50
000604	20	10	10	20	10	20	20	[20]	20	30	40	40
000605	20	10	10	10	10	20	-	-	30	40	50	60
000606	20	10	20	30	40	40	[40]	30	40	50	50	+S
000607	30	30	20	20	20	20	[40]	30	30	30	30	40
000608	20	10	20	10	20	30	[40]	50	50	50	40	40
000609	10	10	10	10	20	30	[30]	20	20	40	40	40
000610	30	20	30	20	30	40	[30]	20	20	40	40	50
000611	30	30	20	30	20	20	[30]	20	30	40	50	50
000612	10	10	10	20	30	30	[40]	-	30	40	40	50
000613	20	20	20	20	10	20	-	-	-	-	50	70
000614	10	10	20	20	-S	40	[70]	90	80	60	60	70
000615	OBS	30	20	20	30	40	[20]	40	30	40	40	-S
000616	20	20	20	20	20	30	40	[40]	40	40	30	30
000617	20	20	20	20	20	30	[30]	30	40	40	40	30
000618	30	20	30	20	20	30	[30]	40	30	40	40	40
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000623	20	10	20	20	30	[30]	30	40	40	40	40	40
000624	30	30	30	30	30	40	[30]	10	50	20	30	20
000625	-10	-10	10	20	-S	-S	-20	-30	20	20	30	40
000626	30	30	30	30	30	40	-	[30]	40	30	-S	-S
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000630	20	10	10	10	10	[30]	30	30	30	40	40	40

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OBS	OBS	OBS	-S	-S	OBS	OBS	OBS	-10	10	20	30	-
40	40	30	30	20	30	30	20	30	20	20	20	28
40	40	40	40	30	40	30	30	30	20	20	10	31
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60	70	60	60	60	50	40	30	30	20	20	20	36
80	80	OBS	OBS	OBS	OBS	OBS	-S	0	0	10	10	-
80	40	40	40	30	40	40	40	30	OBS	30	+S	-
40	40	40	50	40	30	40	30	30	30	20	40	-
40	30	-S	20	30	+S	40	40	40	40	40	30	-
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40	40	40	40	40	40	50	50	40	40	30	30	36
40	50	50	40	30	+S	20	30	40	30	30	30	32
40	40	40	40	30	40	30	20	20	20	20	20	28

Date	00	01	02	03	04	05	06	07	08	09	10	11
000701	20	30	40	30	30	[30]	[40]	40	40	50	50	40
000702	30	20	10	10	10	10	20	[20]	20	30	40	40
000703	10	10	10	10	-S	20	-	-	30	40	40	40
000704	-	-	0	-10	0	[OBS]	-S	130	40	30	-	-
000705	10	10	10	10	10	30	30	40	[10]	30	30	30
000706	30	10	10	-10	-S	20	[20]	40	40	30	40	30
000707	20	20	10	10	10	20	[30]	20	-S	-10	30	40
000708	-	-	-	-	-	-	70	70	170	90	OBS	OBS
000709	30	20	40	20	20	30	[40]	[50]	50	40	30	-10
000710	30	30	30	30	30	40	-	-	50	50	40	40
000711	30	30	30	30	-S	40	OBS	+S	30	50	20	40
000712	-	-	-	-	-	-	OBS	OBS	+S	+S	80	130
000713	40	40	40	40	30	30	[30]	30	30	30	30	20
000714	10	20	10	10	20	30	[30]	30	30	40	40	40
000715	-20	0	10	10	-40	-60	[-20]	20	30	50	-80	-S
000716	30	30	30	30	30	40	[30]	[20]	40	40	40	30
000717	30	30	30	30	40	40	-	-	40	40	30	30
000718	30	30	30	30	40	40	[40]	40	40	OBS	OBS	OBS
000719	10	10	20	20	30	30	[70]	90	70	50	50	40
000720	30	30	20	20	30	40	[40]	30	40	40	30	30
000721	30	20	20	10	20	40	[40]	40	50	50	50	50
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000724	20	10	10	10	30	20	-	-	40	50	50	60
000725	10	20	20	20	20	30	[30]	40	30	40	40	40
000726	10	10	10	10	10	30	[40]	30	30	50	30	OBS
000727	20	30	30	30	40	[40]	40	40	40	40	50	50
000728	10	20	10	10	10	20	30	30	[40]	[30]	30	30
000729	50	30	30	30	10	[30]	70	90	60	40	50	40
000730	30	20	20	20	20	30	30	[30]	30	30	30	40
000731	40	30	30	20	30	30	-	-	30	40	40	40

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50	60	70	60	OBS	OBS	-	-	-	-	-	-	-
20	0	-	10	20	20	30	20	20	OBS	OBS	0	-
30	30	20	20	20	20	20	20	40	-S	10	+S	-
20	30	30	30	30	40	50	40	40	40	30	30	29
50	50	50	60	OBS	OBS	-	-	-	-	-	-	-
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-20	40	40	40	50	30	30	30	30	30	30	20	30
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OBS	30	20	20	30	40	30	30	30	40	20	20	-
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Date	00	01	02	03	04	05	06	07	08	09	10	11
000801	30	30	30	20	20	30	[40]	40	40	40	40	50
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000803	40	30	40	30	30	20	[30]	40	40	40	40	50
000804	30	30	30	30	40	40	[50]	40	40	40	40	40
000805	20	0	-S	20	20	40	[40]	OBS	OBS	OBS	OBS	OBS
000806	-	-	-	-	-	-	-	60	150	90	70	70
000807	30	30	30	30	40	50	-	-	30	30	30	40
000808	40	40	40	30	40	40	[10]	30	50	50	70	70
000809	10	30	30	40	30	40	[40]	40	50	50	50	50
000810	30	20	20	40	30	40	[40]	40	50	50	50	50
000811	20	10	20	20	20	30	[40]	40	50	50	50	+S
000812	30	30	40	30	20	30	[40]	40	40	40	60	60
000813	20	20	30	20	10	20	30	[40]	40	40	50	70
000814	30	30	20	20	20	30	-	-	50	40	50	60
000815	10	10	10	10	20	20	[30]	30	40	40	50	60
000816	10	10	10	10	20	30	[40]	40	40	40	50	60
000817	20	10	20	20	20	30	[40]	40	40	40	40	50
000818	30	30	30	20	20	30	[40]	40	40	30	40	50
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000822	30	0	-10	20	30	30	[40]	40	40	40	50	60
000823	30	20	10	20	20	30	[40]	40	40	40	40	40
000824	20	10	10	20	20	30	[30]	40	40	40	40	40
000825	20	10	20	30	30	30	[40]	30	30	30	30	40
000826	30	20	20	20	30	40	[50]	50	60	60	60	60
000827	30	10	10	10	20	20	30	[30]	30	30	40	40
000828	10	10	10	20	20	30	-	[30]	30	30	40	40
000829	30	30	20	20	20	30	[40]	40	30	40	40	50
000830	30	20	20	20	20	20	[30]	30	40	40	50	50
000831	-S	30	50	30	20	30	[50]	140	120	50	70	70

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+S	120	80	70	50	50	40	30	20	60	OBS	OBS	-
60	50	60	60	50	50	50	40	30	40	40	40	-
40	40	40	40	40	40	40	30	40	40	40	40	-
60	70	70	70	70	60	50	40	40	40	40	30	48
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+S	30	50	50	40	40	30	40	40	30	30	30	35
50	30	30	OBS	-S	+S	40	30	20	10	10	20	-
70	70	70	80	50	40	30	30	30	30	30	20	39
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50	50	OBS	+S	40	+S	30	30	30	20	20	30	-
60	50	50	50	50	50	40	40	40	40	40	30	39
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70	80	80	80	70	40	30	30	30	30	30	30	41
60	60	60	50	50	40	30	30	40	40	40	30	38
40	50	40	40	50	40	40	40	30	30	20	30	34
50	60	60	50	50	40	40	40	30	30	30	20	35
30	40	30	30	30	40	40	40	30	40	30	20	31
60	60	60	50	40	40	30	30	40	40	40	40	43
40	40	40	40	40	30	30	10	20	20	10	10	26
40	40	40	20	20	20	30	30	30	20	20	30	27
50	60	50	50	40	40	40	40	40	30	30	30	37
50	50	50	40	40	40	40	-20	0	30	30	20	31
50	50	80	50	70	OBS	OBS	OBS	OBS	-20	30	30	-

Date	00	01	02	03	04	05	06	07	08	09	10	11
000901	50	50	-50	-30	-70	-90	-30	[30]	70	70	70	50
000902	20	20	20	30	40	40	[50]	40	40	40	30	30
000903	10	20	20	20	30	20	40	[40]	50	40	30	30
000904	20	20	20	30	30	30	[40]	-	40	40	40	40
000905	30	30	30	40	40	40	-	-	-	50	40	30
000906	30	30	20	20	20	30	[40]	40	50	40	40	40
000907	20	30	-20	10	-30	-10	[-40]	10	40	50	60	40
000908	40	40	40	40	40	40	[50]	[50]	40	60	60	60
000909	40	30	30	40	40	[40]	40	50	50	50	60	60
000910	40	40	40	30	30	40	[50]	40	40	40	50	60
000911	30	20	20	30	30	30	[40]	-	50	60	70	80
000912	30	30	30	30	30	40	[40]	50	60	50	80	80
000913	20	30	30	20	20	30	[30]	40	40	50	50	60
000914	40	30	30	30	30	30	[40]	30	80	50	40	50
000915	30	30	20	20	20	30	[30]	30	40	40	40	40
000916	10	10	10	10	20	20	20	10	10	20	30	30
000917	-	-	-	-	-	-	30	30	40	50	40	70
000918	20	20	20	10	20	30	[40]	-	40	40	20	30
000919	30	30	20	20	20	10	[20]	30	30	30	40	40
000920	30	30	30	40	30	40	[40]	40	40	30	40	50
000921	40	40	40	40	40	30	[70]	30	30	30	30	30
000922	10	0	10	10	20	20	[30]	20	20	20	20	20
000923	40	40	40	40	40	50	[60]	50	50	60	60	70
000924	60	30	30	20	10	20	[30]	30	40	40	50	40
000925	30	30	30	20	30	40	[40]	-	30	30	30	30
000926	30	40	30	30	30	40	[50]	40	40	40	30	30
000927	30	30	40	30	30	20	[20]	20	30	30	30	30
000928	10	10	10	20	20	20	[20]	30	30	40	40	50
000929	30	30	20	20	30	30	[30]	30	30	30	30	50
000930	30	30	40	30	30	30	[30]	20	30	30	30	30

12	13	14	15	16	17	18	19	20	21	22	23	Means
50	50	50	50	50	40	40	30	30	30	30	20	25
-S	30	10	+S	+S	OBS	-30	10	0	-30	+S	-S	-
30	30	40	30	30	30	30	30	20	20	30	10	28
40	40	40	40	40	40	30	30	30	30	40	40	34
30	30	40	40	40	40	40	30	10	30	30	30	-
40	50	60	40	40	30	40	30	30	20	10	20	34
40	OBS	-S	30	-20	40	20	30	40	40	40	40	-
60	80	80	70	60	50	70	60	50	50	40	40	53
70	80	70	70	70	50	60	50	50	40	40	40	51
60	70	70	60	50	50	50	40	40	40	30	40	46
80	80	80	80	70	60	50	40	40	40	40	40	50
80	80	70	60	50	50	50	40	30	40	30	30	48
60	60	50	60	+S	OBS	OBS	OBS	30	30	40	40	-
40	40	40	40	40	40	40	40	30	30	30	30	38
40	40	40	40	40	40	30	40	30	20	20	20	32
30	40	[30]	30	40	OBS	OBS	OBS	-	-	-	-	-
50	30	40	30	30	20	20	10	20	-20	-40	20	-
30	30	30	30	40	30	40	40	40	30	20	30	30
40	40	30	30	20	10	20	20	30	30	40	30	28
50	50	50	50	50	50	70	90	50	60	70	60	48
20	30	30	0	20	30	30	30	30	30	30	30	32
20	30	30	30	30	40	40	30	30	40	30	40	25
40	40	30	40	30	20	20	30	30	10	30	30	40
30	40	40	40	40	40	50	50	50	50	40	30	38
40	30	30	30	30	30	30	30	40	40	30	30	32
40	30	30	40	30	30	40	50	50	40	30	30	36
30	30	30	30	30	30	30	20	10	20	10	10	25
50	50	40	40	40	30	30	30	30	30	30	30	30
50	40	30	30	30	40	40	40	30	30	40	30	33
30	30	30	30	30	30	40	50	30	30	30	30	31

Date	00	01	02	03	04	05	06	07	08	09	10	11
001001	-40	-20	30	20	20	30	30	30	[40]	30	40	40
001002	OBS	0	30	30	30	20	[30]	-	30	40	30	30
001003	-S	-S	-S	-30	-30	-S	[0]	20	20	30	30	30
001004	20	20	20	20	20	20	[20]	60	70	70	70	60
001005	10	10	10	20	20	20	[20]	30	40	40	40	40
001006	10	10	10	10	10	20	[20]	20	20	20	20	20
001007	-S	-S	0	0	0	[-10]	-10	10	20	10	OBS	OBS
001008	20	20	0	-20	-S	OBS	OBS	-S	30	20	30	30
001009	10	10	10	10	0	10	-	-	-	20	20	20
001010	20	10	0	0	10	20	10	0	-10	[0]	10	10
001011	-180	-S	-40	0	10	10	[30]	40	30	40	40	40
001012	30	20	10	20	20	20	[30]	30	40	40	40	40
001013	20	-10	-10	10	20	10	[40]	30	40	40	40	40
001014	30	10	10	30	30	30	40	30	10	(30)	40	40
001015	30	40	20	30	40	60	[90]	90	40	40	60	60
001016	30	10	20	20	30	30	-	-	-	20	30	30
001017	40	40	40	30	20	[20]	40	40	40	40	50	50
001018	0	-	-	-	-	-	-	-	80	70	70	50
001019	20	20	20	20	20	20	[30]	30	40	40	40	30
001020	30	20	30	20	20	30	[30]	-	20	20	20	20
001021	0	10	10	10	20	30	40	30	40	40	40	50
001022	10	10	10	10	20	30	30	[20]	30	30	40	50
001023	30	30	30	20	20	20	[20]	20	10	10	20	30
001024	30	50	50	70	70	60	-	-	60	60	50	50
001025	40	30	30	30	30	40	[30]	30	40	40	40	40
001026	40	40	50	80	100	50	[90]	110	80	50	50	50
001027	30	0	30	30	-S	30	[30]	40	40	30	30	30
001028	10	10	10	30	20	20	40	30	40	50	40	50
001029	0	10	0	0	-10	-10	10	[10]	20	30	40	40
001030	40	50	50	40	40	40	40	-	-	20	-10	0
001031	10	10	10	10	0	0	10	-	10	20	30	30

12	13	14	15	16	17	18	19	20	21	22	23	Means
40	30	30	30	40	-S	OBS	OBS	OBS	-20	60	100	-
40	50	50	50	40	40	60	30	30	20	+S	OBS	-
30	20	20	30	40	30	40	50	20	30	20	20	-
70	70	70	60	40	50	40	30	20	20	20	20	41
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30	30	20	20	20	30	30	20	20	20	20	20	-
30	30	20	-50	-90	-50	-30	-S	-S	-S	30	30	-
20	30	40	40	40	40	30	30	30	30	-40	-60	13
40	60	60	40	40	40	40	40	40	40	30	30	23
40	40	40	40	30	30	20	10	20	0	-20	20	25
40	40	40	30	20	30	40	40	40	30	30	30	28
40	40	60	40	40	30	30	40	40	40	40	30	33
70	60	40	40	30	40	30	30	30	40	30	20	44
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50	50	50	40	40	40	40	30	30	30	20	10	37
50	40	40	40	40	50	50	50	50	30	30	30	-
30	20	40	30	30	40	40	30	30	30	30	30	30
30	30	30	30	30	40	30	20	10	10	10	0	23
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50	50	50	50	50	50	40	50	40	40	30	30	34
40	40	50	50	50	40	10	30	30	30	0	10	27
50	50	40	50	60	60	80	60	60	50	40	30	-
40	40	30	30	10	20	30	30	20	30	20	40	32
50	50	40	40	50	80	80	50	30	0	20	30	55
30	30	30	40	40	40	40	40	40	40	30	20	32
50	50	50	50	50	40	40	30	30	20	10	10	33
40	40	40	40	40	50	50	70	70	50	40	40	30
10	20	30	30	30	20	-10	-10	-10	-10	0	10	-
40	40	40	40	40	50	50	50	40	30	20	20	26

Date	00	01	02	03	04	05	06	07	08	09	10	11
001101	-10	10	OBS	OBS	OBS	-10	0	30	20	30	40	40
001102	50	50	50	50	70	-	-	-	+S	30	20	30
001103	20	30	30	30	20	20	30	[40]	30	30	30	30
001104	10	10	0	-40	-20	-20	0	[30]	20	10	10	-10
001105	20	30	30	20	30	20	10	30	[40]	60	40	30
001106	30	30	30	30	20	20	10	10	-	[30]	30	30
001107	40	40	30	20	0	-10	+S	OBS	[10]	0	20	10
001108	40	30	30	30	30	40	30	20	[30]	40	40	40
001109	10	10	30	10	20	30	40	40	50	40	50	40
001110	40	40	30	40	30	20	20	[40]	70	70	70	40
001111	40	30	40	40	30	40	40	[40]	60	60	40	40
001112	10	10	0	0	-10	0	0	0	[-20]	10	30	40
001113	40	40	60	70	70	80	80	-	-	80	60	50
001114	10	20	10	20	20	20	40	[30]	40	50	50	40
001115	30	30	20	10	20	30	+S	[+S]	-10	20	30	30
001116	50	-20	10	0	0	10	70	[30]	10	10	10	30
001117	30	20	30	30	30	50	70	[80]	80	60	50	40
001118	OBS	OBS	OBS	OBS	OBS	[-10]	0	30	-40	-S	-S	0
001119	40	40	40	40	40	40	40	[40]	60	60	50	40
001120	20	20	20	20	10	40	40	[50]	-	40	50	50
001121	30	40	40	30	30	30	40	[70]	50	40	40	40
001122	40	30	20	10	30	40	40	[60]	60	40	30	30
001123	0	10	10	10	30	40	70	[80]	40	20	30	30
001124	20	30	30	30	30	40	[10]	30	40	40	40	40
001125	40	40	40	40	40	40	40	[40]	50	40	40	30
001126	30	20	30	20	30	30	40	OBS	50	60	50	-S
001127	60	60	40	40	40	40	60	-	[50]	40	40	50
001128	40	30	40	40	40	50	60	[60]	50	60	50	50
001129	40	40	40	50	50	50	70	70	[60]	60	50	60
001130	-10	10	20	30	30	70	50	[60]	90	70	60	60

12	13	14	15	16	17	18	19	20	21	22	23	Means
70	50	60	50	50	50	50	50	50	50	50	50	-
30	10	-30	-10	0	-10	-30	0	0	-10	-10	0	-
30	30	30	40	30	30	30	40	40	30	10	10	29
-10	0	10	20	OBS	-S	20	-50	OBS	0	0	10	-
40	30	40	40	40	40	50	40	50	50	40	30	35
30	40	30	40	50	40	50	40	30	40	60	50	34
30	40	40	30	40	40	40	50	50	50	40	40	-
50	40	40	40	40	60	50	60	60	60	40	30	40
40	40	40	60	60	70	80	80	70	80	90	60	48
40	40	30	50	40	40	40	40	50	70	50	50	44
40	40	40	40	40	30	40	40	10	-10	0	-10	33
40	40	40	40	40	50	40	40	40	10	20	30	21
60	70	60	40	40	40	40	40	40	40	30	20	-
40	40	50	40	40	30	20	20	30	40	40	30	32
50	40	40	40	30	60	40	40	30	30	+S	40	-
30	40	30	50	40	0	40	40	30	40	40	30	26
40	40	60	70	60	80	80	60	40	20	40	OBS	52
-30	20	30	40	30	30	40	40	50	50	40	40	-
40	30	30	30	20	30	30	20	-10	30	20	-20	33
60	60	40	40	50	60	70	40	30	30	30	40	40
40	40	40	50	50	30	40	70	30	40	40	30	41
30	40	40	30	50	80	30	0	10	-10	-10	10	30
30	40	40	40	40	30	40	40	40	30	20	10	32
30	30	30	20	40	60	60	50	30	70	60	60	38
10	30	-40	20	40	40	20	10	10	10	10	10	27
OBS	40	80	100	80	70	80	100	90	80	70	60	-
40	40	50	50	60	70	70	70	60	40	50	40	50
50	50	50	50	50	50	50	40	30	40	40	30	46
50	60	50	50	60	70	70	50	30	20	20	10	49
60	50	60	60	70	80	80	80	80	90	70	50	57

Date	00	01	02	03	04	05	06	07	08	09	10	11
001201	60	70	120	90	120	110	120	[130]	70	30	30	20
001202	50	40	30	30	30	20	10	[10]	[20]	-10	-10	30
001203	10	30	30	40	30	30	[50]	60	30	20	20	30
001204	70	40	30	30	30	20	20	-	-	30	20	30
001205	30	30	20	30	20	30	[20]	10	30	20	30	40
001206	0	0	0	10	0	0	[0]	0	-10	-10	-10	-20
001207	10	10	10	10	0	0	10	[10]	10	20	30	20
001208	0	0	0	0	0	0	10	[30]	40	50	50	50
001209	50	50	40	50	60	50	[50]	[70]	70	40	50	50
001210	40	60	40	40	40	50	50	50	50	[40]	70	50
001211	10	10	20	+S	+S	-S	OBS	-	-	30	50	60
001212	30	40	50	50	40	50	70	70	[100]	110	70	80
001213	70	40	50	60	80	100	80	80	[40]	40	50	60
001214	30	30	40	30	40	40	30	[40]	50	50	70	70
001215	90	80	70	70	60	50	50	30	OBS	OBS	+S	OBS
001216	20	20	20	20	20	20	30	[40]	40	40	40	30
001217	20	20	20	20	20	20	30	30	[40]	40	50	40
001218	40	30	20	OBS	40	30	30	-	-	60	60	70
001219	50	50	40	50	50	60	50	70	[80]	[90]	60	80
001220	40	50	60	70	70	80	70	[70]	90	80	80	80
001221	30	30	10	-10	-10	10	10	[20]	20	10	10	20
001222	40	30	40	30	30	30	30	[40]	[40]	40	50	40
001223	10	0	-10	-10	-30	-50	-50	[-50]	-40	-30	-20	0
001224	60	60	60	60	50	40	80	[110]	110	100	90	70
001225	30	40	70	30	40	30	[40]	[40]	40	40	50	30
001226	60	60	40	40	-	-	-	-	-	-	-	-
001227	50	50	10	10	-	-	50	70	[40]	60	40	30
001228	50	40	50	60	70	60	-	-	-	-	-	-
001229	30	30	20	30	30	30	30	[30]	30	50	70	60
001230	+S	OBS	-	40	30	40	40	-	-	70	70	80
001231	40	30	40	40	20	30	30	[30]	[40]	50	50	50

12	13	14	15	16	17	18	19	20	21	22	23	Means
10	30	40	40	30	0	20	20	20	0	20	30	51
20	30	[30]	50	40	30	20	30	20	70	40	10	27
40	40	30	30	50	50	70	30	50	30	20	70	37
10	-10	-10	30	20	0	0	30	10	-10	30	30	-
30	30	30	40	30	20	30	20	40	40	20	0	27
-20	-20	-10	-10	0	-10	0	0	0	0	0	10	-4
20	30	30	30	30	20	20	10	10	10	0	10	15
70	70	80	80	70	80	80	80	80	70	30	30	44
40	30	60	40	40	40	60	50	30	20	10	30	45
60	60	40	30	40	40	20	20	40	30	30	30	43
30	30	30	30	40	30	40	30	30	30	30	30	-
70	70	70	60	60	70	60	70	60	40	70	60	63
60	50	50	50	50	50	40	50	40	50	50	40	55
70	50	40	40	50	50	50	50	60	60	70	70	49
30	+S	50	40	40	50	50	40	40	30	30	30	-
30	40	40	30	40	30	40	40	40	30	30	20	31
40	40	50	70	70	80	70	60	OBS	40	70	50	43
50	60	70	80	100	50	60	70	70	60	60	50	-
50	40	40	130	160	80	40	30	30	30	40	30	60
70	70	70	70	80	90	90	80	60	60	50	60	70
10	20	30	40	40	50	60	60	50	50	40	40	27
50	50	60	60	70	30	10	20	10	20	10	10	35
10	20	30	-10	-20	0	20	20	30	30	30	70	-2
40	40	40	40	70	50	100	130	90	80	30	30	68
10	10	30	20	40	40	40	50	30	50	60	60	38
-	-	-	-	70	70	40	30	30	0	30	80	-
70	60	40	20	30	40	80	80	30	20	20	30	-
50	40	40	70	70	80	90	90	100	80	60	50	-
70	70	50	70	100	100	90	60	40	40	90	70	54
40	60	70	50	80	80	70	60	80	70	80	80	-
50	50	40	50	80	90	80	40	100	100	80	70	53

*Hourly means of the
2001*

Date	00	01	02	03	04	05	06	07	08	09	10	11
010101	80	50	50	40	30	50	30	-	60	70	60	70
010102	-30	-30	-20	-30	-40	-40	-30	-	-	10	0	20
010103	30	60	40	30	40	30	50	70	[70]	60	40	30
010104	80	70	40	50	70	80	80	[30]	10	-40	-40	-40
010105	20	10	60	70	80	80	80	70	110	80	80	30
010106	40	40	40	30	30	30	40	[40]	60	70	70	60
010107	30	40	40	20	10	20	20	[20]	20	20	20	20
010108	20	30	40	30	20	20	10	-	20	30	30	10
010109	10	-10	-10	-10	10	10	30	-	-	30	30	40
010110	50	50	40	40	40	50	70	[80]	70	70	80	90
010111	80	90	80	50	-10	30	70	[80]	80	30	40	50
010112	20	30	30	30	40	70	70	[60]	70	60	80	70
010113	50	60	70	60	50	40	40	[40]	50	50	60	60
010114	30	30	30	20	50	40	60	[30]	40	80	70	70
010115	60	70	50	50	60	60	60	-	-	70	7	70
010116	50	70	40	40	50	60	80	[70]	60	60	60	60
010117	0	-20	-20	-20	-30	-40	-10	[-10]	-30	-20	-10	-10
010118	-10	0	-10	-10	-10	-30	-20	[-30]	40	-50	-50	-40
010119	-30	30	30	10	-40	-70	-80	[-70]	-40	-30	-50	-80
010120	20	30	0	20	20	30	-10	0	20	10	[10]	-10
010121	40	20	30	20	-30	-30	0	[0]	30	20	20	30
010122	-40	-40	-50	-50	-50	-50	-50	-	-	-50	-60	-50
010123	-10	-20	-10	-20	-20	-20	-30	[-30]	-40	-30	-30	0
010124	-20	-30	-20	-30	-20	-20	-10	[0]	10	10	10	10
010125	-20	-20	-40	-10	-S	OBS	50	40	20	40	30	10
010126	-10	-20	0	30	30	40	70	[80]	80	50	70	80
010127	10	-20	-10	-10	0	10	20	0	10	30	40	60
010128	30	20	10	20	30	20	30	[40]	40	50	40	40
010129	2	10	10	20	30	40	50	-	-	60	40	40
010130	30	30	20	40	40	40	20	[20]	30	20	70	0
010131	30	10	10	20	30	20	10	0	10	10	20	30

potential gradient

12	13	14	15	16	17	18	19	20	21	22	23	Means
60	60	50	40	30	20	-20	-10	-30	-40	-50	-40	29
30	20	20	30	70	60	70	80	80	60	40	30	-
70	50	30	40	70	80	30	40	70	50	70	40	50
0	-10	-20	-30	-40	0	10	30	70	60	50	40	23
10	-10	-20	-10	10	20	40	50	40	40	40	40	43
70	70	60	70	110	90	90	100	80	80	90	70	64
20	30	20	30	40	40	40	50	60	40	40	30	30
10	20	20	-10	OBS	OBS	20	20	10	10	20	10	-
50	50	50	60	80	80	90	80	80	80	80	60	-
90	90	80	80	90	90	100	100	90	80	70	80	74
70	80	30	40	50	50	50	50	60	50	40	30	53
80	80	80	80	70	60	50	70	80	80	70	50	62
60	70	70	50	60	50	40	40	50	40	30	30	51
70	80	80	80	80	80	90	80	80	80	70	60	62
70	80	80	80	80	80	90	80	70	50	60	60	-
30	-10	-10	30	20	30	10	10	0	-10	-10	-10	33
-20	-20	-10	-10	0	0	0	0	-40	-10	-10	-10	-15
-40	-50	-30	10	30	30	30	0	-40	-10	-50	-50	-20
-40	-50	-20	-10	20	40	20	0	-10	-10	-10	10	-20
20	30	30	20	30	-10	0	-10	-10	-30	-30	20	8
30	40	30	40	40	30	30	40	20	10	10	-10	19
-60	-50	-60	-60	-50	-60	-60	-50	-20	-20	-30	-10	-
20	30	80	70	90	80	80	80	70	40	40	20	18
10	0	-10	-10	-20	-20	-20	-10	-20	-30	-20	-10	-11
10	30	20	20	-20	-	-20	10	-10	10	-20	30	-
80	70	60	70	70	80	60	90	130	120	80	20	60
50	50	20	70	40	10	-10	30	10	30	30	30	21
40	40	50	50	60	50	50	60	40	40	30	30	38
40	40	40	60	70	70	60	60	80	60	50	30	-
-10	0	-10	0	10	10	0	10	-10	0	10	10	16
30	40	0	0	-10	10	10	10	10	-20	-10	0	11

Date	00	01	02	03	04	05	06	07	08	09	10	11
010201	0	0	0	0	0	20	30	[30]	30	40	40	50
010202	20	10	20	30	30	30	30	[30]	OBS	-S	10	30
010203	20	-20	0	30	30	40	40	[40]	50	60	50	30
010204	50	40	30	60	60	40	40	[40]	70	60	70	30
010205	60	50	50	40	60	60	70	-	[70]	60	50	60
010206	30	30	30	40	40	40	70	[70]	90	90	7	70
010207	10	0	10	10	10	30	40	[40]	60	60	60	70
010208	40	40	30	40	50	30	30	[40]	40	40	40	40
010209	30	30	0	10	20	20	10	[20]	40	50	50	40
010210	0	20	30	30	20	30	30	[30]	40	40	40	40
010211	40	40	40	40	30	40	40	50	[60]	60	50	50
010212	50	30	40	70	70	70	80	-	[80]	100	80	70
010213	30	40	40	40	40	50	40	[40]	70	70	70	70
010214	30	20	20	20	30	30	30	[40]	40	40	40	70
010215	40	40	40	40	30	30	40	[40]	40	40	50	60
010216	50	40	30	50	50	60	50	[50]	70	70	60	80
010217	50	50	50	40	40	40	50	[40]	40	40	40	40
010218	20	30	30	40	30	30	10	[30]	30	0	20	40
010219	10	20	20	30	30	30	40	-	-	-	30	40
010220	10	10	10	10	10	20	30	[20]	20	20	-10	-S
010221	30	30	40	30	10	20	10	[20]	30	40	30	40
010222	OBS	OBS	20	20	20	20	20	[30]	20	30	30	30
010223	20	OBS	OBS	OBS	OBS	OBS	20	[30]	10	30	OBS	OBS
010224	70	50	50	40	40	30	40	[40]	60	60	50	60
010225	70	60	40	40	50	40	40	60	[60]	60	50	60
010226	30	30	30	40	30	30	50	-	-	70	50	70
010227	40	40	40	30	40	40	50	[50]	70	60	50	50
010228	0	10	0	0	0	-30	-30	[-30]	10	50	60	60

12	13	14	15	16	17	18	19	20	21	22	23	Means
50	40	50	50	50	50	50	50	50	20	10	20	30
40	-S	50	40	40	50	50	60	60	50	30	10	-
40	40	0	0	30	30	30	40	40	40	50	40	31
30	50	30	50	30	30	30	60	60	60	40	50	46
50	40	40	OBS	60	30	0	0	10	10	20	30	42
70	60	50	60	50	50	40	40	30	-20	0	0	46
60	70	50	50	40	60	50	50	60	40	40	40	42
40	40	30	30	30	30	30	30	20	0	-10	-10	30
50	50	60	50	50	40	40	10	20	-20	10	0	28
40	40	50	50	50	60	60	70	60	50	50	40	40
50	60	50	50	40	50	60	40	30	30	30	40	45
50	50	40	40	40	50	50	40	30	30	40	30	54
70	70	70	30	30	40	40	40	50	50	40	40	49
70	70	60	70	70	50	40	40	30	30	30	20	41
70	60	50	30	30	40	40	70	70	50	40	50	45
90	90	60	50	50	60	40	40	40	80	70	50	58
30	30	30	20	10	30	40	30	20	10	-10	0	32
40	30	40	30	20	10	30	30	20	20	20	10	25
40	40	30	10	10	30	30	30	20	10	20	30	-
30	+S	-S	40	30	60	-40	40	90	40	20	30	-
50	50	40	40	40	40	40	40	30	40	30	OBS	33
30	30	40	40	40	40	40	40	30	30	20	20	-
OBS	+S	OBS	OBS	OBS	40	40	OBS	OBS	40	40	40	-
60	70	80	60	50	50	60	80	70	70	40	60	56
50	60	60	40	30	30	40	40	50	40	30	30	47
60	50	40	30	40	60	60	50	50	40	40	30	-
50	40	40	40	40	30	30	40	40	30	30	10	41
50	50	50	50	-20	-30	OBS	OBS	OBS	OBS	-S	-10	-

Date	00	01	02	03	04	05	06	07	08	09	10	11
010301	-10	-10	-10	0	10	-20	-10	[0]	20	30	40	50
010302	80	170	70	-	-	70	30	[50]	4	50	50	60
010303	-S	-S	-S	-20	30	100	120	160	130	70	50	50
001034	40	60	50	40	20	10	10	[10]	10	30	50	50
010305	40	30	30	20	30	-10	20	-	-	40	40	40
010306	40	40	40	40	40	40	50	[50]	50	50	50	50
010307	40	40	20	30	20	10	20	[30]	40	50	50	50
010308	-10	-10	-10	-20	-30	-20	-30	[0]	0	10	30	40
010309	40	30	30	40	30	40	40	[40]	40	50	50	50
010310	30	0	0	20	-	-	-	-	-	40	40	50
010311	50	50	60	50	30	30	40	[40]	40	40	30	40
010312	40	30	30	30	30	30	20	[50]	-	50	60	60
010313	20	30	20	30	20	30	-10	[-20]	-S	-S	-S	-10
010314	30	30	30	20	30	30	40	50	[40]	40	30	40
010315	30	30	30	30	30	40	40	[40]	30	40	40	30
010316	-10	0	20	40	40	30	30	[40]	40	40	40	50
010317	30	30	40	20	10	20	20	[30]	50	50	50	40
010318	20	10	10	10	10	10	10	20	[30]	40	40	40
010319	30	30	20	30	40	30	40	[50]	-	60	50	+S
010320	30	30	40	40	40	40	50	[50]	60	60	50	50
010321	50	40	50	40	60	70	-	-	-	-	-	60
010322	40	20	30	30	60	30	20	10	20	20	+S	OBS
010323	OBS	OBS	0	30	30	30	40	[40]	[50]	50	50	50
010324	120	120	110	50	30	20	+S	[+S]	30	-20	40	60
010325	70	30	30	20	10	20	10	[50]	60	50	50	40
010326	-	-	-	-	-	50	-	-	30	40	70	60
010327	30	30	50	40	70	6	[60]	40	30	50	70	70
010328	50	30	30	30	30	40	[60]	[60]	60	50	50	40
010329	0	-10	10	20	-10	-10	-10	[10]	0	-10	-10	-20
010330	-30	-30	-30	-20	-10	20	[0]	10	30	30	40	40
010331	30	20	30	40	40	40	[60]	70	40	50	50	60

12	13	14	15	16	17	18	19	20	21	22	23	Means
50	40	40	40	30	50	40	30	30	30	70	80	26
-S	10	40	40	30	30	40	50	30	30	30	-S	-
40	50	50	50	60	50	50	50	60	70	50	50	-
40	40	40	40	30	20	20	20	20	30	80	40	33
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50	50	50	50	50	50	60	60	50	40	50	30	47
50	50	50	40	40	40	50	50	30	0	-10	0	33
40	40	40	50	40	40	30	30	10	10	10	30	13
50	50	50	40	40	30	40	20	30	30	0	30	37
50	50	50	50	50	60	50	50	60	70	70	60	-
40	40	40	20	OBS	OBS	20	50	70	70	70	50	-
60	60	60	50	50	50	50	40	30	30	10	0	40
-50	20	20	10	20	20	40	50	70	60	50	40	-
40	40	40	40	40	40	40	40	50	30	30	30	36
40	50	50	50	40	50	60	OBS	-S	30	10	-10	-
50	50	50	50	40	30	40	60	50	50	70	40	39
40	40	20	-10	30	30	40	30	30	40	40	-S	31
40	40	40	40	10	30	30	30	40	40	40	40	28
OBS	-30	OBS	OBS	OBS	130	-S	50	40	40	40	30	-
50	50	40	30	30	30	50	60	50	40	30	40	43
50	50	30	40	70	60	70	30	20	20	30	60	-
-	+S	+S	30	OBS	70	80	90	100	100	140	120	-
50	40	20	OBS	OBS	OBS	-S	10	30	30	60	70	-
50	50	50	40	40	40	40	60	70	50	70	80	-
0	OBS	OBS	OBS	OBS	OBS	OBS	OBS	OBS	OBS	-	-	-
60	60	50	60	70	80	70	40	50	70	60	40	-
70	50	50	50	50	50	50	50	40	60	50	70	52
40	40	60	50	60	50	50	50	30	20	10	0	41
-10	20	30	0	-10	10	0	10	-10	-10	0	-10	-1
40	50	40	40	30	20	30	20	0	0	20	30	15
60	70	70	70	70	60	50	50	40	40	40	40	50

Date	00	01	02	03	04	05	06	07	08	09	10	11
010401	40	40	30	30	30	30	30	[70]	70	80	60	60
010402	20	30	30	30	20	30	-	-	40	50	50	50
010403	30	30	30	30	30	40	[40]	40	40	40	50	50
010404	10	20	30	20	20	30	[40]	30	40	40	50	50
010405	30	30	30	30	20	3	30	[-20]	30	30	30	40
010406	30	20	20	20	30	30	[50]	50	40	40	40	40
010407	30	20	20	10	20	30	[30]	30	30	40	30	30
010408	-10	-S	-S	-S	-S	-S	OBS	-S	-S	-S	-	-30
010409	40	30	30	20	30	30	[30]	-	30	30	30	30
010410	40	30	40	30	40	40	[60]	[70]	70	70	70	80
010411	40	30	30	10	10	20	[10]	60	40	40	30	20
010412	30	20	20	20	20	20	[20]	20	20	30	20	30
010413	30	OBS	20	OBS	40	30	-S	OBS	40	40	40	70
010414	40	30	40	40	30	30	[40]	40	40	40	OBS	-S
010415	40	30	30	30	30	[30]	40	40	30	30	20	30
010416	40	40	30	30	40	[40]	[60]	40	40	50	40	40
010417	30	30	30	30	40	40	-	-	-	50	40	40
010418	40	30	30	30	30	40	40	[40]	40	40	40	30
010419	60	40	30	30	30	30	30	[40]	30	30	20	30
010420	20	30	30	30	OBS	20	30	[30]	[80]	110	70	30
010421	0	-10	-30	0	-30	10	10	[30]	[20]	50	50	30
010422	40	40	40	40	40	40	40	40	[40]	50	40	20
010423	30	40	40	30	30	40	40	[40]	-	40	50	40
010424	60	50	50	40	40	40	40	[40]	40	40	40	40
010425	40	30	20	20	30	30	40	[40]	30	40	40	40
010426	10	20	10	20	-S	-S	[30]	30	30	20	30	20
010427	30	30	30	20	20	20	30	[40]	30	20	10	20
010428	30	20	30	20	20	30	40	[30]	40	40	40	40
010429	20	20	20	10	10	10	20	30	[30]	30	40	30
010430	10	10	20	10	20	20	-	-	30	30	40	50

12	13	14	15	16	17	18	19	20	21	22	23	Means
60	60	70	70	70	60	80	50	40	40	30	20	51
50	50	50	50	50	40	40	40	30	40	40	30	-
50	40	40	40	40	30	40	30	20	30	20	20	35
50	50	50	40	40	40	40	40	40	30	20	20	35
40	50	40	40	40	40	50	50	40	50	40	40	35
30	30	30	40	40	50	40	40	60	50	30	30	37
30	30	20	0	-20	10	20	0	20	20	30	-60	18
-10	20	-20	10	20	30	30	30	40	40	30	40	-
40	40	30	40	40	30	50	40	40	40	40	40	35
80	80	60	50	40	40	50	60	40	40	40	40	53
30	40	40	30	20	10	10	10	10	10	30	20	25
30	40	40	30	40	40	40	20	30	30	30	30	28
+S	-S	OBS	40	-S	-S	30	30	40	30	40	30	-
+S	90	-S	-S	OBS	40	40	60	50	50	40	40	-
20	20	30	20	20	20	20	10	20	20	30	40	27
40	40	30	30	40	+S	OBS	-S	20	30	30	40	-
40	40	40	40	40	40	40	50	50	50	40	50	-
30	40	30	40	40	30	30	40	40	40	40	40	36
30	30	0	-10	OBS	OBS	OBS	OBS	OBS	OBS	OBS	10	-
30	30	30	40	40	40	40	40	40	50	60	20	40
10	10	10	20	20	30	30	30	30	70	60	40	20
10	10	-20	10	20	20	10	30	40	40	30	30	29
40	50	50	50	50	50	50	60	50	50	50	60	45
40	40	50	50	50	50	50	50	50	50	50	50	46
40	40	50	50	40	40	30	40	40	40	20	20	35
OBS	30	40	30	30	40	40	40	30	40	30	30	-
30	30	30	40	30	30	30	30	30	30	30	20	28
40	40	30	30	0	20	30	30	40	30	20	20	30
40	40	40	40	40	40	30	20	20	20	20	10	26
50	50	40	40	40	40	40	40	30	30	20	30	-

Date	00	01	02	03	04	05	06	07	08	09	10	11
010501	20	20	20	10	10	20	20	[20]	30	30	40	40
010502	20	20	20	10	10	20	40	[30]	-	40	50	50
010503	20	10	10	10	10	10	30	40	[30]	30	30	40
010504	30	30	20	20	20	30	40	[30]	30	40	40	40
010505	OBS	+S	+S	40	20	10	10	[30]	[120]	40	30	30
010506	30	30	30	40	30	20	OBS	OBS	OBS	OBS	30	20
010507	-10	-10	-10	-10	0	10	0	-	-	10	10	20
010508	OBS	OBS	OBS	-20	-10	-10	-40	10	[30]	30	30	30
010509	30	30	30	30	30	30	30	[30]	30	20	10	30
010510	30	20	20	20	20	20	30	[30]	30	30	30	30
010511	20	10	10	20	10	20	30	[30]	30	30	30	20
010512	50	40	50	50	30	30	30	[30]	30	30	30	30
010513	30	30	30	20	30	20	30	30	[40]	30	30	30
010514	20	10	10	20	10	10	10	-	-	0	-10	10
010515	20	20	20	20	10	20	20	[20]	[20]	30	30	30
010516	30	20	20	10	0	0	30	[40]	40	40	40	40
010517	20	10	0	30	30	30	[40]	40	40	50	50	40
010518	20	20	20	20	30	20	30	[+S]	40	20	20	20
010519	30	30	30	30	30	20	[30]	50	40	40	30	20
010520	20	10	10	20	20	10	30	[30]	30	30	30	30
010521	10	20	20	30	30	30	40	[40]	40	40	40	50
010522	30	40	30	30	30	20	[10]	20	30	40	50	50
010523	40	40	30	30	30	30	[30]	[20]	30	30	30	40
010524	10	20	10	10	30	30	[30]	30	40	50	50	40
010525	10	20	20	20	30	30	[40]	40	40	40	50	50
010526	30	20	30	30	30	40	50	[60]	70	60	50	50
010527	10	20	10	20	30	30	30	[30]	40	40	40	30
010528	10	10	10	-	-	-	-	-	60	50	40	20
010529	10	10	20	20	20	30	50	[40]	+S	40	40	40
010530	30	30	30	30	20	40	[40]	40	40	60	50	50
010531	20	10	10	10	10	20	[30]	20	20	30	OBS	OBS

12	13	14	15	16	17	18	19	20	21	22	23	Means
40	40	50	50	40	40	40	30	30	20	20	20	29
50	50	50	50	40	40	40	40	40	30	30	20	34
40	40	40	40	40	40	40	30	20	20	20	20	28
40	50	OBS	OBS	-S	OBS	OBS	OBS	30	40	-S	OBS	-
40	50	50	-S	40	40	40	40	40	30	30	30	-
10	10	10	10	10	10	10	10	0	-10	0	-10	-
10	-10	-10	-10	-10	-10	10	0	-20	-10	0	10	-
20	30	30	30	30	30	30	30	30	30	30	30	-
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40	30	30	OBS	OBS	OBS	-S	OBS	OBS	10	30	30	-
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50	50	50	60	50	70	60	40	30	10	10	10	42
30	40	30	20	-20	OBS	0	-S	-S	0	0	OBS	-
40	40	30	30	20	30	30	30	+S	30	10	10	-
40	50	50	40	40	40	40	30	30	30	40	30	34
50	60	60	70	50	50	50	50	40	30	20	20	42
30	40	OBS	OBS	40	30	30	20	-10	OBS	10	20	-

Date	00	01	02	03	04	05	06	07	08	09	10	11
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010602	30	30	20	20	20	20	[20]	30	30	20	40	30
010603	20	10	30	30	30	30	40	[40]	30	+S	OBS	-S
010604	10	20	20	20	30	30	[40]	40	40	30	40	30
010605	30	30	30	30	40	40	-	-	30	40	40	40
010606	10	10	10	20	30	30	[20]	20	20	30	40	40
010607	20	20	10	10	10	20	[40]	40	40	40	40	40
010608	20	20	10	10	10	20	[30]	30	30	30	40	30
010609	10	10	10	10	0	-10	[10]	10	20	20	30	10
010610	40	30	30	20	20	20	30	[30]	30	30	20	30
010611	+S	20	30	20	10	30	[20]	-	30	10	OBS	OBS
010612	20	10	20	30	20	30	30	40	[30]	-	30	30
010613	20	30	30	20	30	30	[30]	30	30	30	40	40
010614	20	30	20	20	20	20	[30]	30	30	40	40	30
010615	20	10	10	10	20	20	20	30	[30]	(40)	50	40
010616	20	10	10	20	10	30	[30]	20	30	30	40	40
010617	30	OBS	OBS	OBS	OBS	OBS	OBS	OBS	OBS	OBS	OBS	OBS
010618	20	10	10	10	20	40	[50]	-	40	30	30	30
010619	10	10	10	10	20	20	[30]	20	20	30	30	20
010620	10	0	0	0	20	0	0	[10]	10	90	0	0
010621	10	20	30	30	40	80	[80]	70	70	70	40	40
010622	10	10	30	OBS	-10	30	80	[40]	70	40	+S	OBS
010623	20	30	20	20	20	20	[30]	30	30	30	30	30
010624	30	30	30	20	30	30	30	[30]	30	30	30	30
010625	20	20	10	20	30	40	-	-	40	50	50	50
010626	30	30	40	20	30	40	[40]	40	40	40	50	50
010627	30	20	20	20	20	30	[30]	30	40	50	60	60
010628	30	20	20	10	20	20	[30]	30	40	40	40	40
010629	40	40	30	30	50	50	[40]	40	30	40	30	30
010630	20	20	20	20	20	[20]	[30]	20	30	40	40	50

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30	OBS	30	40	40	40	40	40	30	30	30	30	32
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OBS	OBS	+S	OBS	OBS	OBS	-S	30	20	-20	-10	10	-
20	20	20	10	20	30	40	40	40	40	40	30	29
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50	50	50	60	50	40	40	50	40	30	20	20	35
30	-S	OBS	30	+S	30	-S	+S	30	40	30	30	-
20	30	30	40	40	40	40	40	60	40	30	30	24
40	40	30	30	30	20	10	10	20	20	+S	20	26
OBS	10	10	80	10	10	10	20	20	10	10	10	-
30	30	30	30	30	30	30	30	30	30	30	30	28
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OBS	OBS	50	80	50	30	30	20	20	10	20	20	-
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10	0	90	30	30	20	10	20	-S	OBS	10	10	-
40	60	60	60	60	40	30	30	20	20	10	10	43
OBS	10	10	30	20	20	30	40	40	30	30	20	-
40	40	40	40	40	40	30	30	30	30	30	30	30
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70	80	80	80	70	50	40	40	40	30	20	30	43
40	+S	OBS	OBS	20	30	30	30	10	20	20	30	-
40	40	40	40	30	30	30	30	30	30	30	20	35
60	50	50	60	60	50	40	30	30	30	20	30	35

Date	00	01	02	03	04	05	06	07	08	09	10	11
010701	10	10	0	10	20	10	30	20	[30]	10	10	10
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010703	40	30	30	30	30	40	[40]	30	40	40	40	40
010704	OBS	30	30	0	10	20	[70]	80	50	80	40	30
010705	20	30	20	30	50	60	[50]	70	70	60	60	50
010706	30	30	30	40	40	40	30	[10]	10	30	30	30
010707	10	10	10	10	10	10	10	[10]	10	10	10	20
010708	-S	-S	10	10	10	10	[30]	40	40	40	40	40
010709	30	20	20	30	30	30	-	-	30	30	40	30
010710	20	20	20	10	20	30	[30]	30	30	40	40	40
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010715	30	30	40	40	40	40	50	[40]	[40]	40	40	40
010716	20	20	20	20	20	[30]	30	-	30	30	40	40
010717	10	10	10	10	10	30	OBS	OBS	OBS	-10	0	0
010718	10	10	20	20	20	40	[60]	60	50	50	50	50
010719	30	30	20	30	20	40	[70]	[90]	70	50	50	40
010720	30	30	[20]	20	20	110	120	100	60	70	40	40
010721	40	30	30	40	40	40	[20]	30	-20	30	40	30
010722	40	30	20	10	20	20	40	[40]	60	40	40	30
010723	30	20	20	20	+S	OBS	OBS	-	50	40	30	10
010724	40	30	20	30	+S	OBS	0	0	30	40	80	30
010725	30	30	30	30	30	30	30	[40]	40	40	40	40
010726	40	40	40	40	40	30	[40]	[30]	20	20	30	30
010727	30	20	20	10	20	[30]	50	40	40	[40]	40	40
010728	30	20	30	20	20	3	[40]	40	40	50	50	50
010729	20	10	10	10	10	30	30	-	40	50	60	50
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010731	30	20	20	10	10	20	30	[40]	40	40	50	60

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30	-S	OBS	OBS	20	20	30	30	30	20	30	40	-
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40	40	40	40	30	40	40	40	30	20	20	10	31
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40	40	50	[50]	30	20	10	20	-10	OBS	OBS	+S	-
30	20	20	30	40	40	40	40	40	40	40	40	31
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50	50	50	50	40	40	40	40	40	30	40	40	36
50	50	50	50	40	40	50	40	40	30	40	30	41
40	40	40	-S	OBS	50	OBS	OBS	OBS	-S	-S	0	-
20	20	30	40	30	30	30	30	30	30	20	20	-
50	50	50	50	50	-S	OBS	OBS	OBS	40	30	20	-
40	OBS	OBS	50	40	40	-S	OBS	OBS	OBS	30	0	-
OBS	OBS	OBS	50	40	30	10	20	20	30	40	30	-
20	10	20	20	60	20	OBS	30	OBS	10	40	50	-
20	10	20	40	50	40	50	40	50	60	40	30	35
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50	30	40	40	40	50	50	40	40	40	40	40	38
40	40	40	40	20	OBS	OBS	30	40	30	30	40	-
40	40	40	40	50	50	50	40	50	40	30	30	37
50	50	50	50	50	50	40	30	30	40	30	20	38
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70	70	70	70	50	40	40	30	20	20	30	30	38

Date	00	01	02	03	04	05	06	07	08	09	10	11
010801	20	10	10	10	20	30	[30]	30	40	50	50	50
010802	40	30	30	30	30	30	[40]	40	40	30	30	30
010803	20	10	10	10	10	10	0	20	30	40	50	70
010804	40	30	30	30	30	30	[40]	40	40	40	50	50
010805	30	30	30	30	-40	10	20	[30]	40	40	40	40
010806	30	30	20	30	30	30	-	-	40	50	50	40
010807	10	10	10	20	20	30	[40]	[30]	40	40	40	50
010808	20	10	20	20	20	30	[40]	[30]	30	30	30	40
010809	30	30	20	20	20	10	[50]	70	60	50	50	60
010810	30	30	30	30	30	[30]	30	30	30	40	40	40
010811	OBS	30	40	50	40	[50]	50	50	50	40	50	40
010812	40	30	20	30	30	20	40	50	50	50	50	50
010813	30	20	20	20	20	20	-	-	40	30	40	40
010814	20	20	10	10	20	20	[30]	40	40	40	50	50
010815	10	10	10	30	30	30	[40]	40	40	40	40	40
010816	20	20	30	20	30	30	[30]	30	20	30	40	30
010817	20	10	10	10	20	20	20	[30]	30	30	40	50
010818	10	20	20	30	20	[10]	20	20	30	30	40	50
010819	10	20	20	20	20	20	20	20	[30]	30	40	40
010820	20	10	10	10	10	20	20	-	-	40	40	40
010821	+S	OBS	OBS	10	10	20	80	-	80	80	50	40
010822	30	20	20	20	10	10	[10]	20	30	40	40	40
010823	30	30	30	30	30	30	[30]	30	30	40	40	40
010824	+S	OBS	20	10	10	20	80	[130]	80	80	70	50
010825	10	10	10	10	20	30	[30]	40	40	50	50	60
010826	30	30	30	20	20	30	30	30	[30]	40	50	60
010827	20	30	30	30	30	20	-	-	30	30	30	40
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010829	20	20	10	20	20	30	40	[30]	40	30	30	40
010830	20	10	10	10	10	20	[40]	40	50	40	40	40
010831	30	20	20	20	20	30	[10]	10	0	-10	-20	0

12	13	14	15	16	17	18	19	20	21	22	23	Means
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30	40	40	50	40	40	40	40	30	30	20	20	34
70	70	50	50	40	40	40	40	40	40	50	50	36
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40	50	40	50	40	40	40	30	30	30	30	40	32
50	50	40	50	50	40	30	20	30	20	20	20	-
50	50	50	+S	30	50	40	40	40	30	30	20	33
40	40	40	30	30	-20	30	20	OBS	OBS	30	30	-
60	60	70	60	50	50	40	40	40	40	30	30	43
30	100	+S	+S	OBS	+S	OBS	OBS	OBS	OBS	OBS	+S	-
40	40	40	50	50	50	40	40	50	50	40	40	44
-	8	40	40	50	50	50	50	50	40	30	30	42
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40	50	50	40	40	40	30	40	30	40	40	40	32
50	50	50	60	60	-	OBS	OBS	-S	30	30	30	-
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70	80	70	70	60	40	40	40	40	30	30	30	40
70	80	80	70	70	50	50	50	40	40	40	30	45
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40	40	40	40	40	40	30	30	30	40	30	20	31
30	40	40	30	40	40	40	40	30	30	40	30	32
0	+S	30	20	30	20	20	20	30	30	10	-S	-

Date	00	01	02	03	04	05	06	07	08	09	10	11
010901	OBS	0	10	20	30	+S	[10]	50	50	40	50	50
010902	20	10	10	10	10	20	30	[20]	40	30	40	30
010903	30	30	20	20	20	-	-	-	40	40	30	30
010904	20	20	20	20	30	30	[30]	40	40	40	50	50
010905	-30	30	10	-10	-30	-60	[-30]	20	30	20	-30	-30
010906	-	-	-	-	-	-	-	-	-	-	-	-
010907	40	40	30	30	20	30	[30]	30	70	70	50	50
010908	40	40	40	30	40	50	[-20]	[10]	20	10	50	30
010909	OBS	OBS	OBS	OBS	OBS	OBS	OBS	OBS	70	80	50	30
010910	30	20	30	40	40	-	-	-	40	40	40	40
010911	40	40	40	20	30	40	[50]	40	40	40	40	30
010912	10	20	10	10	10	10	[20]	OBS	OBS	30	40	40
010913	20	20	20	10	20	30	[30]	40	40	70	50	50
010914	20	20	20	10	10	20	[20]	[20]	30	40	30	30
010915	-	-	40	30	20	30	40	[70]	40	80	80	40
010916	20	30	20	20	10	10	20	40	[20]	30	50	40
010917	30	40	30	20	10	-	20	30	30	40	40	40
010918	30	0	OBS	OBS	OBS	OBS	-	-	-	-	40	30
010919	40	30	40	30	40	40	[40]	40	30	40	40	40
010920	40	40	40	40	30	30	[30]	40	40	40	40	40
010921	30	30	30	20	30	30	[30]	40	40	50	50	50
010922	20	10	10	10	10	10	[20]	30	40	30	30	40
010923	20	20	20	20	20	20	20	30	40	20	30	-20
010924	10	-S	OBS	-10	10	-	20	60	70	(70)	(50)	50
010925	10	20	20	30	30	30	[40]	[40]	40	40	40	40
010926	0	20	30	40	40	50	[60]	60	40	20	10	10
010927	40	40	30	40	30	30	40	[40]	40	40	40	40
010928	40	40	30	30	30	40	[40]	50	50	50	60	60
010929	40	30	30	20	10	10	[10]	40	40	50	50	50
010930	50	50	40	50	50	70	70	40	[40]	40	40	50

12	13	14	15	16	17	18	19	20	21	22	23	Means
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-30	-30	-30	-30	-10	-10	-20	-30	-20	-	-	-	-
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-10	40	40	40	30	30	40	0	20	20	-10	0	24
30	OBS	30	30	OBS	-S	30	30	40	30	30	30	-
40	40	40	30	40	30	-10	-S	-30	30	30	30	-
30	20	30	40	40	30	30	30	30	30	20	20	33
110	-10	OBS	OBS	-20	10	40	30	30	30	40	30	-
40	40	40	40	30	20	40	40	40	40	40	30	35
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40	40	40	30	40	30	40	30	40	40	40	40	32
-S	OBS	60	+S	-10	-40	-30	10	20	10	30	10	-
OBS	OBS	40	40	50	50	50	60	40	40	40	40	-
40	40	40	30	30	30	30	40	40	40	40	40	37
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50	50	40	50	40	50	50	50	50	50	50	50	40
40	40	50	50	50	50	40	30	30	40	40	50	46

Date	00	01	02	03	04	05	06	07	08	09	10	11
011001	50	40	40	40	60	-	[50]	(20)	30	20	30	40
011002	30	40	40	30	30	40	[40]	50	40	40	50	60
011003	40	40	50	40	40	60	[40]	40	20	30	40	50
011004	20	10	10	10	20	30	[40]	[30]	30	40	30	20
011005	30	30	20	30	20	30	[40]	80	70	60	50	40
011006	40	40	30	80	100	80	80	40	40	40	40	50
011007	30	40	20	20	10	10	[0]	[-10]	0	-10	20	40
011008	40	30	20	20	30	-	(10)	(40)	50	40	40	40
011009	20	30	40	40	30	20	10	[40]	40	40	40	40
011010	40	0	40	30	30	20	30	[40]	30	30	30	40
011011	20	20	20	20	20	30	40	[70]	40	40	40	40
011012	30	20	20	20	20	30	[30]	[40]	30	40	50	50
011013	20	30	30	30	20	20	[30]	-	40	40	50	50
011014	30	30	30	50	80	90	130	[140]	90	80	20	30
011015	10	10	10	10	10	-	30	[40]	30	20	-	40
011016	20	40	30	30	40	40	[40]	[40]	40	50	50	40
011017	40	40	40	30	30	30	[20]	30	20	20	20	20
011018	10	20	20	10	10	-10	[-20]	[-10]	-30	-10	20	20
011019	30	50	80	60	60	40	30	30	40	40	40	70
011020	30	20	10	30	20	20	20	10	0	0	-10	-10
011021	-10	-10	-30	-20	10	30	[20]	30	10	10	30	30
011022	10	10	10	20	10	30	40	-	30	30	20	10
011023	20	30	30	20	20	20	20	-	40	40	40	50
011024	20	20	30	20	10	10	[20]	[30]	30	30	40	40
011025	-80	-30	20	40	50	60	60	60	30	20	30	20
011026	20	20	10	20	20	30	[30]	20	0	20	30	30
011027	10	0	-40	-10	20	30	[20]	30	20	20	30	30
011028	40	40	40	40	30	40	40	[20]	10	10	30	30
011029	110	130	60	80	60	40	-	-	10	20	20	-10
011030	70	40	30	30	40	40	40	[40]	30	-10	-10	-20
011031	0	0	0	10	10	20	20	30	40	[40]	30	40

12	13	14	15	16	17	18	19	20	21	22	23	Means
40	40	40	40	30	30	30	30	30	30	30	30	-
60	40	40	40	30	20	10	30	20	20	20	30	35
50	50	40	40	40	40	40	30	30	20	20	20	38
30	30	20	10	-10	0	10	20	0	10	30	30	20
40	30	30	30	30	30	40	40	30	30	30	30	37
50	50	[40]	40	30	40	40	40	40	30	30	20	46
40	40	40	30	30	20	20	30	40	40	20	40	23
40	40	30	30	30	40	30	30	40	30	20	30	-
40	40	40	40	40	30	40	40	40	40	30	30	35
30	40	30	30	30	30	40	40	30	30	20	10	31
40	40	40	40	50	60	60	50	40	40	30	30	38
50	50	40	40	30	40	40	30	40	30	20	20	34
50	60	60	50	50	60	80	40	40	30	30	30	41
40	40	40	40	40	40	30	40	40	30	30	20	49
40	40	30	40	30	40	30	30	30	20	20	20	-
60	60	80	70	40	40	40	50	40	50	40	40	45
10	10	10	10	30	40	30	30	40	40	30	30	27
10	30	20	40	30	30	40	40	50	50	40	40	19
80	70	50	50	40	40	60	50	40	40	40	40	49
-10	10	10	0	10	20	30	20	10	10	10	0	11
40	30	-10	OBS	+S	10	30	OBS	-S	-S	OBS	20	-
20	30	30	30	30	40	40	30	40	30	30	20	26
50	60	40	40	40	50	50	40	40	30	30	20	36
40	40	40	40	40	40	40	30	30	30	-50	-100	22
10	20	10	20	20	-10	20	30	30	30	30	20	21
40	40	30	40	40	30	10	10	30	20	40	20	25
40	40	40	20	40	20	40	40	30	30	30	40	24
30	40	30	30	30	20	30	-S	OBS	30	OBS	OBS	-
-30	-30	-20	0	-10	-10	-10	-10	70	60	60	70	-
-20	-10	-10	-10	10	10	10	10	10	0	0	0	13
40	40	40	50	40	50	70	50	60	50	40	0	32

Date	00	01	02	03	04	05	06	07	08	09	10	11	
011101	0	10	20	10	10	10	20	[30]	40	40	40	40	
011102	40	30	30	20	30	40	40	[40]	40	40	40	40	
011103	40	40	40	40	40	40	40	[40]	40	40	40	40	
011104	30	40	30	30	30	40	70	[80]	30	0	-10	0	
011105	40	40	40	40	40	40	-	-	-	40	40	40	
011106	40	40	20	0	10	10	20	[30]	20	10	0	-20	
011107	30	40	40	30	20	10	20	[30]	[30]	20	30	50	
011108	20	10	10	10	10	10	10	[10]	[40]	40	0	0	
011109	OBS	OBS	OBS	OBS	OBS	OBS	OBS	20	30	[30]	40	40	40
011110	40	60	60	40	40	50	50	[50]	50	50	40	40	
011111	30	20	10	20	20	20	10	[-20]	-40	-40	-50	-30	
011112	10	20	10	20	30	30	-	-	-	-	0	20	
011113	40	40	30	30	20	30	40	[60]	40	40	30	10	
011114	40	40	40	40	50	60	60	[50]	60	60	50	50	
011115	40	40	40	40	40	40	50	[60]	[60]	60	70	80	
011116	60	50	50	40	40	40	40	70	[30]	20	30	30	
011117	30	30	30	30	30	30	30	40	[40]	[60]	60	60	
011118	0	10	20	20	20	30	60	[80]	40	20	30	20	
011119	10	10	20	10	10	20	-	-	-	-	40	40	
011120	20	20	10	OBS	10	20	20	[30]	[40]	40	40	40	
011121	30	30	30	30	30	30	30	[30]	30	30	40	40	
011122	30	20	20	20	20	10	20	[30]	40	40	40	30	
011123	10	OBS	10	OBS	OBS	20	20	OBS	40	60	50	30	
011124	30	30	30	20	20	30	30	[40]	30	30	30	40	
011125	40	40	40	3	40	40	40	40	[40]	50	50	50	
011126	40	50	50	40	40	40	50	-	-	30	20	30	
011127	-10	50	40	40	50	30	30	[40]	20	0	10	-10	
011128	20	30	20	30	50	40	100	[120]	[80]	40	50	20	
011129	40	40	30	30	20	30	50	[60]	50	40	40	40	
011130	-160	-S	-S	-S	-S	-80	-60	OBS	-20	30	10	40	

12	13	14	15	16	17	18	19	20	21	22	23	Means
50	40	40	40	50	50	40	60	40	40	40	40	33
40	40	50	50	60	50	40	40	50	40	40	40	40
40	60	60	70	70	60	30	20	30	30	30	30	42
20	40	40	40	40	30	20	-10	20	20	20	10	28
40	40	40	40	50	50	40	40	40	40	40	40	-
-30	-10	30	40	50	80	40	70	70	50	10	10	25
40	40	40	50	60	60	20	20	40	40	40	30	35
30	50	60	50	40	40	50	60	60	40	20	50	30
40	40	40	50	70	60	60	70	80	70	70	50	..
40	50	40	40	40	40	50	40	30	30	30	30	43
-20	-30	-30	10	20	30	20	30	30	30	30	20	4
30	40	30	30	40	70	50	-10	30	30	40	40	-
20	0	0	-S	-S	-S	50	80	80	70	60	40	-
50	50	60	60	70	60	60	60	50	40	40	40	52
80	80	70	60	80	80	80	40	50	50	50	50	58
50	50	50	60	60	70	70	70	60	50	40	40	49
50	40	20	30	40	30	20	20	10	10	-10	0	30
20	20	10	20	20	10	20	30	20	20	10	20	24
40	40	40	40	40	40	40	30	30	30	30	30	-
40	40	50	40	40	40	40	40	40	30	40	40	33
30	40	40	40	40	30	30	30	30	30	20	20	32
30	40	40	40	40	40	20	0	0	-10	30	30	26
40	40	50	40	50	40	50	50	40	40	40	30	-
30	OBS	OBS	50	50	50	50	50	40	40	40	40	-
50	50	40	40	50	50	50	60	50	50	40	40	45
20	20	-10	10	30	70	40	30	40	40	10	-20	-
-10	-10	0	10	10	0	10	30	30	-10	0	30	16
60	40	50	30	40	60	40	40	60	60	40	40	48
30	30	50	20	30	40	-120	-160	-40	120	70	-40	21
40	70	80	90	90	80	80	70	60	50	40	30	-

Date	00	01	02	03	04	05	06	07	08	09	10	11
011201	30	30	30	30	20	40	40	40	[60]	60	50	60
011202	70	40	40	40	70	100	130	[130]	110	80	90	80
011203	50	40	40	40	60	40	-	40	30	30	[60]	-
011204	20	10	20	20	30	30	0	[30]	0	-20	-30	-40
011205	-40	-10	-30	-40	-30	-20	-10	[20]	40	0	0	50
011206	0	-30	-30	OBS	-S	OBS	OBS	OBS	OBS	-S	OBS	-10
011207	30	20	30	20	10	20	20	[10]	30	40	30	30
011208	60	70	50	40	50	50	70	[70]	80	70	70	60
011209	70	50	40	40	40	40	40	60	[60]	60	60	60
011210	60	60	70	60	70	70	-	60	-	60	70	70
011211	40	50	30	20	10	10	30	[20]	+S	80	40	40
011212	60	50	70	90	30	30	30	+S	OBS	OBS	90	90
011213	40	20	40	60	60	50	60	50	60	60	60	60
011214	0	10	10	20	10	10	20	[20]	30	30	30	40
011215	40	40	50	50	50	60	60	70	80	80	80	80
011216	30	10	20	20	20	10	0	-10	0	20	30	40
011217	50	50	50	60	60	60	-	-	50	50	50	40
011218	30	10	0	10	10	-20	-10	[-10]	[20]	30	30	40
011219	30	30	40	40	40	40	30	[40]	[30]	40	40	40
011220	40	40	30	30	30	30	40	[40]	[50]	40	50	40
011221	40	30	30	30	20	10	20	[40]	40	40	50	50
011222	40	40	0	30	20	40	40	[30]	40	50	50	50
011223	-30	OBS	OBS	30	40	40	40	[40]	50	60	60	40
011224	50	50	40	40	30	40	30	[50]	70	70	80	120
011225	70	50	40	0	-10	-10	-	30	30	40	40	50
011226	40	40	40	50	50	40	50	[50]	70	60	50	30
011227	50	60	40	40	30	30	40	[50]	-	50	50	50
011228	40	40	30	30	0	0	[-10]	10	20	30	20	30
011229	50	40	40	40	50	10	60	[70]	50	40	50	60
011230	30	40	40	50	50	40	40	40	40	[40]	40	50
011231	30	30	30	30	40	40	40	[50]	-	50	OBS	30

12	13	14	15	16	17	18	19	20	21	22	23	Means
80	80	90	80	120	100	90	100	90	90	80	80	65
80	70	60	50	80	60	80	70	80	30	30	40	71
60	80	70	40	70	60	40	40	20	30	30	30	-
-20	0	-20	-30	-10	-10	-20	-50	-50	-30	-50	-40	-11
70	40	40	80	150	130	60	20	0	10	10	0	23
-100	-50	30	30	50	70	120	100	120	+S	80	40	-
20	20	20	40	50	60	60	70	80	80	70	60	38
60	70	60	80	80	90	80	100	90	80	90	80	71
70	80	80	80	70	70	90	90	90	90	80	70	66
70	80	80	80	80	70	80	90	80	70	60	40	-
60	40	60	40	40	40	70	50	80	70	50	60	45
70	40	80	100	80	OBS	40	80	80	80	50	60	-
60	60	40	30	20	20	-20	-80	-50	-30	-10	-10	27
40	60	60	60	40	30	30	30	40	40	30	20	30
80	70	40	20	30	70	60	50	50	40	30	20	54
30	40	50	70	60	60	60	70	70	60	60	60	37
50	50	50	30	40	40	30	50	70	50	40	20	-
40	30	40	40	40	40	50	50	40	40	30	40	25
40	30	40	30	40	50	40	50	40	50	40	40	39
40	40	OBS	40	30	50	50	50	70	70	60	40	43
50	30	30	40	40	30	30	20	20	20	40	40	33
50	50	50	50	50	70	70	50	40	0	20	20	40
50	40	50	40	50	60	50	50	70	70	50	40	-
110	70	110	80	70	70	70	70	70	60	80	90	68
50	50	40	50	40	40	50	60	60	50	40	40	39
60	70	60	90	80	110	90	100	90	60	80	60	63
50	50	50	50	50	60	70	50	50	50	40	30	47
40	30	60	60	50	40	60	30	30	40	40	50	32
70	60	60	60	60	60	70	70	40	30	20	30	50
50	50	50	50	60	50	40	50	40	40	30	30	43
50	50	50	0	0	40	50	40	40	40	-30	-40	-

Hourly means of the quantities of positive and negative
1999

Month		00	01	02	03	04	05	06	07	08	09	10	11
9901	+	0	0	0	0	0	0	0	0	0	0	0	0
9901	-	0	0	0	0	0	0	0	0	0	0	0	0
9902	+	0	0	0	0	0	0	0	0	0	0	0	0
9902	-	0	0	0	0	0	0	0	0	0	0	0	0
9903	+	0	0	0	0	0	0	0	0	0	0	0	0
9903	-	0	0	0	0	0	0	0	0	0	0	0	0
9904	+	1	0	0	0	0	0	0	0	0	0	0	0
9904	-	0	0	0	0	0	0	0	0	0	0	0	0
9905	+	6	4	0	2	0	0	0	0	0	0	0	0
9905	-	3	5	0	0	0	0	0	0	0	0	0	0
9906	+	14	3	0	0	0	0	0	7	0	0	0	3
9906	-	9	0	0	0	0	0	0	0	0	0	0	0
9907	+	2	18	0	12	1	19	20	5	18	11	4	6
9907	-	26	22	0	11	4	18	7	4	23	2	2	10
9908	+	0	0	0	0	0	0	1	3	4	0	0	0
9908	-	0	0	0	0	0	0	0	3	4	0	0	0
9909	+	0	0	0	0	0	0	1	0	1	1	7	0
9909	-	0	0	0	0	0	0	0	0	1	0	9	2
9910	+	0	1	0	0	0	1	0	0	0	0	0	0
9910	-	0	0	0	0	0	0	0	0	0	0	0	0
9911	+	0	0	0	0	0	0	0	0	0	0	0	0
9911	-	0	0	0	0	0	0	0	0	0	0	0	0
9912	+	0	0	0	0	1	0	0	0	0	0	0	2
9912	-	0	0	0	0	1	0	0	0	0	0	0	0

charges transported by point-discharge for each month

12	13	14	15	16	17	18	19	20	21	22	23	Means
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	0	0	0,1
0	10	0	0	0	0	0	0	0	0	0	0	0,4
0	0	0	0	0	0	0	1	0	1	5	6	1,0
6	0	0	0	8	0	0	1	1	0	2	6	1,3
1	26	6	11	14	13	18	13	6	12	1	22	7,1
2	1	39	26	36	10	43	16	9	6	28	6	9,6
8	1	0	24	4	11	9	4	0	0	8	9	8,1
8	1	1	12	7	9	19	18	2	1	10	13	9,6
0	7	8	5	0	16	8	0	7	15	4	4	3,4
0	3	7	0	3	30	10	0	5	15	5	5	3,8
0	0	1	7	8	5	9	0	1	4	0	1	1,9
0	0	1	9	6	8	0	0	6	1	0	0	1,8
0	0	0	0	0	0	0	0	0	1	0	0	0,1
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0	0
0	0	4	1	1	0	0	0	1	0	0	0	0,4
0	3	5	3	0	0	0	0	2	0	0	0	0,6

Hourly means of the quantities of positive and negative
2000

Month		00	01	02	03	04	05	06	07	08	09	10	11
0001	+	0	0	0	1	0	0	0	0	1	1	0	12
0001	-	0	0	0	0	0	0	0	0	2	1	0	11
0002	+	2	0	0	0	0	0	0	1	5	0	0	0
0002	-	0	0	0	0	0	0	0	0	1	0	0	0
0003	+	1	0	1	6	4	3	13	2	4	0	5	8
0003	-	0	0	0	6	3	5	9	0	1	7	1	20
0004	+	1	8	9	6	0	0	0	0	0	0	0	0
0004	-	13	12	4	6	0	0	0	0	0	0	0	0
0005	+	0	0	0	1	0	0	4	4	2	3	7	5
0005	-	0	0	0	0	0	0	0	10	2	1	10	0
0006	+	1	0	0	0	0	0	0	0	0	0	0	2
0006	-	0	0	0	0	0	0	0	0	0	0	0	1
0007	+	0	0	0	0	0	5	48	0	3	1	1	13
0007	-	0	0	0	0	1	0	9	0	0	2	1	6
0008	+	1	0	0	0	0	0	0	0	3	7	6	3
0008	-	0	0	0	0	0	0	0	6	10	7	4	8
0009	+	0	0	0	0	0	0	0	0	0	0	0	0
0009	-	0	0	0	0	0	0	0	0	0	0	0	0
0010	+	0	0	0	0	0	0	0	0	0	0	0	0
0010	-	0	0	0	0	0	0	0	0	0	0	0	0
0011	+	1	3	16	12	1	0	1	0	0	0	0	0
0011	-	1	5	14	7	1	0	0	0	0	0	0	0
0012	+	0	0	0	0	0	0	0	0	0	0	1	0
0012	-	0	0	0	0	0	0	0	0	0	1	0	1

IONOSPHERE DATA

Mean ionospheric absorption $L'(dB)$ at oblique incidence (A3)

$$f = 270 \text{ kHz}$$

The following tables give the values of mean ionospheric absorption at oblique incidence (A3) for certain zenith distances of the Sun (χ) expressed in decibels (dB). Values for ground sunset (SS) and ground sunrise (SR) are given for periods of 20 minutes centered on the times of $\chi = 90^\circ$. Night values have been determined by taking the periods ranging from $\chi = 100^\circ$ to 23 00 GMT. The date column gives year, month, day (e.g. 990101 indicates 1999 January 1). SS and Night values in actual row are valid for the actual day, however, the SR values always for the next day's dawn. Values uncertain for some reason are entered in round brackets (). Some gaps are due to missing records.

The sky wave of the transmitter Československo ($f = 272 \text{ kHz}$) has been recorded since January 1967. The geographical coordinates of the reflection point are 48.4° N , 17.1° E . Because of reconstruction works on the transmitter Československo, the absorption measurement at 272 kHz and the publication of data were suspended from April 1975 till September 1978. (At present the transmitter frequency is 270 kHz.) Due to changes and repeated troubles in transmitting conditions the publication of absorption data has been abandoned from August 10, 1999.

The equipment and the method have been described in the papers by BENCZE P and MÄRCZ F: "Atmosphärisch-elektrische und ionosphärische Messungen im Observatorium bei Nagycenk". Observatoriumsberichte des Geophysikalischen Forschungslaboratoriums der Ungarischen Akademie der Wissenschaften vom Jahre 1966, Sopron, 1967, as well as by BENCZE P, HORVÁTH J, MÄRCZ F: "A new equipment for the measurement of ionospheric absorption" Geophysical Observatory Report of the Geodetic and Geophysical Research Institute of the Hungarian Academy of Sciences, Year 1975. Observatory of Nagycenk, Sopron, 1976. Further information is given by BENCZE P and MÄRCZ F: "The Geophysical Observatory near Nagycenk II. Atmospheric electric and ionospheric measurements" (*Acta Geod. Geoph. Mont. Hung.*, 16, 1981, 353-357).

See CD (program Seenck.exe, menu item Ionosphere/Absorption).

Mean ionospheric absorption L' (dB) at oblique incidence (A3)
f = 270 kHz
 1999

Date	SS	Night	SR
990101	22.2	15.7	29.2
990102	35.2	14.1	19.9
990103	33.2	21.0	23.8
990104	35.2	21.8	28.2
990105	35.2	22.2	27.2
990106	35.2	22.2	37.7
990107	41.2	26.4	37.7
990108	28.2	20.2	27.2
990109	37.7	(20.6)	
990110	22.7	21.0	25.0
990111	41.7	23.8	33.2
990112	28.2	25.7	19.5
990113	35.2	23.8	23.8
990114	27.2	26.4	30.3
990115	31.7	23.2	25.0
990116	31.7	23.2	28.2
990117	29.2	23.8	27.2
990118	35.2	21.8	30.3
990119	23.8	25.7	33.2
990120	27.2	27.2	28.2
990121	27.2	(18.9)	
990122			
990123	33.2	18.9	31.7
990124	20.6	25.7	31.7
990125	27.2	27.2	28.2
990126	30.3	27.2	31.7
990127	31.7	25.7	
990128	41.2	27.2	37.7
990129	37.7	26.4	31.7
990130	41.2	29.2	29.2
990131	35.2	26.4	31.7
990201	33.2	24.4	18.6
990202	25.0	19.9	25.0
990203	41.2	26.4	23.8
990204	25.7	24.4	27.2
990205	37.7	23.8	26.4
990206	31.7	20.2	25.7
990207	26.4	19.5	24.4
990208	25.7	27.2	31.7

Date	SS	Night	SR
990209	26.4	21.4	24.4
990210	33.2	19.9	25.7
990211	35.2	21.8	27.2
990212	30.3	21.8	25.7
990213	29.2	18.3	21.0
990214	23.8	27.2	28.2
990215	35.2	21.0	31.7
990216	33.2	28.2	27.2
990217	30.3	26.4	33.2
990218	35.2	26.4	29.2
990219	33.2	30.3	33.2
990220	31.7	25.0	33.2
990221	35.2	23.8	27.2
990222	35.2	22.2	28.2
990223	27.2	22.7	28.2
990224	35.2	18.6	
990225	27.2	22.2	37.7
990226	26.4	23.8	41.2
990227	37.7	19.2	29.2
990228	35.2	24.4	47.2
990301	23.8		
990302	21.4	21.8	21.8
990303	33.2	20.6	28.2
990304	23.2	23.2	23.8
990305	23.2	18.1	23.8
990306	27.2	17.8	23.8
990307	21.8	23.2	26.4
990308	26.4	21.0	28.2
990309	26.4	19.5	23.8
990310	25.0	(21.8)	25.0
990311	30.3	21.4	28.2
990312	23.2	18.9	23.8
990313	19.2	21.8	18.3
990314	19.2	18.3	21.8
990315	16.9	19.5	22.7
990316	21.8	21.0	21.0
990317	22.2	18.3	28.2
990318	26.4	21.0	21.4
990319	25.0	17.6	27.2
990320	23.8	18.3	28.2
990321	25.7	18.3	25.0
990322	22.7	17.8	27.2
990323	24.4	18.1	25.0

MEAN IONOSPHERIC ABSORPTION 1999

Date	SS	Night	SR
990324	30.3	21.4	27.2
990325	24.4	18.1	31.7
990326	28.2	19.9	27.2
990327	23.2	18.1	27.2
990328	24.4	21.0	19.2
990329	22.2	20.6	22.2
990330	27.2	19.2	23.2
990331	19.5	17.8	21.4
990401	22.7	18.3	23.8
990402	25.0	21.0	22.2
990403	27.2	19.2	25.7
990404	22.7	25.0	22.2
990405	24.4	19.9	22.7
990406	22.7	19.9	22.7
990407	25.0	16.7	21.4
990408	23.8	19.2	29.2
990409	33.2	17.6	21.4
990410	21.8	23.2	18.6
990411	22.2	14.6	21.8
990412	26.4	19.5	23.2
990413	30.3	17.8	24.4
990414	26.4	19.9	25.0
990415	30.3	19.2	24.4
990416	26.4	21.8	21.8
990417	27.2	18.3	21.0
990418	24.4	19.5	19.9
990419	23.8	19.9	20.2
990420	23.8	23.8	24.4
990421	19.5	26.4	21.0
990422	26.4	23.8	23.2
990423	21.4	(26.4)	23.2
990424	25.0	21.4	
990425	17.1	19.5	29.2
990426	26.4	16.5	24.4
990427	28.2	21.8	23.2
990428	23.8	23.2	
990429	31.7	23.2	24.4
990430	23.8	17.3	26.4
990501	29.2	23.8	27.2
990502	35.2	21.0	21.8
990503	26.4	21.0	24.4
990504	24.4	17.8	33.2
990505	35.2	18.6	27.2

Date	SS	Night	SR
990506	33.2	19.5	28.2
990507	26.4	21.4	19.9
990508	31.7	23.8	23.8
990509	41.2	19.9	33.2
990510	28.2	19.9	22.2
990511	33.2	22.7	26.4
990512	29.2	20.2	23.2
990513	35.2	22.7	23.2
990514	25.7	22.2	27.2
990515	30.3	17.6	31.7
990516	31.7	26.4	29.2
990517	37.7	24.4	25.7
990518	25.7	24.4	25.7
990519	30.3	26.4	27.2
990520	29.2	17.8	28.2
990521	24.4	20.6	30.3
990522	28.2	21.8	25.0
990523	31.7	18.3	22.7
990524	26.4	19.2	25.0
990525	23.8	24.4	28.2
990526	33.2	21.8	27.2
990527	27.2	21.4	24.4
990528	25.7	21.0	27.2
990529	30.3	26.4	31.7
990530	31.7	23.8	31.7
990531	25.7	26.4	26.4
990601	24.4	21.0.	27.2
990602	31.7	20.6	24.4
990603	37.7	23.8	31.7
990604	33.2	22.7	28.2
990605	27.2	21.8	29.2
990606	30.3.	23.2	27.2
990607	31.7	20.2	28.2
990608	27.2	23.8	35.2
990609	30.3	21.4	28.2
990610	26.4	26.4	27.2
990611	30.3	23.8	(26.4)
990612	23.8	24.4	(33.2)
990613	31.7	28.2	37.7
990614	24.4	19.2	27.2
990615	26.4	24.4	26.4
990616	26.4	25.7	26.4
990617	35.2	25.0	26.4

Date	SS	Night	SR
990618	30.3	23.2	(30.3)
990619	30.3	23.8	(28.2)
990620	24.4	20.2	26.4
990621	24.4	23.8	31.7
990622	28.2	26.4	26.4
990623	25.0	19.5	
990624	31.7	26.4	24.4
990625	26.4	23.2	31.7
990626	24.4	21.0	27.2
990627	29.2	24.4	27.2
990628	35.2	21.0	27.2
990629	30.3	27.2	31.7
990630	27.2	24.4	26.4
990701	30.3	24.4	26.4
990702	30.3	28.2	29.2
990703	28.2	26.4	29.2
990704	21.4	27.2	37.7
990705	26.4	21.4	25.7
990706	28.2	23.8	24.4
990707	21.8	21.4	26.4
990708	26.4	33.2	31.7
990709	30.3	26.4	27.2
990710	28.2	24.4	29.2
990711	29.2	28.2	33.2
990712	31.7	21.0	27.2
990713	35.2	23.2	28.2
990714	31.7	23.8	26.4
990715	29.2	25.7	24.4
990716	29.2	24.4	29.2
990717	37.7	27.2	25.7
990718	25.7	29.2	35.2
990719	29.2	21.8	27.2
990720	27.2	23.8	24.4
990721	29.2	25.7	27.2
990722	27.2	26.4	31.7
990723	23.8	25.7	31.7
990724	25.7	25.0	25.7
990725	24.4	23.8	26.4
990726	30.3	21.4	26.4
990727	35.2	19.9	31.7
990728	26.4	23.2	25.7
990729	25.7	27.2	23.8
990730	30.3	22.7	33.2

Date	SS	Night	SR
990731	27.2		
990801	27.2	23.2	28.2
990802	27.2	20.2	23.2
990803	28.2	(21.4)	(27.2)
990804			
990805	(31.7)	(23.8)	(26.4)
990806			
990807	29.2	26.4	30.3
990808	29.2	24.4	23.8
990809	29.2	19.5	

Due to changes and repeated troubles in transmitting conditions the publication of absorption data has been abandoned from August 10, 1999

THE IPS-42 IONOSONDE STATION

K. KOVÁCS

The IPS-42 typ. ionosonde (Fig. 1), produced by the KEL Aerospace is to sound the ionosphere at regular intervals by the pulse-echo technique.

The operating frequency of a pulse transmitter is varied over the range 1 MHz to 22.6 MHz. The resulting echoes from the ionosphere are detected by a receiver tuned automatically to the same frequency as the transmitter. The echoes received are processed to remove noise and interference and are displayed on a cathode ray tube along with a graticule indicating virtual height along one axis and frequency along the other.

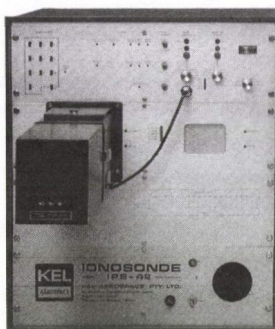


Fig. 1. The IPS-42 ionosonde

The instrument is connected to an IBM PC with a special interface and the data are stored in the hard disc. These records are called ionograms (Fig. 2).

Further technical specifications of the instrument are the following.

The transmitter final power amplifier produces a 5 kW peak pulse-power output. The digital Frequency Synthesizer provides coverage from 1 MHz to 22.6 MHz in 576 logarithmic steps. A complete frequency sweep to produce an ionogram takes 12 seconds of a 20 seconds program cycle. A group of front panel switches allows the operator to select manually any of the synthesizer's 576 channels.

The transmitter pulse width is 41.67 μ s and the pulse interval is 5.33 ms.

The configuration of the antenna system is illustrated in Fig. 3.

We employ two vertical delta antennas. Each antenna consists of a large trian-

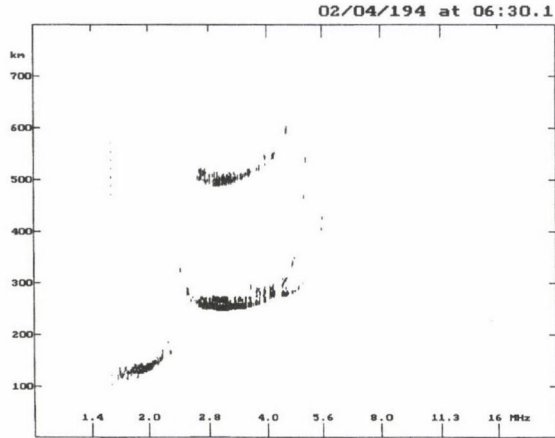


Fig. 2. Sample ionogram recorded in Nagycenk Observatory with IPS-42

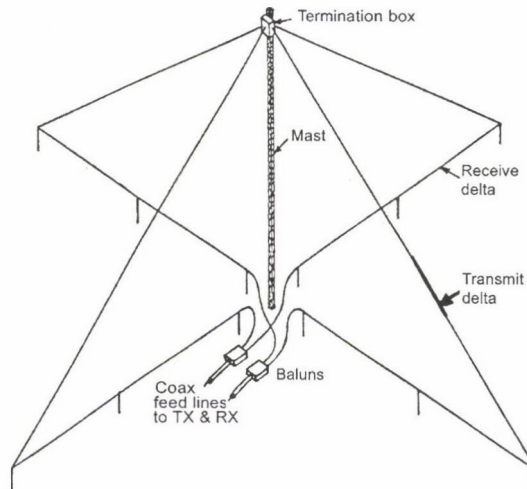


Fig. 3. Vertical delta antenna

gular loop of wire, supported at the apex. The height of the mast is 30 m and the horizontal part of the delta is 2 m from the ground. The antennas are mounted orthogonally to reduce coupling between them. The Vertical Delta antenna has an average feedpoint impedance of about 600 ohms and requires a balanced feedline.

The Maximum Virtual Height Range of the instrument is 800 km and the Height Marker Interval is 100 km.

The regular measurements began in 1998. The ionograms are archived in CD ROM and are available by special arrangement.

SCHUMANN RESONANCE OBSERVATIONS

G. SÁTORI

Schumann resonances are the electromagnetic eigenmodes of the Earth-ionosphere cavity maintained by the world thunderstorm activity (Schumann 1952).

The first efforts were already made in sixties to record the variations of the natural electromagnetic energy source in the Schumann resonance (SR) frequency range. P Bencze constructed an equipment for measuring SR and reported on the first results together with A Ádám (Ádám and Bencze 1963).

The experiments were renewed in eighties to realize the continuous measurements of Schumann resonance frequencies and amplitudes. Since May of 1993, the vertical electric field component in SR frequency range between 2 and 25 Hz has regularly been measured in the Nagycenk Observatory (47.6°N, 16.7°E) using a very stable ball-antenna, a preamplifier with high input impedance and low noise, an amplifier and a personal computer with high speed, multi-channel AD-converter. The complex demodulation as a spectral technique has been applied for the quasi-continuous determination of the actual peak-frequencies and the corresponding amplitudes of the first three SR modes (Sátori et al. 1996).

Using convolution filters the phase-variations of the complex wave vector relating to the central period of the filters are determined. By computing the phase changes versus time the frequency (and the amplitude) can also be monitored in time. Using this spectral technique, the frequency can be determined within a given range of frequencies, in the case applied here in the frequency range of the first three Schumann-resonance modes, namely between 7–9 Hz, 13–15 Hz and 19–21 Hz. An alternate sampling and computation process yields a quasi real-time technique.

The horizontal magnetic field components (north-south and east-west) have regularly been measured since January of 1997 using induction coils. The spectral technique is the same as in case of the vertical electric field component.

The electronics of the SR recording system was developed by J Pongrácz and J Horváth, the ball-antenna was constructed by Gy Pála.

Recording SR-transients started in the frame of US-Hungarian Joint Found (JF.554) in 1998. These events, so called Q-bursts, are excited by individual energetic lightning strokes.

The hourly averages of the peak-frequencies and the amplitudes for the first three modes and SR transients for selected time periods (international campaigns) are available (e-mail: satori@ggki.hu). Figure 1 shows Schumann resonance recording system with the ball-antenna for the measurement of the vertical electric field component, as well as the two induction coils for the horizontal north-south and east-west magnetic field components. Figure 2, as example, exhibits the daily frequency and amplitude variations of the first three modes characteristic for a winter month. Figure 3 depicts a SR-transient.

Some results based on SR observations

The observation of Schumann resonances is important from the point of view of the world thunderstorm activity in the troposphere, as well as the different emissions (red sprite, blue jet, elves) induced by lightning strokes and large scale influences of extraterrestrial origin in the lowest ionosphere.

The semiannual variations of SR amplitudes measured at the Nagycenk Observatory, Central Europe, are the manifestation of the semiannual variation of the surface air temperature in the tropical continental regions (Sátori and Zieger 1996). The latter is due to the semiannual wave of solar insolation with maxima at the equinoxes. The magnitude of the semiannual temperature variation is about 1.5–2.0 °C. The high significance level of the semiannual variation of the SR amplitudes at Nagycenk shows that the quality of this SR data set makes it suitable for detecting temperature variations at the level of some tenths of a degree centigrade. In this way, the observation of the SR amplitudes/intensities have great importance from the point of view of global climatic changes.

Parameters of global thunderstorm activity were deduced from the long term Schumann resonance records at Nagycenk (Nickolaenko et al. 1998).

The ENSO (El Niño Southern Oscillation) phenomenon is among others characterized by sea surface temperature anomaly in the equatorial Pacific which can affect weather patterns around the world. A meridional redistribution of the world thunderstorm activity was deduced from the variations of SR frequencies on the ENSO time scale observed at Nagycenk (Sátori and Zieger 1999).

See CD (program Seenck.exe, menu item SchumannRes).

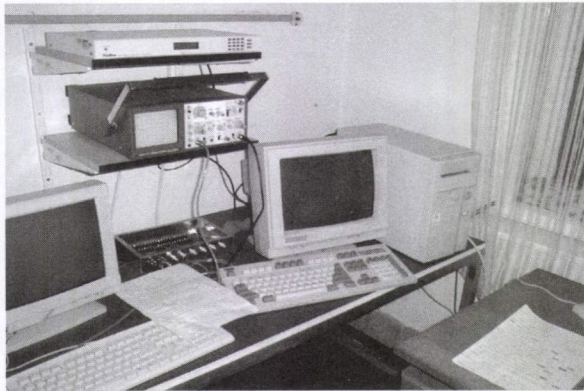
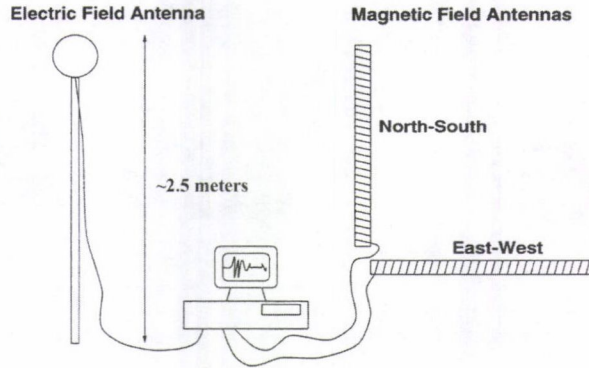


Fig. 1. Schumann resonance recording system: ball-antenna (top left), block diagram of the measurement (top middle), induction coils (top right), data acquisition system (bottom left), hut for the induction coils (bottom right)

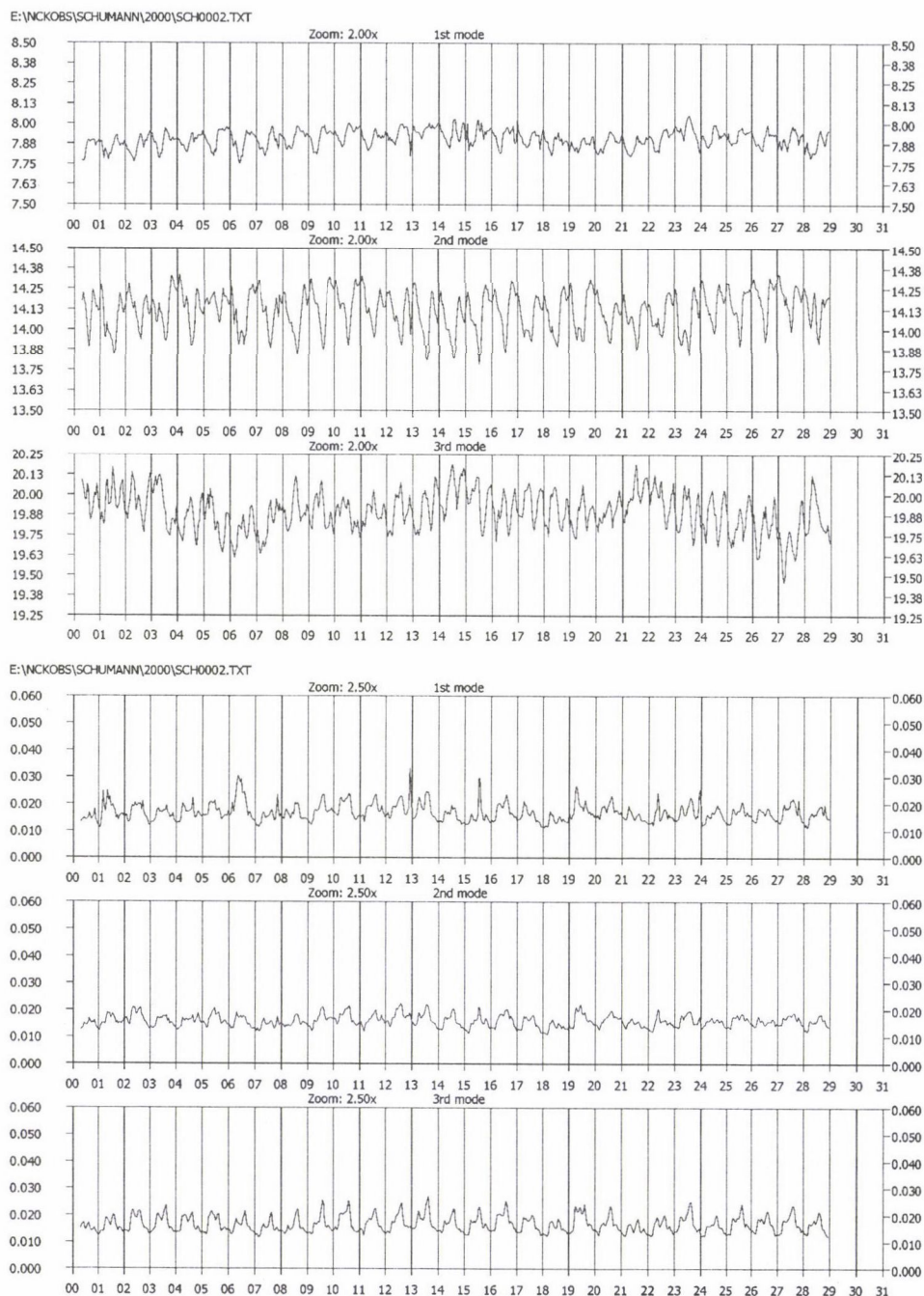


Fig. 2. Hourly means of SR frequencies in Hz (top) and relative amplitudes in V (bottom) measured for the first three modes in the days of February, 2000

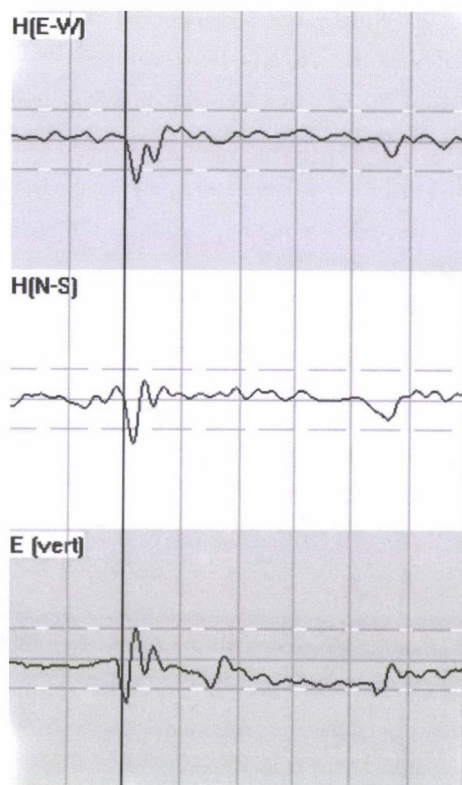


Fig. 3. SR-transient recorded at Nagycenk. Time markers include intervals of 100 ms. The horizontal broken lines indicate the trigger level of ± 0.6 V

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IV. METEOROLOGICAL OBSERVATIONS

1999-2001

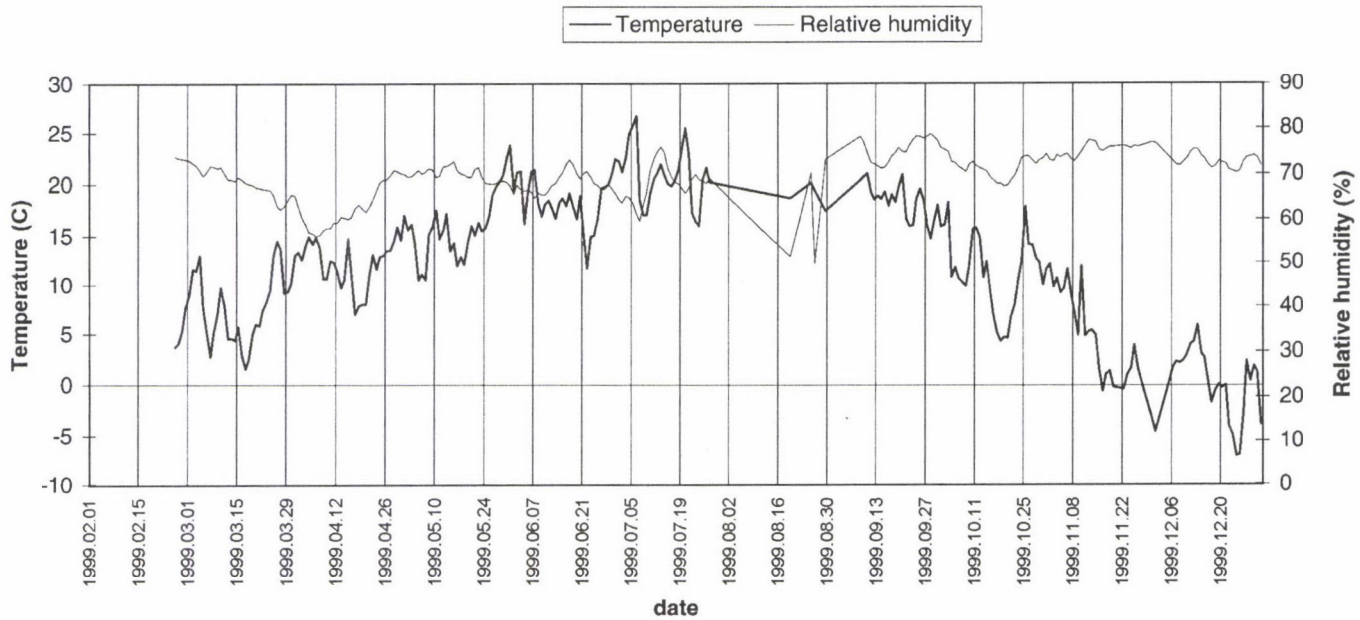


Fig. 1. Daily averages 1999

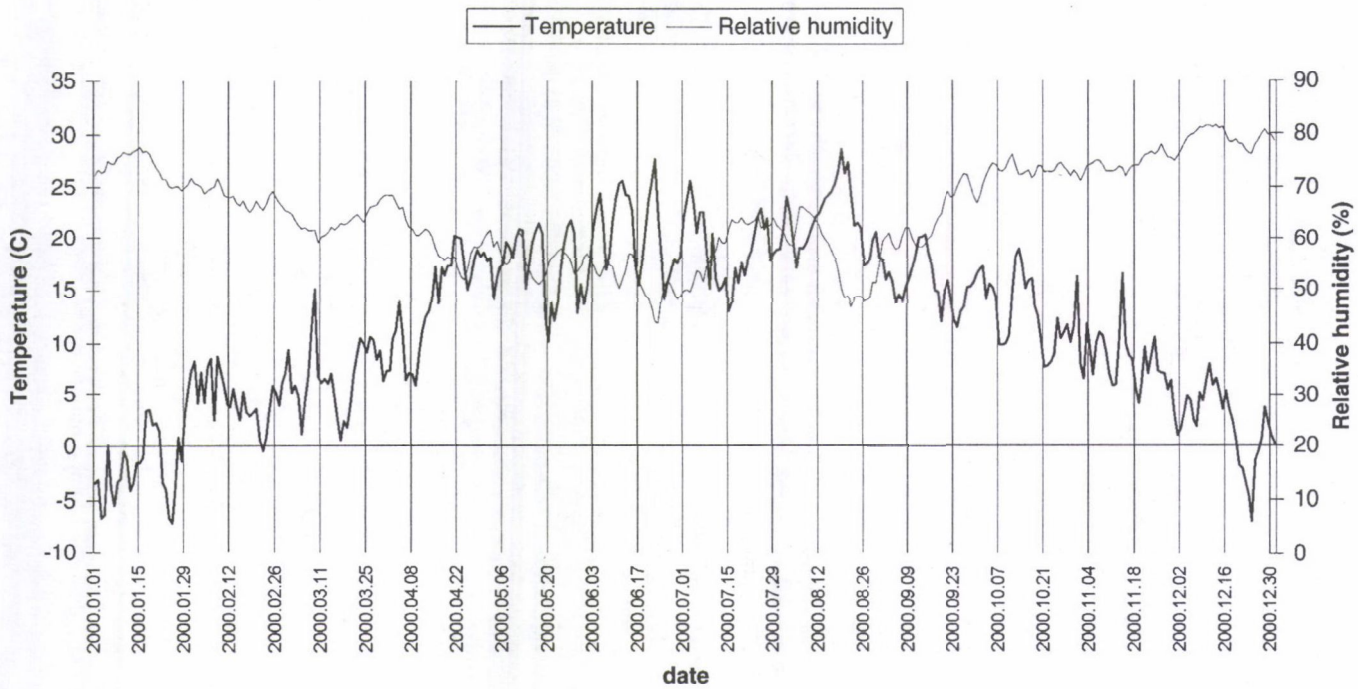


Fig. 2. Daily averages 2000

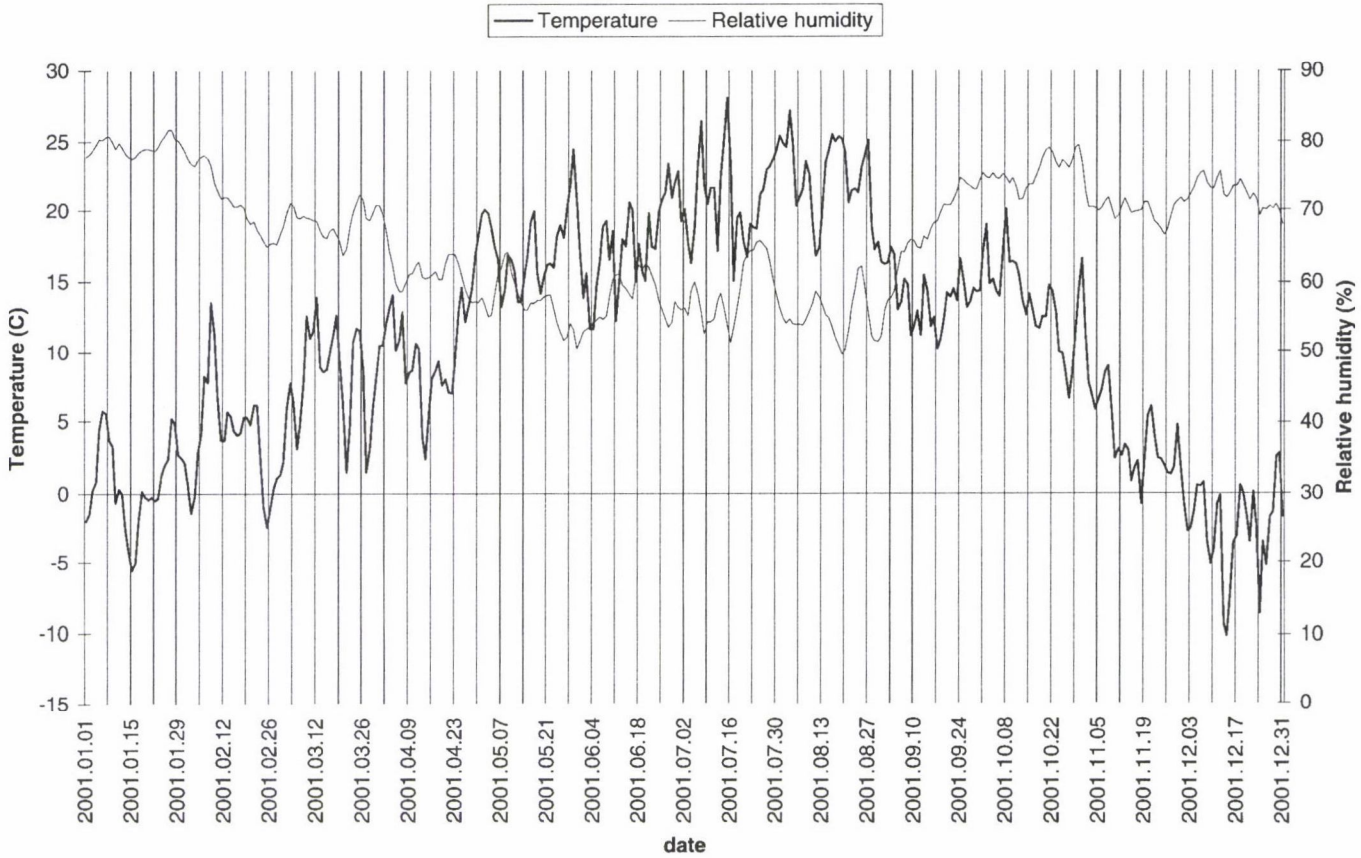


Fig. 3. Daily averages 2001

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