



ZAMG

Conrad Observatory Magnetic Results 2021

GMO Bulletin 8

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Conrad Observatory: Magnetic Results 2021

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Chapter 1

Introduction

The Conrad Observatory, a geophysical observatory, monitors the physical parameters of our planet. It is named after the Austrian geophysicist Victor Conrad (1876 - 1962), who for many years worked at the Zentralanstalt für Meteorologie und Geodynamik (ZAMG) in Vienna. The observatory is almost entirely underground and guarantees constant temperature for all applied techniques. With its range of supported measurement techniques, instrumentation and the layout of the underground facilities, the Conrad Observatory represents a unique research and development location for earth scientists of all disciplines. The Conrad Observatory includes two main facilities: (1) The seismo-gravimetric observatory (SGO), which was opened in 2002, and (2) the geomagnetic observatory (GMO), officially opened in 2014. The basic task for earth observatories is the observation of temporal and spatial variations of physically relevant parameters, which are crucial to our understanding of processes on earth. At the Conrad Observatory, earthquake activity (seismology), changes in gravity and mass distribution, geomagnetic field variations, geodetic parameters, atmospheric conditions and meteorological data are all continuously monitored.

This yearbook provides an overview of geomagnetic measurements performed at the Conrad Observatory. It also contains detailed descriptions of data treatment, analytical methods, quality assessment and results. Long- and short-term variations of the geomagnetic field, e.g. secular variation and geomagnetic activity, are analysed and discussed. The yearbook of the Conrad Observatory is published every year and made available online following the links provided on the title page. The electronic data from the Conrad Observatory can also be requested online at our data portal (<https://cobs.zamg.ac.at>)

Chapter 2

Location and Instrumentation

The geomagnetic part of the Conrad Observatory is located at Trafelberg, Lower Austria, about 50 km south-west of Vienna. Three different geological formations are found in the vicinity of the Conrad Observatory: the Gutenstein Formation, Reifling Formation, and Wetterstein Limestone. All of them are dominated by very weakly magnetic limestones and dolomites of predominantly Middle Triassic age (247.1 - 237 Ma) [Wessely, 2006]. The observatory is part of a large underground installation covering the full geophysical monitoring program including seismology, gravity, meteorology and geomagnetism. The geomagnetic section consists of a 1 km long tunnel system, which includes several adits dedicated to electric and magnetic measurement systems. A location map indicating the positions of various instruments described below is shown in Figure 2.1. Absolute determinations of earth magnetic field directions, also referred to as DI measurements, are conducted within the absolute area at the northern end of the main tunnel. The main azimuth mark is located at the southern end of the main tunnel in a distance of 380 m. A further azimuth mark is located northwards (not shown) on a mountain at a distance of ≈ 2.5 km.

The following instruments are deployed at the Observatory for magnetic measurements: 3 Fluxgate sensors, 6 Overhauser sensors, and several other magnetic sensors. Auxiliary temperature measurements have been performed at all Fluxgate sensor positions, at their electronics and at several other positions in the tunnel. As will be shown below, temperature variations and magnetic gradients are extremely small throughout the observatory. Details on instrumentation are provided in Table 2.1. The primary instruments used in determination of definitive data are printed in bold. Beside the above mentioned permanently running instruments, the Conrad Observatory additionally operates several DI Theodolite/Fluxgate combinations including an automated version (AutoDIF) for base value determination. There are several measurement systems for magnetic remanence measurements and rock magnetism as well as mobile sensors for field work and prospection. A three-dimensional Merritt coil system with an axis length of 3 m for sensor calibration tests complements the portfolio.

Table 2.1. Operational instruments in 2021 and their parameters.

Name	Type	Serial Number	Dynamic Range	Time-step Accuracy	Passband	Spectral Noise	Absolute Error	Orthogonality	Resolution	Setup	Operational
FGE	Fluxgate	S0252	3200nT	<10ms	1Hz	$60\text{pT}/\sqrt{\text{Hz}}$		<2mrad	100 pT	HEZ	inactive
G823A	Cesium	C120	80000nT			$<4\text{pT}/\sqrt{\text{Hz}}$					
G823A	Cesium	C228	80000nT			$<4\text{pT}/\sqrt{\text{Hz}}$					
GP20S3EWS1	Potassium	111201									maintenance
GP20S3EWS2	Potassium	111201									maintenance
GP20S3EWS3	Potassium	111201									maintenance
GP20S3NSS1	Potassium	012201									2015-07
GP20S3NSS2	Potassium	012201									2015-07
GP20S3NSS3	Potassium	012201									2015-07
GP20S3V/S1	Potassium	911005									2015-07
GP20S3V/S2	Potassium	911005									2015-07
GP20S3V/S3	Potassium	911005									2015-07
GSM190	Overhauser	14245	100000nT			$22\text{pT}/\sqrt{\text{Hz}}$	0.2nT		10 pT		2014-12
GSM190	Overhauser	31968									2015-04
GSM190	Overhauser	6107631									
LEM1025	Fluxgate	22	3000nT	<10ms	3.5Hz	$<10\text{pT}/\sqrt{\text{Hz}}$		<30min of arc	1 pT	HEZ	2017-12
LEM1036	Fluxgate	1	4000nT	<10ms	3.5Hz	$<10\text{pT}/\sqrt{\text{Hz}}$		<30min of arc	1 pT	HEZ	2015-12
LEM1036	Fluxgate	2	4000nT	<10ms	3.5Hz	$<10\text{pT}/\sqrt{\text{Hz}}$		<30min of arc	1 pT	HEZ	2021-06
LEM1036	Fluxgate	3	4000nT	<10ms	3.5Hz	$<10\text{pT}/\sqrt{\text{Hz}}$		<30min of arc	1 pT	HEZ	
POS1	Overhauser	N432	80000nT				0.5nT		1 pT		inactive

Note. — Spectral noise is determined at 0.3 Hz. Bold printed instruments are the primary source of high resolution data.

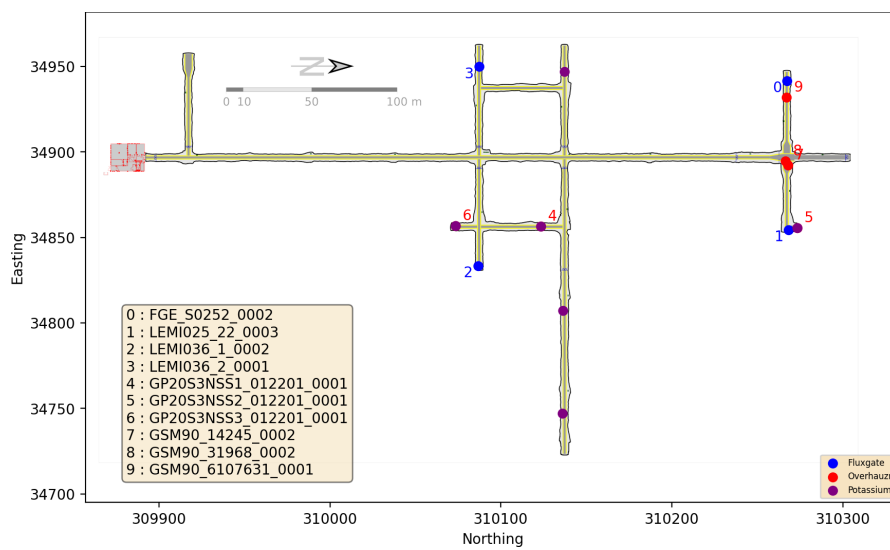


Figure 2.1 Location map of the Conrad Observatory with instrumentation

Chapter 3

Methods

3.1 Acquisition and data transmission

Variations in directional components of the Earth’s magnetic field at the Conrad Observatory in 2021 are mainly based on measurements from a LEMI036 sensor. This instrument is installed in hdz orientation within the tunnel system of the geomagnetic observatory (Figure 2.1). It fully satisfies the current one-second INTERMAGNET minimum requirements. The LEMI036 vector magnetometer samples the magnetic field and its data is digitally filtered to 10 Hz. One-second and one-minute values are produced using the standard INTERMAGNET Gaussian filter [St-Louis, 2020]. A GP20S3 scalar magnetometer, which samples the field at 1 Hz, is used to determine the geomagnetic field intensity. As with vector measurements, filtered values are produced using a Gaussian filter. Most measurement systems at the Conrad Observatory are connected to a *Magpy Automated Realtime Acquisition System* (MARTAS) [Leonhardt et al., 2013], which reads e.g. serial communication data and buffers field records. Any data is then continuously streamed using MQTT (Message Queuing Telemetry Transport). A *Magpy Automated Realtime Collection and Organisation System* (MARCOS) subscribes to MARTAS clients and collects all data and the related metadata within a MySQL database. An independent analysis process frequently checks the contents of the database and produces all data products near realtime. Adjusted data sets are then forwarded on to our data portal and the INTERMAGNET gins every 5 minutes. GPS signals are used to ensure exact timestamps. As all measurements are performed underground, the GPS signal is transferred by optical fibres to the cabinets in the tunnel, which house the sensor electronics and the MARTAS. The time delay, conservatively estimated making use of the manufacturer’s data as well as distance considerations between outside GPS antenna and cabinet, is about 10^{-6} seconds. Each setup of sensor and acquisition unit is equipped with an independent lightning protection system and a local uninterruptible power supply facilitating approximately 72 hours of service after power loss. An observatory wide uninterruptible power supply with roughly 40 hours of power adds to this two-step protection system and primarily secures data transfer towards the two redundant MARCOS servers. Data acquisition is therefore safe for about 5 days in the case of a full power loss. Data acquisition as well as all analyses including filtering procedures, baseline calculations, format conversions, and others discussed here, are performed using MagPy packages [Leonhardt et al., 2016]. Version 1.0.6 is available at <https://github.com/geomagpy/magpy>.

Table 3.1. Fluxgate theodolites used at pier A2 and their serial numbers

Theodolite (SN)	Fluxgate (SN)	Amount
T10B 154167 03-2019	MAG01H 378-0619H 03-2016H	2
T010B 160391 07-2018	MAG01H 504-0911H 03-2016	109
T010B 160391 07-2018	MAG01H 562 1024H	8
Hegy 6814-5255 04-2012	DTU DI0146 04-2012	20

3.2 Baseline adoption

Magnetic observatories record the geomagnetic field from very high frequencies, which is of particular interest for the study of externally triggered field variations such as pulsations and geomagnetic storms, up to long term variations covering months and years, which mainly have internal sources and are required to analyse secular variation over decades and centuries. However, vector magnetometers tend to drift over such long time scales, due in part to temperature variation, ageing of the device and slow pillar movements. The drift of the instruments deployed at the Conrad Observatory is rather small (less than 0.32 nT per year for 2021), nevertheless it is necessary to perform DI measurements, which precisely determine the declination and inclination using a fluxgate theodolite [*Jankowski and Sucksdorff, 1996*]. The vector value is then reconstructed by additionally using independent measurements of a scalar magnetometer. Their drift, which is usually assumed to be negligible, is tested by comparing independent records of several instruments.

For absolute measurements we use several different types of fluxgate theodolites. The primary instrument is a T010B 160391 07-2018 equipped with a MAG01H 504-0911H 03-2016 fluxgate magnetometer. In addition, we also perform frequent measurements with other fluxgate theodolites as listed in table 3.1. Most measurements are conducted on the absolute pier A2. The primary azimuth mark is 380 m away at the southern end of the tunnel, which ensures the absence of any thermal fluctuations when aiming. The primary, permanently recording F instrument, located on pier AS-O-40, is 100 m distant from the main absolute pier A2 and shows a total constant F difference of -1.6 nT. Magnetic field differences between all absolute piers are regularly measured by an additional scalar magnetometer, which is moved every week on another of the 16 piers. Table 3.2 summarizes all delta values within the absolute area of the Conrad Observatory. Overall the horizontal gradients within this area of the tunnel system at pier height are on average less than 0.13 nT/m (maximum: 0.42 nT/m), indicating perfect measurement conditions by international standards [*Jankowski and Sucksdorff, 1996*]. Since the opening of the observatory, absolute measurements have been made on average every 7.0 days, which is sufficient to monitor expected variation/drift signals at this location. Measurements make use of the 'residual' technique [*Lauridsen, 1985*]. DI values are measured, typed into an online form, automatically analysed using MagPy and stored within the observatory databases. It should be noted here that the analysis algorithm requires variation data in a magnetic coordinate system (HDZ, HEZ). Beside routine measurements on pier A2, automatic measurements are periodically performed on pier A16 using an AutoDIF system [*Rasson and Gonsette, 2011*]. Furthermore, DI measurements are conducted once a month in a wooden hut (pier H1) outside the tunnel approximately 350 m south-west of A2 using a mire perpendicular to the two main azimuth marks of A2 for stability control. These measurements are discussed below.

Table 3.2. Delta values for all piers with respect to A2. These delta values need to be added to data from the respective pier to correct the measurements towards A2.

Pier	Distance to A2 [m]	δF [nT]	Epoch (F)	δD [ArcSec]	δI [ArcSec]	Epoch (Dir)
A1	1.75	-0.17	2021			
A10	4.38	-0.77	2021			
A11	7.38	-0.53	2021			
A12	7.47	-0.41	2021			
A13	2.38	-0.09	2021			
A14	2.65	0.26	2019			
A15	5.56	0.43	2021			
A16	5.73	0.83	2019	60.912	-18.288	2021
A3	2.20	-0.15	2021			
A4	3.96	0.80	2021	0.000	-8.784	2021
A5	2.41	-0.37	2021	-8.496	0.000	2021
A6	1.75	-0.74	2021			
A7	2.69	-0.19	2021	0.000	-4.932	2021
A8	4.39	0.61	2021	33.912	0.000	2017
A9	4.22	-1.04	2021			
H1	353.89	1.08	2018	0.000	0.000	2021

3.3 Data analysis and products

Principally we publish and submit three types of data sets, which are distinguished by their information content and speed of availability: adjusted data, quasi-definitive data and definitive data. Adjusted data sets are produced and published completely automatically every 5 minutes. The following analysis steps are routinely performed every 5 minute cycle:

1. Filter incoming MQTT data streams from all instruments to one-second IAGA/INTERMAGNET recommended products.
2. Check availability of data and define primary instruments according to a priority list.
3. An automatic outlier detection tool (MagPy) is checking and flagging the one-second data product.
4. Get primary one-second variometer data, apply the flags, apply compensation fields, eventually transform towards HEZ.
5. Read all existing basevalues and calculate a constant baseline approximation using the geometric mean of the last three months.
6. Perform baseline correction with adopted constant baseline.
7. Get one-second scalar data, apply flags, apply latest pier offset.
8. Merge variation data and scalar data.
9. Store distribution formats (ImagCDF, IAGA-2000) and submit data to Edinburgh GIN.
10. Filter final data set to one-minute and repeat storage and submission.
11. Special analysis: k-value determination, storm detection, gradient analysis, web page plots.

As the baseline is very stable at the Conrad Observatory, the constant baseline approach is a fast and reasonable approximation of the definitive values (Figure 4.1). The automated outlier identification method uses relatively weak criteria. Therefore some outliers and artificial disturbances are still present in this data set.

Quasi-definitive data sets are produced in a semi-automatic routine. Once a week an automated job checks for current flagging information for the primary systems within the database. Whenever an observer has finished the flagging procedure by inspecting the data of the primary instruments for a certain time range, these dates are updated within the database. The QD job now extracts all yet unanalyzed data prior to the last inspected data minus one week. The additional week makes sure that basevalues are available as they are determined in a weekly period. Then basevalues are obtained and a one-year baseline is calculated using the latest baseline function parameters (see below). All other steps follow the procedure of adjusted data production.

Definitive data is produced once a year using a manual iterative process. In a first step, we review all existing flagging information for the respective year starting in December the year before until end of January, thus covering 14 month. For flagging we consider observatory notes and many additional sensors indicating traffic, environmental changes etc. We use difference analysis and gradients of individual instruments and analyse derivatives of signals. Any additional flag is added into the flagging database. Then we analyse one year of data using a constant baseline hypothesis (see next chapter for details). Step1 definitive data is calculated and the overall delta values are examined. For step 2 we eventually add any additional flagging information. The baseline is now calculated using optimal functional parameters. Step 2 data is used to obtain and analyze pier differences. In the final step 3 we finally consider all pier differences and produce the final result. All analyses steps are performed on high-resolution data, usually with one-second intervals, for all sensors and combinations. One-minute definitive data is a filtered product of these results. Please note that for one-second data we do not fill gaps with data from other sensors as they might have different frequency characteristics. All final dissemination products (IAF, ImagCDF, IAGA-2000) are obtained from the final step 3 results. Further details are depicted in chapter 5.

K values are calculated according to the FMI approach [Sucksdorff *et al.*, 1991], which is one of the IAGA recommended routines [Menvielle *et al.*, 1995]. The method uses three major steps: in the first run, K values are calculated by simply determining the maximum-minimum difference of the minute variation data within three hour segments. This is done for both horizontal components and the maximum difference is selected. Using a transformation table related to the Niemeck scale and a $K9$ level of 500 nT, the K values are then calculated. Based on this step, a first estimate of the quiet daily variation (S_r) is obtained. Finally, hourly means with extended time ranges (30min + m + n) are obtained for each half hour. m refers to 120 minutes (0-3a.m., 21-24p.m.), 60 minutes (3-6, 18-21) or 0 minutes. n is determined by $K^{3.3}$. Using these newly obtained hourly means, the final K values are calculated. Preliminary data are made publicly available within 5 min on the ZAMG data distribution server and on the INTERMAGNET's website (intermagnet.github.io). Quasi-definitive data are produced following the methods described above and are usually provided within three weeks after acquisition on the same servers. Definitive data for each year are prepared within a couple of months after the end of the year. They can be retrieved from INTERMAGNET's website or from the website of the Conrad Observatory, Zentralanstalt fuer Meteorologie und Geodynamik (<http://www.conrad-observatory.at>). After a final cross-check by specialists from other institutions participating in INTERMAGNET, definitive data are published on a DVD/USB medium together with the definitive data from the whole INTERMAGNET network.

Earth observation data from the Conrad Observatory are licensed under CC Attribution (CC-

BY-NC-4.0). Publications making use of the data should include an acknowledgement statement of this form: The results presented rely on data collected at the Conrad Observatory, Austria. We thank the Zentralanstalt fuer Meteorologie and Geodynamik (ZAMG) for supporting its operation.

Chapter 4

Accuracy and Coverage

4.1 Basevalues and Baseline

4.1.1 Primary baseline adoption

One measure of the accuracy of geomagnetic data is the quality of the baseline, i.e. the calibration curves that are used to correct the slow drift in time of the vector magnetometer in order to produce definitive data. Baselines for the Conrad Observatory are obtained for H (horizontal), D (declination) and Z (downward vertical) components by fitting a cubic spline curve to the correction values deduced from the absolute measurements. Each year the spline curve is calculated using data from mid-December of the previous year to mid-January of the following year in order to avoid discontinuities from one year to the next.

Base values and the corresponding best fitting baseline are shown in Figure 4.1. 139 absolute measurements by the WIC observers on pier A2 were considered for the analysis of 2021 (each one represented by a gray point). On average, DI measurements were performed with a period of 7 days. In a first run, a constant baseline approximation based on a median value of all basevalues is used. This approach is depicted by the blue line in Figure 4.1. Making use of this approximation and calculating the difference between this baseline corrected directional data and an independently recorded F value will result in a delta F value as shown in the blue curve in the lower plot of Figure 4.1. The here observed variation gives an indication about the actual complexity of the baseline. An optimal baseline was determined using MagPy's fitting function with a spline fit (knot parameter = 0.3, which is the normalized distance between spline knots) as shown by the red line in Figure 4.1. A more complex fitting function (e.g. magenta curve) does not improve the delta F value. For each component, a measure of quality of the absolute measurements was assessed by calculating the standard deviation of the residuals between all measurements and the baseline curve. The obtained standard deviations are 0.28 nT for H, 0.13 nT for Z and 4.8 arcsec for D, which are well within INTERMAGNET requirements. Calculated baseline curves have a maximum amplitude of 0.72 nT in the X and Z components, and 2.6 arcsec in the declination. Base values indicate a long term variation of the baseline with signal periods larger than half a year, therefore the typical frequency of one absolute measurement per week is sufficient to observe and correct these trends. Baseline variations are very limited throughout 2021. The resulting δF (see section 4.2) and and variometer differences after baseline correction are virtually zero.

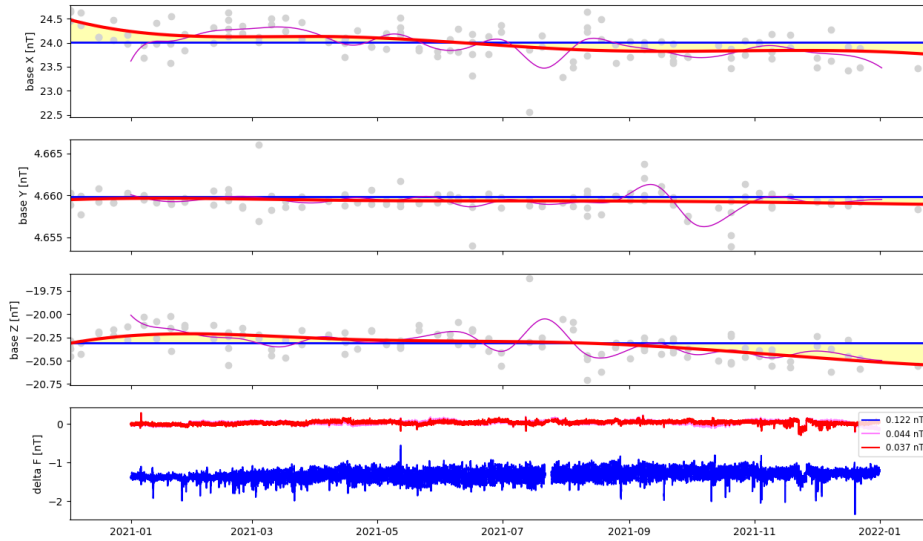


Figure 4.1 Basevalues for the primary vectorial system LEMI036 and iterative choice of optimal baseline. The first analysis step makes use of a constant baseline approximation (blue line). The resulting delta F values between baseline-corrected variometer and permanently recording F are depicted in the lower plot (also in blue) and show a considerable trend. According to this remaining trend a cubic spline fit (red) is chosen leading to a significantly improved delta F close to zero and characterized by a very low variance. Fitting small scale variations of basevalues (magenta) will not improve the delta F value. Actually the variance is getting larger again as expressed by the overall standard deviations given in the legend of the delta F plot. The red curve is therefore chosen as optimal baseline for definitive data.

4.1.2 Consistency between measurement piers

Beside manual DI determination, an automatic DI measurement system (AutoDIF) [Rasson and Gonsette, 2011] is in operation at Conrad Observatory. The system is located on pier A16 (Figure 2.1). This automatic unit is configured to measure base values every 30 minutes. For analysis of this data, the site differences between A16 and the main pier A2, as listed in Table 3.2, are accounted for. As done for the manual measurements at pier A2 we also calculated the standard deviation of the residuals as a measure of quality. The obtained standard deviations are 0.62 nT for H, 0.30 nT for Z and 18.8 arcsec for D. A maximum amplitude of 2.60 nT in the X and Z components, and 161.0 arcsec in the declination is obtained. In 2021 DI measurements have been performed on six piers, A2, A4, A5, A7, A16, and H1. Beside the main pier A2, where most manual measurements were done, we do monthly manual determinations on piers A7, H1 and non-periodical measurements on A4, A5. Automatic AutoDIF measurements on pier A16 are performed every 30 minutes and are available except for February till April and a maintenance breaks in July. The clearly visible baseline jump is related to an insufficient laser beam initialization accuracy, resulting in a partial loss of azimuth measurement data and thus in wrong although consistent determinations. Therefore AutoDIF data has to be treated with

care in 2021. It is not used for our analysis. Figure 4.2 shows the average daily basevalues of all piers analysed for the main variometer. All basevalues are almost identical and exhibit a very similar almost linear trend which underlines the high quality and stability of the chosen adopted baseline shown as red line in Figure 4.2. Please note that for this plot the piers delta values as given in table 3.2 have been taken into account. In summary all tests support the high quality of the baseline of the Conrad Observatory.

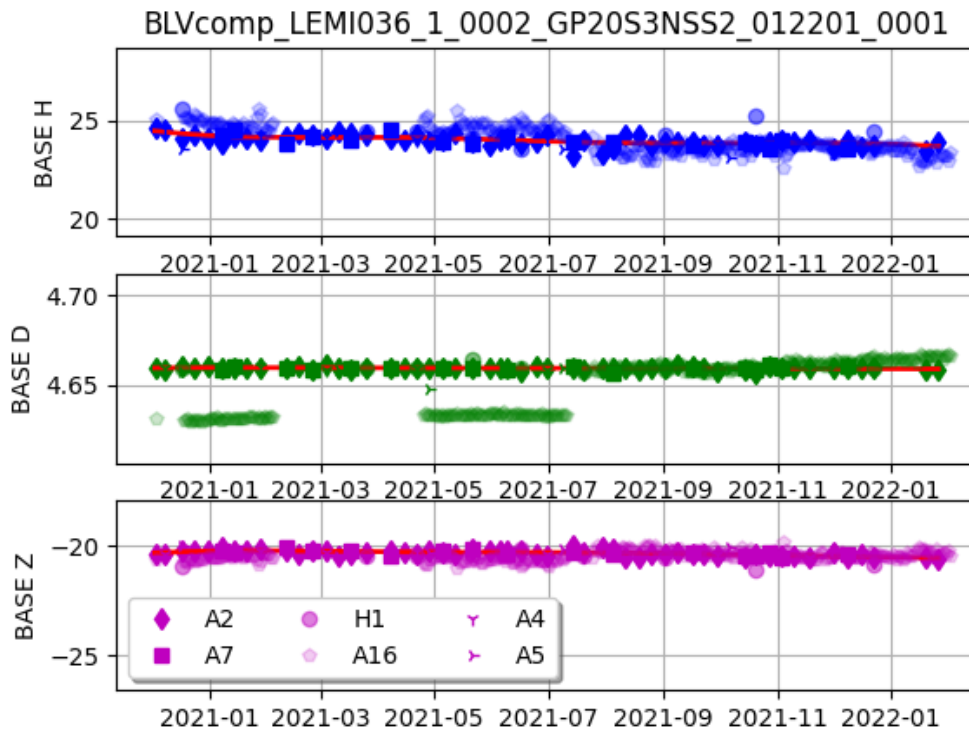


Figure 4.2 Combined plot of all basevalues for the LEMI036 variometer as determined on the piers given in the legend. Average pier differences as listed in Table 3.2 have been regarded for.

4.2 Delta F

The quality of the measurements can further be assessed by looking at the scalar residual, which is the difference between the field strength directly measured by a scalar magnetometer and the field strength derived from the vector measurement after drift correction with the baseline curve. As can be seen in Figure 4.3, the scalar residual of minute mean values corresponds to an average of 0.04 nT with a standard deviation of 0.04 nT. The maximum amplitude remains below 0.58 nT for the year 2021. Taking baseline and delta F uncertainty estimates into consideration by combining the scalar residual and statistical variation of absolute measurements results in a $2\text{-}\sigma$ uncertainty scenario with maximum values of ± 0.32 nT for all components in 2021. This is well within INTERMAGNET's requirement of a 5 nT accuracy for definitive data [St-Louis, 2020].

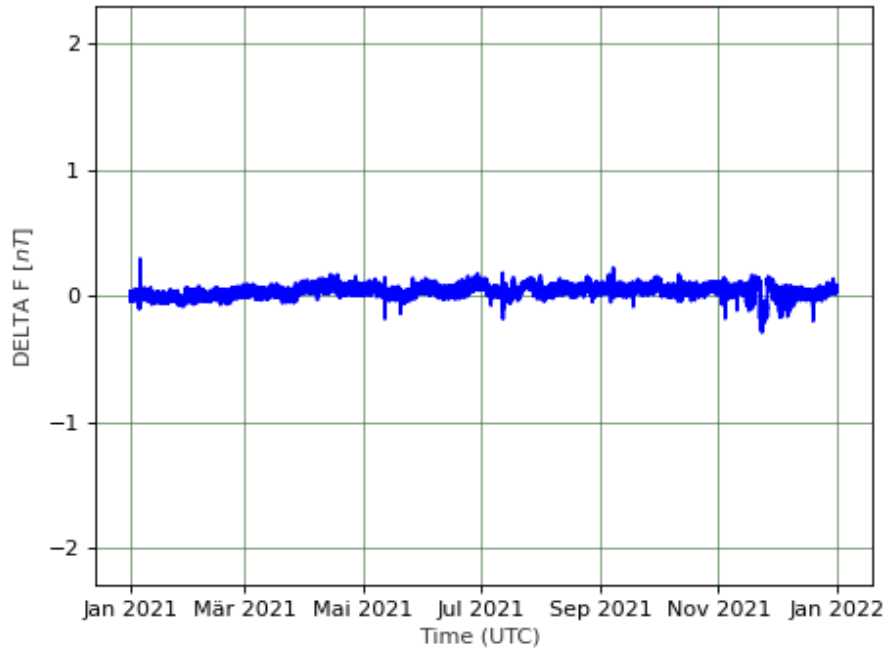


Figure 4.3 Delta F values between the scalar magnetometer and the field strength calculated from the baseline corrected vectorial data set. The scale of the figure is related to the INTERMAGNET 5 nT criteria.

4.3 Variometer differences

A third measure of quality comes from the comparison of records from different variometers after baseline correction. Additionally this test also provides an independent check of correctness of adopted baseline algorithms, especially if the two instruments are not identically oriented. For difference analysis, the orthogonal X, Y, and Z components of available variometer records after baseline correction are subtracted from each other. In 2021, variometer data from 2 independent systems are compared. In Figure 4.4, we depict these differences for each component and for each variometer relative to the primary variometer LEMI036. The scale of the figure is related to the INTERMAGNET 5 nT criteria, and the analysis makes use of filtered one-minute data. The average residual of the X component and its standard deviation is 0.20 ± 0.22 nT. For the Y and Z component values of 0.05 ± 0.19 nT and -0.09 ± 0.12 nT are obtained. Data from our secondary instrument is available from July 2021 onwards. Variation data of two instruments is available for 2021, full records from a LEMI036 and a LEMI025. All variometers are set up in HEZ orientation. Due to secular variation, the magnetic reference system changes with time and all systems slightly deviate from “perfect” orientation of Y towards magnetic east. These angular differences are considered in basevalue determination. After baseline adoption, the differences of all instruments is negligibly small, supporting the following three conclusions: 1) the algorithms and the calculation of adopted baselines, as depicted in section 3.2, are correct; 2) all instruments record an identical geomagnetic field at all periods; and 3) the combination of all accuracy tests

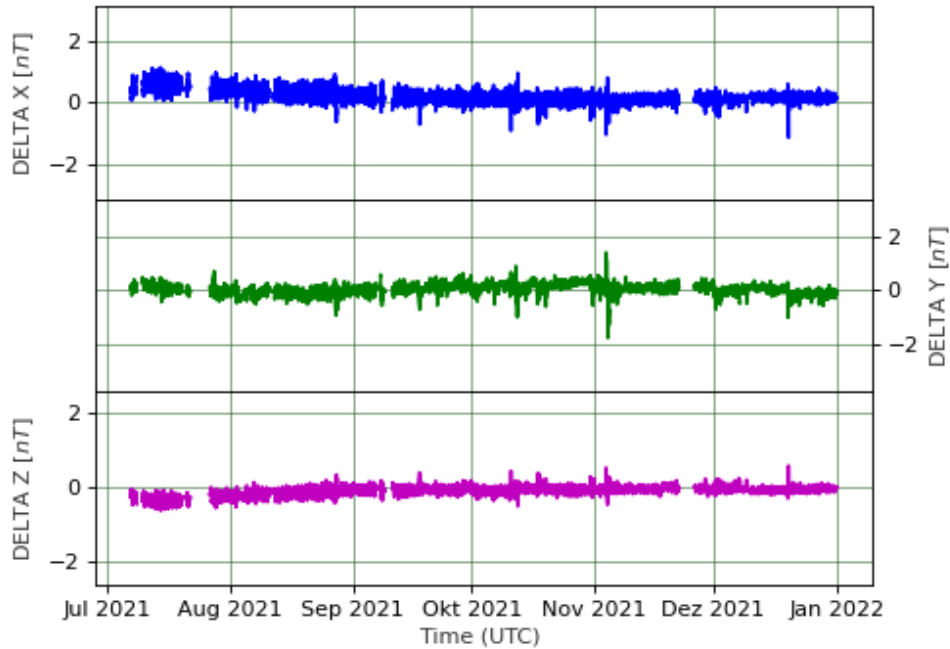


Figure 4.4 Delta values of vectorial components of baseline corrected variometer data.

underlines the very high quality of the geomagnetic field record.

4.4 Residuals between absolute DI and definitive data

Another internal quality check makes use of absolute DI measurements, by calculating the residual between these absolute values and the definitive data product. If all analysis steps are valid and correct, the residual between DI and definitive data needs to be almost zero. For difference analysis both measurements are transferred into an XYZ coordinate system and subtracted from each other. Please note, that we are using the minute resolution definitive data here, requiring some interpolation. The average residuals are 0.010 nT for X, -0.012 nT for Y and 0.001 nT for Z underlying the correctness and quality of our analysis procedure and our final data products.

4.5 Data coverage

A data coverage of 99.2 % of vectorial data in minute resolution was established for 2021. For filtering we use the recommended approach: minute means are only calculated if at least 90 % of one-second data is available within the filtering window. Therefore the relative recovery rate for one-second data is eventually higher. For scalar minute data, a data coverage of 100.0 % was obtained. One-second definitive data provided online consists solely of variation data from LEMI036 and scalar data from GP20S3NSS2 (see table 2.1). For minute data, gaps within the variation sequence were filled using secondary variometers. Gaps in the scalar one-minute record

are filled by data from secondary scalar systems. For 2021 the composite minute data set consists of contributions from all instruments shown in figure 4.5. Yellow shaded regions indicate the availability of variation data, green shaded regions indicate the presence of scalar data. The lowermost plot indicates average differences between all scalar values. The basic reason for only using single instrument records for our definitive one-second data is to maintain the frequency characteristics of the underlying instruments. For filtered one-minute data and longer periods, all instruments have widely similar characteristics within the frequency domain, which means an averaging and gap filling procedure is justified. Variation data is available almost continuously

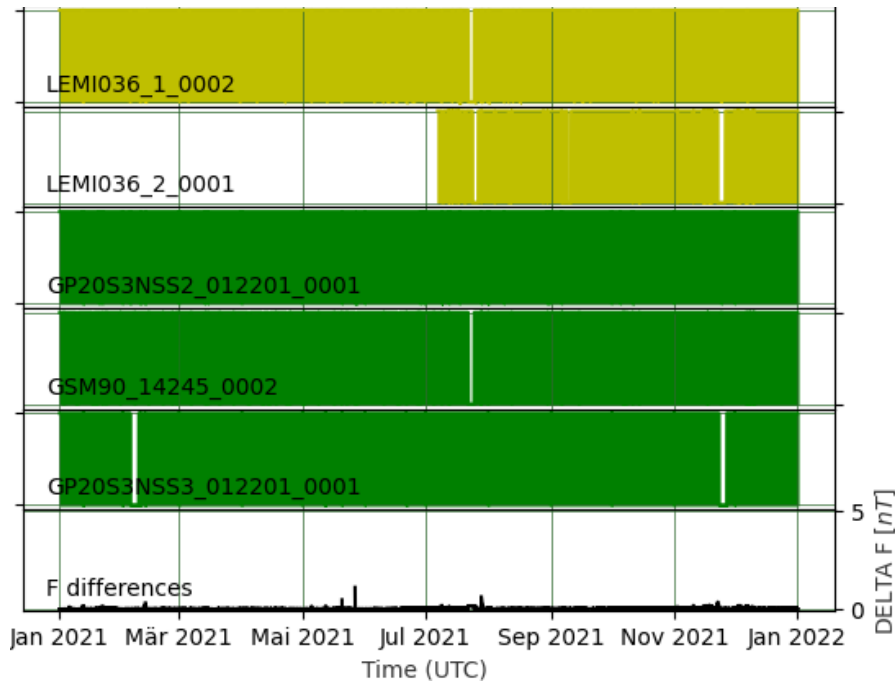


Figure 4.5 Contributions of each sensor for the analysis of 2021. Yellow shaded regions indicate time ranges of respective variometer data, green shaded regions mark scalar data which has been averaged for the composite one-minute record. The lowermost plot depicts the average difference between all scalar data.

for 2021. Minor gaps are mainly related to thunderstorms and disturbances due to wood work in the vicinity of the observatory. Gaps of the secondary variometer have been explained above. Thunderstorms occurred frequently and produced a lot of spikes. Table 8.2 in appendix gives an overview about days with thunderstorms and an estimate of independent lightning events with magnetic signatures. The one-second data record consists solely of data from LEMIO36 SN1. For minute values, LEMIO36 SN2 records merged into LEMIO36 SN1 data to fill gaps, a procedure which is absolutely valid looking at the similarity of both records after baseline correction. Scalar data was mainly recorded with three instruments in 2021. One-second data is based solely on GP20S3NS2. For minute data, gaps are filled. Gaps in the scalar record have the same reasons as listed above for the variometer.

Chapter 5

Definitive Data

5.1 Definitive data production

A compilation of all results is shown in Figure 5.1. Vectorial components, after baseline correction, comprise the upper three plots. An independently measured value of the field strength F is shown below. Temperature variation is very small. The average temperature corresponds to 6.21 ± 0.02 °C. Please note that the absolute value of temperature is not accurately known; its variation, however, is very precise and almost negligible. The lower two plots show the locally determined K value and the global index K_p provided by the GFZ Potsdam, which have similar characteristics. All variometers located at the Conrad Observatory were set up in HEZ direction at the time of installation. Due to secular variation, the magnetic coordinate system is slowly moving in time. This will lead to increasing deviations from a perfect HEZ orientation for all variometers. The baseline correction technique of *Lauridsen* [1985], however, requires HEZ orientation. Even slight deviations from this boundary condition will lead to an improper variation correction which can result in slight offsets of δF , as an example. The LEMI036 variometer was set up in December 2015. Since then, the east component has moved by an angle of -0.988 degrees, which can be easily tested with reasonable accuracy by rotating the yearly average HEZ so that the average E component results in zero. For definitive data production, all calculations are performed on such coordinate-transformed data. A few magnetic events are visible in 2021 (Figure 5.1), marked by large vectorial deviations and high K indices. The events correspond to geomagnetic storms, in particular to coronal-mass ejections hitting earth. Throughout the year a gradual increase of Z and an increasing positive (east) declination is visible, as also found in the long-term trend in central Europa (see next chapter).

5.2 Comparison to preliminary and quasi-definitive data

Adjusted and quasi-definitive (QD) data is available from December 2015 onwards, although QD datasets are regularly uploaded to the GIN in Edinburgh only since end of 2018. Since then these data sets are primarily based on LEMI036 variation data as this instrument is widely undisturbed. Adjusted data show average absolute differences of less than 0.11 nT in x , less than 0.01 nT in y , less than 0.03 nT in z and less than 0.57 nT in F . Overall, the deviations from quasi-definitive data to definitive data is comparably small with average differences of less than 0.10 nT in x , less than 0.35 nT in y , less than 0.01 nT in z and less than 0.04 nT in F . The differences are well within the 5 nT range for suitable quasi-definitive data for both, our

adjusted and quasi-definitive data products.

5.3 Disturbances and anthropogenic signals

5.3.1 Frequency characteristics and noise levels

The spectral analysis of geomagnetic time series revealed some recurring magnetic disturbances. An average quiet day spectrum for definitive F of the GP20S3NSS2 potassium sensor is shown in Figure 5.2. Some small spectral peaks are visible at $T = 300s$, $\sim 220s$, $\sim 180s$, $\sim 150s$, $\sim 130s$, $\sim 120s$, $\sim 110s$, $T = 100s$, $T = 70s$, $50s$, $35s$, $\sim 7.5s$ and $T = 5s$. Also visible is a weak broadband distribution from $300s < T < 3s$ and from $10000s < T < 3s$. The average noiselevel was found to be $0.6^{pT}/\sqrt{Hz}$. From the average spectrum the last l samples were used to dynamically derive the given noiselevel. This algorithm works as follows:

1. Set a percentage value $r_x\%$ which defines the ratio of samples that will be used to derive the noiselevel. Typically 5% is a good value.
2. From the average spectrum derived by slepian tapering and FFTs find the index of the sample closest to the percentage value according to the following formula:

$$l = \min |r_x\% - [1/N, 1]_{\logspace}| \quad (5.1)$$

where $[1/N, 1]_{\logspace}$ is a numerical row in logarithmic spacing from $\log_{10}(1.0/N)$ up to 1 with N samples where N is the length of the onesided (positive) frequency series with length N .

3. Derive an incremental value $Inc = l/100$. If $l < 100$ the derivation is not possible.
4. For all the samples in the interval from the shortest period up to the sample with index l append the maximum of the absolute value for each subinterval $[k, k + Inc]$ to a list b for $0 \leq k < l - 1$.
5. Use the list of maximum absolute values per subinterval b to derive the noiselevel a_{noise}

$$a_{noise} = \sqrt{\pi} \cdot \sqrt{\overline{b^2}} \quad (5.2)$$

where $\overline{b^2}$ is the median of the squared b values.

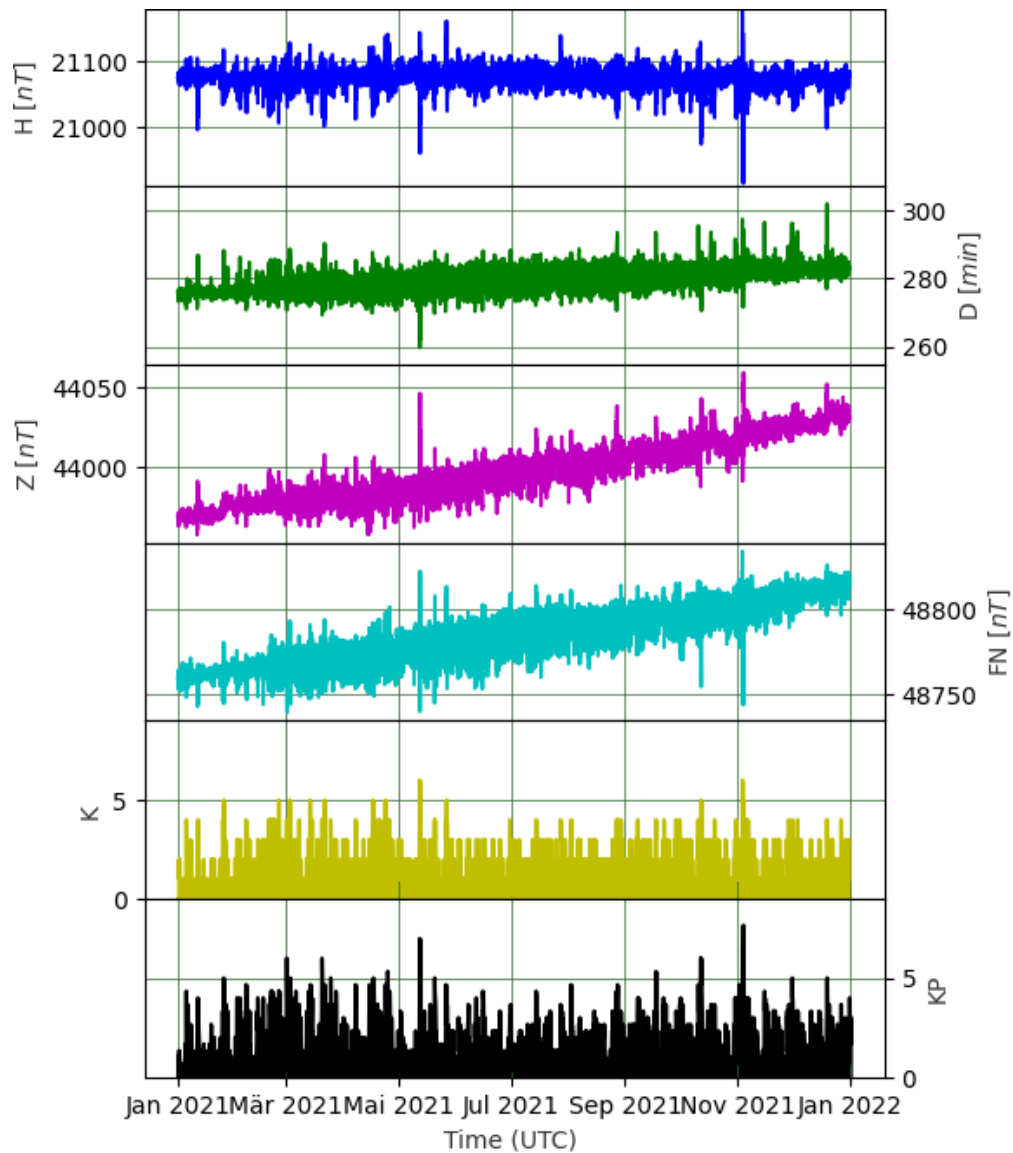


Figure 5.1 Definitive one-minute data of WIC. Shown are the three baseline corrected vectorial components, the independently determined F value, as well as local K and global K_p indices.

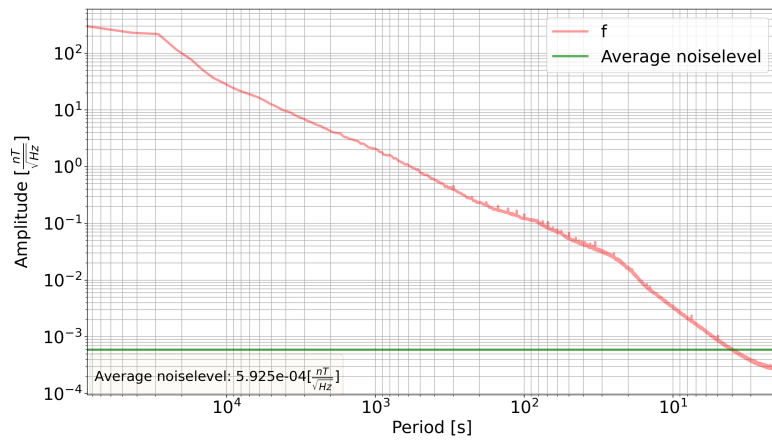


Figure 5.2 Average quiet day spectrum of total field intensity from definitive data of the GP20S3NSS2 potassium sensor.

Chapter 6

Geomagnetic Characteristics

6.1 Secular Variation

Geomagnetic secular variation originates in the dynamo processes of the Earth's outer core, where fluid flows generate the main magnetic field. In order to reduce geomagnetic contributions of external origin such as the interaction of the Sun's magnetic field with the Earth's magnetosphere, monthly and annual means are calculated. It should be mentioned that this procedure does not completely remove external field contributions. The monthly and yearly mean data for Conrad Observatory are provided in tables 6.1 and 6.2, respectively.

After combining yearly means of the two Vienna observatories Cobenzl, WIK (running from 1955 to 2015), and the Conrad Observatory, WIC (from 2014 onwards), a secular variation diagram as shown in Figure 6.1 has been obtained. In the combination of both data sets, the Cobenzl annual means have been corrected towards the Conrad Observatory values using the average differences of years 2014 and 2015. Fortunately, the location difference (≈ 50 km) and thus the averaged difference in each component is not large and constant in time between the two years of overlapping records (diff X = 169 ± 2 nT, diff Y = -30 ± 1 nT, diff Z = -272 ± 1 nT).

As can be seen in Figure 6.1, field strength F and vertical component Z have been gradually increasing since 1955. The agonic, the line of zero declination, has been monotonously moving westwards and passed the Conrad Observatory in 1973. The H component has also increased since the beginning of observation, but has shown minimal variation since 1980.

Considering the last two years, a secular variation rate of $dX = -4.0$ nT/year, $dY = 48.0$ nT/year and $dZ = 62.0$ nT/year is obtained. Fitting and extrapolating an average annual derivative curve using cubic splines results in the following predicted average field values for 2022: H = 21070 nT, D = 4.79 deg, Z = 44063 nT. Please note that for this approximation it is assumed that the 50 km distant locations WIK and WIC have exhibited the same secular variation pattern in the past, as the WIK data has been corrected using constant offsets.

6.2 Geomagnetic Activity

6.2.1 Local K values and K_p

The K-index (K) and the planetary K-index (K_p) are used to characterize the magnitude of geomagnetic activity. K_p is an excellent indicator of disturbances in the Earth's magnetic field and is used by many space weather prediction centres. Geomagnetic storms typically result in DC fluctuations in power grids, interruptions to spacecraft operations and GNSS due to

Table 6.1. Monthly arithmetic means at the Conrad Observatory. These mean values are deduced from minute data sets. If less than 90% of data is available then averages are not calculated.

Date	X [nT]	Y [nT]	Z [nT]	F _n [nT]
2021-01	21006.555	1691.114	43972.098	48761.471
2021-02	21001.743	1697.095	43978.866	48765.710
2021-03	21001.906	1700.556	43983.071	48769.712
2021-04	21006.392	1703.008	43985.963	48774.236
2021-05	21009.605	1706.159	43990.137	48779.506
2021-06	21011.217	1710.402	43995.210	48785.002
2021-07	21009.374	1714.667	44000.736	48789.423
2021-08	21005.750	1717.432	44005.511	48792.125
2021-09	21005.224	1721.512	44010.879	48796.872
2021-10	21001.349	1724.635	44017.030	48800.872
2021-11	20996.430	1730.812	44025.029	48806.209
2021-12	20998.396	1733.550	44030.746	48812.323

Table 6.2. Yearly arithmetic means at the Conrad Observatory. These mid-year mean values are deduced from the yearly hourly data sets and therefore are not necessarily exactly equal to an average of the monthly means.

Date	x [nT]	y [nT]	z [nT]	f [nT]
2014	20995.000	1353.000	43633.000	48440.000
2015	20991.000	1402.000	43678.000	48480.000
2016	20999.000	1452.000	43718.000	48521.000
2017	20999.000	1507.000	43768.000	48568.000
2018	21007.000	1561.000	43820.000	48620.000
2019	21009.000	1615.000	43879.000	48676.000
2020	21009.000	1665.000	43938.000	48731.000
2021	21005.000	1713.000	44000.000	48786.000

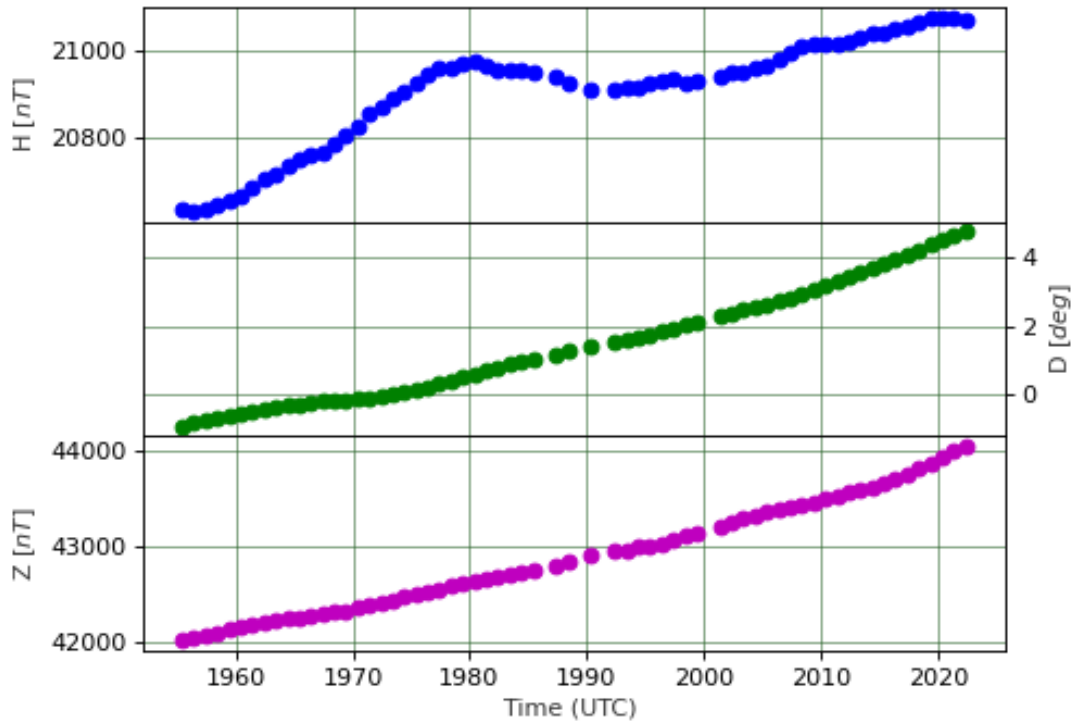


Figure 6.1 Yearly means since 1955. Data from 1955 until 2015 was obtained at the Cobenzl Observatory and corrected for the average offset of years 2014 and 2015 to the Conrad Observatory. Shown is also a predicted value for 2022.

ionospheric radio signal disturbances, and visible aurorae. The average local K for 2021 at Conrad Observatory corresponds to 1.5, which is in perfect agreement with the yearly average K_p of 1.5 provided by the GFZ Potsdam (<http://www.gfz-potsdam.de/kp-index/>). Figure 6.2 depicts the yearly and seasonal distribution of K values. As to be expected because of the orbital distance, the summer term is characterized by slightly higher average activity.

6.2.2 Quiet and disturbed days

On a global scale, quiet and disturbed days are identified based on three characteristics which each are used to define a single yearly or monthly ordering number (see <http://www.gfz-potsdam.de/sektion/erdmagnetfeld/daten-produkte-dienste/kp-index/erklaerung/qd-days/>). These parameters include (a) the sum of all K_p values of one day, (b) the sum of squares of all K_p , and (c) the maximum values of K_p . The three ordering numbers are then averaged and lowest and highest averages are selected. It has to be noted that this measure is purely relative and is not representative for classifying and comparing disturbance levels of different time periods. Therefore additional notes and codes are used based on the average daily A_p index, originating from eight a_p values which are the nT thresholds for

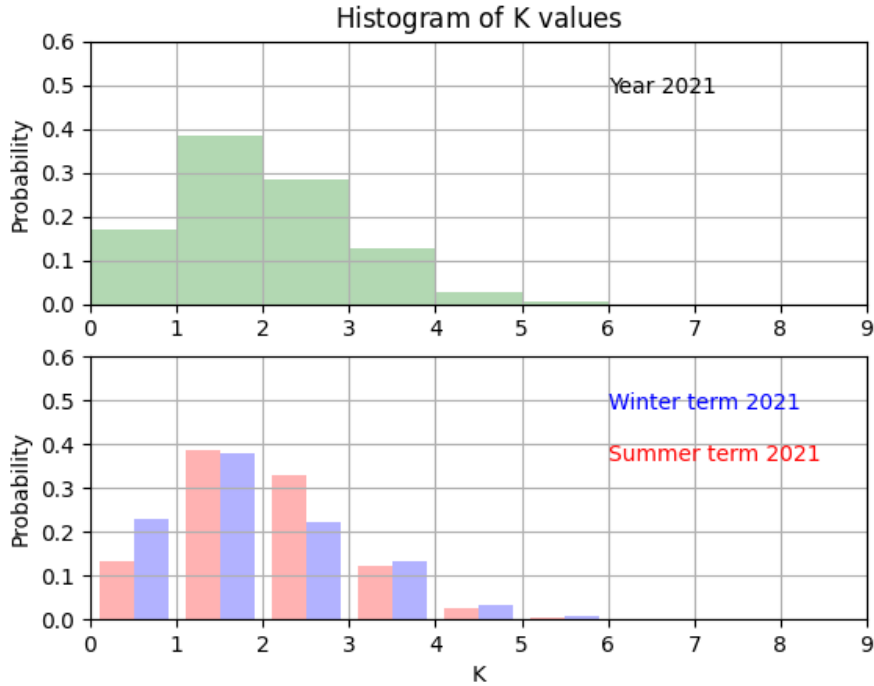


Figure 6.2 Distribution of K values.

each K_p . Detail can be found in the link above. For describing quiet and disturbed days at the Conrad Observatory, and to assure that data from all time periods is comparable, we prefer to use solely the average daily K index. Disturbed days are defined as days in which the average daily K index exceeds a value of 3.0. Such values were found for the following 9 days: 2021-03-01, 2021-03-14, 2021-03-21, 2021-04-17, 2021-05-12, 2021-05-27, 2021-10-12, 2021-11-04, 2021-11-06. For quiet days the average daily K index needs to be below 0.5, and this was found for 20 days: 2021-01-01, 2021-01-02, 2021-01-09, 2021-01-10, 2021-01-14, 2021-01-15, 2021-01-16, 2021-01-17, 2021-01-29, 2021-01-30, 2021-01-31, 2021-03-10, 2021-03-16, 2021-05-24, 2021-06-01, 2021-07-24, 2021-09-19, 2021-10-08, 2021-10-28, 2021-10-29.

6.2.3 Geomagnetic Storms

Using an automated storm detection method [Bailey and Leonhardt, 2016], which aims to detect storms likely to cause geomagnetically induced currents, 16 storms were detected in the year 2021: 2021-01-05, 2021-01-11, 2021-01-25, **2021-03-20**, 2021-04-07, 2021-04-17, 2021-04-25, **2021-05-12**, 2021-05-17, 2021-05-20, 2021-05-26, 2021-06-02, 2021-06-07, 2021-05-15, **2021-11-03**, and 2021-11-30. The dates highlighted in bold were three of the five most active days during the year by maximum k_p value. Out of the 16 detections, five (2021-01-05, 2021-01-11, 2021-05-17, 2021-06-02, and 2021-06-07) were of SSC-like signals in the data that were not followed by geomagnetic storms. The technique makes use of a combination of NOAA real-time solar wind data along with geomagnetic recordings from the Observatory. An example of an automated storm detection using both sets of data is shown in Figure 6.3.

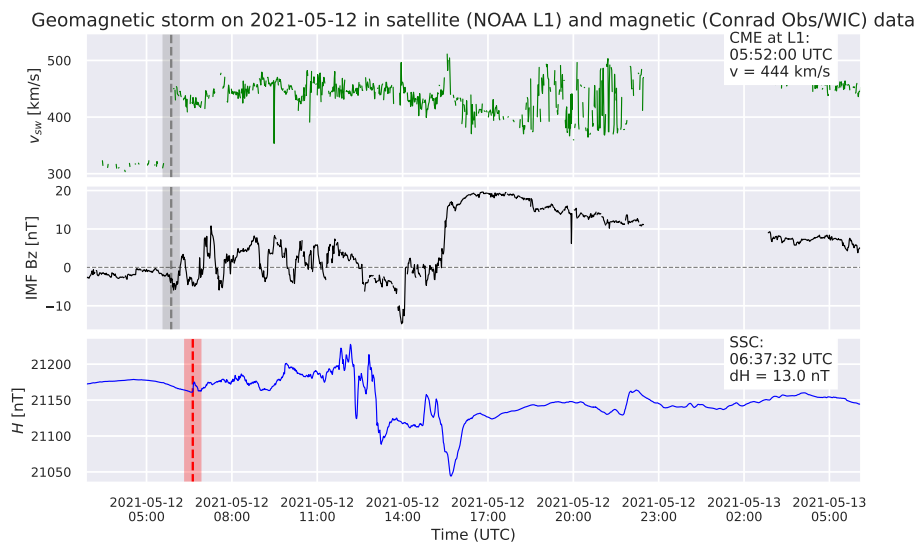


Figure 6.3 Most prominent geomagnetic storm in 2021. Shown are solar wind speed as determined at Lagrange point 1 (L1) by DSCOVR/ACE satellites and the horizontal component (H) of the geomagnetic field. Denoted are the times when shock front of the coronal mass ejection (CME) passed the satellite and initiated the sudden storm commencement (SSC) on earth.

Chapter 7

Publications and Presentations

In 2021 the geomagnetism group contributed to the following presentations and publications:

2021

- Arneitz, P., N. Kompein, R. Egli, and R. Leonhardt, Peculiarities from the frequency analysis of geomagnetic data at COBS, *CobsJournal*, 6, 10, 2021a.
- Arneitz, P., N. Kompein, R. Egli, R. Leonhardt, B. Leichter, R. Kornfeld, and R. Mandl, Recurring magnetic disturbances in the pT range recorded at the Conrad Observatory, in *IGA Meeting*, 2021b.
- Arneitz, P., R. Leonhardt, R. Egli, and K. Fabian, Dipole and Nondipole Evolution of the Historical Geomagnetic Field From Instrumental, Archeomagnetic, and Volcanic Data, *Journal of Geophysical Research*, 126, 10, 2021c.
- Arneitz, P., K. Radner, and R. Leonhardt, Archeomagnetic dating of an Iron Age pottery kiln from Northeast Iraq, *CobsJournal*, 6, 17, 2021d.
- Arneitz, P., E. Schnepf, and R. Leonhardt, A Miocene reversed-to-normal polarity transition recorded in a volcanic section on St. Helena, South Atlantic, in *IGA Meeting*, 2021e.
- Bailey, R., R. Leonhardt, C. Möstl, P. Schachinger, and D. Albert, Historical Analysis of Geomagnetic Storm Scales in Austria, *CobsJournal*, 6, 5, 2021a, ISSN 978-3-903171-08-4.
- Bailey, R. L., M. A. Reiss, C. N. Arge, C. Möstl, C. J. Henney, M. J. Owens, U. V. Amerstorfer, T. Amerstorfer, A. J. Weiss, and J. Hinterreiter, Using Gradient Boosting Regression to Improve Ambient Solar Wind Model Predictions, *Space Weather*, 19, 5, 2021b.
- Kompein, N., P. Arneitz, R. Leonhardt, R. Egli, and G. Diendorfer, Correlations of thunderstorm and magnetic records at the Conrad Observatory, Austria, in *IGA Meeting*, 2021a.
- Kompein, N., P. Arneitz, R. Leonhardt, R. Egli, and G. Diendorfer, Correlations of thunderstorms and magnetic records at COBS, *CobsJournal*, 6, 12, 2021b.
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Schnepp, E., P. Arneitz, M. Ganerød, R. Scholger, I. Fritz, R. Egli, and R. Leonhardt, Intermediate Field Directions Recorded in Pliocene Basalts in Styria (Austria): Evidence for Cryptochron C2r.2r-1, *Earth, Planets and Space*, 73, 182, 2021.

Wilfinger, J., R. Leonhardt, W. Magnes, A. Valavanoglou, N. Kompein, and G. Berghofer, Magnetometer Calibration Facility, *CobsJournal*, 6, 9, 2021.

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Chapter 8

Appendix

Table 8.1. K indices: Daily K indices according to the FMI method as described in the text.
 Quiet and disturbed days are marked by Q and D respectively

Date	1:30	4:30	7:30	10:30	13:30	16:30	19:30	22:30	Activity
2021-01-01	0.0	0.0	0.0	0.0	0.0	2.0	1.0	2.0	
2021-01-02	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	Q
2021-01-03	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	
2021-01-04	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	
2021-01-05	1.0	0.0	1.0	2.0	4.0	3.0	2.0	3.0	
2021-01-06	2.0	1.0	2.0	2.0	2.0	2.0	1.0	1.0	
2021-01-07	1.0	1.0	1.0	0.0	1.0	1.0	2.0	3.0	
2021-01-08	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	
2021-01-09	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	Q
2021-01-10	0.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	Q
2021-01-11	0.0	0.0	1.0	2.0	3.0	3.0	3.0	4.0	
2021-01-12	4.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0	
2021-01-13	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	
2021-01-14	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	Q
2021-01-15	2.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	Q
2021-01-16	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	
2021-01-17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	Q
2021-01-18	1.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	
2021-01-19	2.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	
2021-01-20	0.0	1.0	2.0	1.0	1.0	2.0	2.0	1.0	
2021-01-21	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	
2021-01-22	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	
2021-01-23	1.0	0.0	0.0	1.0	1.0	1.0	1.0	2.0	
2021-01-24	1.0	1.0	0.0	1.0	2.0	1.0	2.0	2.0	
2021-01-25	1.0	1.0	3.0	4.0	3.0	3.0	3.0	5.0	
2021-01-26	3.0	3.0	1.0	1.0	1.0	3.0	3.0	2.0	
2021-01-27	1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
2021-01-28	2.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	
2021-01-29	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	Q
2021-01-30	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	Q
2021-01-31	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	Q
2021-02-01	2.0	1.0	0.0	1.0	1.0	2.0	2.0	2.0	
2021-02-02	3.0	3.0	3.0	2.0	3.0	2.0	0.0	2.0	
2021-02-03	2.0	2.0	2.0	1.0	1.0	3.0	3.0	3.0	
2021-02-04	1.0	2.0	2.0	1.0	1.0	0.0	nan	nan	
2021-02-05	0.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	
2021-02-06	0.0	0.0	0.0	1.0	1.0	2.0	3.0	2.0	
2021-02-07	4.0	3.0	3.0	3.0	3.0	1.0	2.0	1.0	
2021-02-08	0.0	0.0	1.0	1.0	1.0	2.0	3.0	3.0	
2021-02-09	0.0	0.0	2.0	1.0	0.0	nan	nan	nan	
2021-02-10	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	Q
2021-02-11	0.0	0.0	2.0	1.0	0.0	1.0	0.0	0.0	
2021-02-12	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	
2021-02-13	2.0	2.0	1.0	3.0	2.0	2.0	1.0	2.0	
2021-02-14	0.0	1.0	2.0	1.0	1.0	0.0	1.0	0.0	
2021-02-15	0.0	0.0	0.0	0.0	1.0	1.0	3.0	3.0	
2021-02-16	1.0	2.0	2.0	3.0	2.0	3.0	2.0	1.0	
2021-02-17	1.0	2.0	2.0	1.0	2.0	2.0	3.0	2.0	
2021-02-18	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	
2021-02-19	1.0	0.0	1.0	1.0	4.0	3.0	4.0	3.0	
2021-02-20	2.0	1.0	3.0	2.0	3.0	3.0	4.0	4.0	
2021-02-21	3.0	2.0	3.0	4.0	4.0	2.0	1.0	4.0	
2021-02-22	4.0	3.0	2.0	3.0	2.0	1.0	4.0	3.0	

Table 8.1 (cont'd)

Date	1:30	4:30	7:30	10:30	13:30	16:30	19:30	22:30	Activity
2021-02-23	3.0	2.0	2.0	2.0	3.0	2.0	3.0	1.0	
2021-02-24	2.0	2.0	3.0	2.0	1.0	3.0	5.0	3.0	
2021-02-25	2.0	3.0	2.0	2.0	1.0	2.0	3.0	3.0	
2021-02-26	3.0	1.0	1.0	2.0	3.0	2.0	3.0	3.0	
2021-02-27	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
2021-02-28	0.0	1.0	0.0	1.0	1.0	0.0	2.0	3.0	
2021-03-01	3.0	4.0	4.0	3.0	1.0	3.0	4.0	2.0	
2021-03-02	1.0	1.0	2.0	2.0	2.0	3.0	5.0	4.0	
2021-03-03	2.0	3.0	3.0	2.0	2.0	2.0	2.0	3.0	
2021-03-04	3.0	2.0	0.0	1.0	2.0	3.0	3.0	2.0	
2021-03-05	2.0	0.0	1.0	0.0	1.0	1.0	2.0	2.0	
2021-03-06	2.0	3.0	2.0	3.0	3.0	1.0	1.0	2.0	
2021-03-07	1.0	0.0	1.0	2.0	0.0	3.0	2.0	4.0	
2021-03-08	0.0	0.0	0.0	1.0	1.0	2.0	2.0	1.0	
2021-03-09	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	
2021-03-10	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	Q
2021-03-11	0.0	0.0	0.0	1.0	0.0	1.0	1.0	2.0	
2021-03-12	2.0	1.0	2.0	2.0	2.0	2.0	3.0	2.0	
2021-03-13	3.0	3.0	2.0	2.0	2.0	3.0	5.0	4.0	
2021-03-14	3.0	3.0	2.0	2.0	3.0	4.0	4.0	4.0	D
2021-03-15	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	
2021-03-16	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	Q
2021-03-17	1.0	1.0	0.0	0.0	1.0	3.0	2.0	1.0	
2021-03-18	1.0	1.0	1.0	1.0	1.0	0.0	0.0	2.0	
2021-03-19	2.0	1.0	1.0	0.0	0.0	1.0	2.0	3.0	
2021-03-20	2.0	3.0	4.0	3.0	2.0	4.0	3.0	3.0	
2021-03-21	3.0	3.0	2.0	2.0	3.0	5.0	4.0	3.0	D
2021-03-22	3.0	1.0	2.0	1.0	2.0	1.0	1.0	2.0	
2021-03-23	2.0	2.0	1.0	1.0	2.0	1.0	2.0	2.0	
2021-03-24	2.0	1.0	2.0	2.0	2.0	1.0	2.0	4.0	
2021-03-25	4.0	3.0	3.0	3.0	3.0	1.0	0.0	3.0	
2021-03-26	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	
2021-03-27	0.0	0.0	0.0	1.0	0.0	1.0	3.0	3.0	
2021-03-28	3.0	2.0	1.0	1.0	0.0	1.0	1.0	1.0	
2021-03-29	1.0	1.0	0.0	1.0	1.0	0.0	1.0	2.0	
2021-03-30	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	
2021-03-31	1.0	1.0	1.0	1.0	1.0	3.0	2.0	3.0	
2021-04-01	3.0	2.0	1.0	1.0	0.0	1.0	2.0	1.0	
2021-04-02	1.0	1.0	1.0	0.0	1.0	3.0	3.0	1.0	
2021-04-03	1.0	1.0	1.0	1.0	0.0	0.0	2.0	2.0	
2021-04-04	1.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	
2021-04-05	1.0	0.0	0.0	2.0	2.0	1.0	1.0	1.0	
2021-04-06	1.0	1.0	2.0	1.0	1.0	0.0	1.0	1.0	
2021-04-07	0.0	1.0	2.0	3.0	4.0	4.0	3.0	1.0	
2021-04-08	0.0	0.0	0.0	1.0	1.0	0.0	1.0	2.0	
2021-04-09	1.0	2.0	0.0	1.0	0.0	1.0	0.0	0.0	
2021-04-10	0.0	0.0	1.0	1.0	1.0	2.0	1.0	2.0	
2021-04-11	0.0	1.0	0.0	1.0	1.0	0.0	3.0	3.0	
2021-04-12	1.0	0.0	1.0	2.0	1.0	2.0	1.0	1.0	
2021-04-13	0.0	0.0	1.0	2.0	2.0	2.0	2.0	2.0	
2021-04-14	1.0	1.0	1.0	2.0	0.0	1.0	2.0	3.0	
2021-04-15	3.0	2.0	3.0	1.0	3.0	2.0	1.0	1.0	
2021-04-16	2.0	2.0	2.0	3.0	3.0	3.0	4.0	4.0	

Table 8.1 (cont'd)

Date	1:30	4:30	7:30	10:30	13:30	16:30	19:30	22:30	Activity
2021-04-17	5.0	3.0	4.0	3.0	4.0	4.0	3.0	3.0	D
2021-04-18	3.0	2.0	2.0	3.0	2.0	2.0	3.0	3.0	
2021-04-19	3.0	2.0	3.0	3.0	2.0	3.0	4.0	3.0	
2021-04-20	2.0	2.0	2.0	2.0	2.0	2.0	4.0	3.0	
2021-04-21	2.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0	
2021-04-22	1.0	0.0	1.0	3.0	2.0	1.0	0.0	2.0	
2021-04-23	2.0	2.0	2.0	2.0	3.0	3.0	3.0	5.0	
2021-04-24	2.0	2.0	2.0	1.0	2.0	2.0	2.0	3.0	
2021-04-25	4.0	3.0	2.0	2.0	2.0	1.0	3.0	2.0	
2021-04-26	4.0	3.0	3.0	2.0	1.0	1.0	0.0	1.0	
2021-04-27	3.0	2.0	3.0	2.0	1.0	1.0	1.0	1.0	
2021-04-28	1.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	
2021-04-29	1.0	1.0	2.0	2.0	1.0	2.0	2.0	0.0	
2021-04-30	1.0	1.0	2.0	2.0	2.0	3.0	3.0	2.0	
2021-05-01	2.0	1.0	2.0	2.0	2.0	1.0	1.0	2.0	
2021-05-02	3.0	3.0	2.0	2.0	1.0	2.0	2.0	2.0	
2021-05-03	2.0	2.0	2.0	1.0	2.0	2.0	0.0	1.0	
2021-05-04	1.0	0.0	1.0	2.0	1.0	1.0	1.0	0.0	
2021-05-05	0.0	0.0	0.0	2.0	2.0	0.0	1.0	0.0	
2021-05-06	0.0	0.0	1.0	2.0	2.0	2.0	1.0	0.0	
2021-05-07	1.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	
2021-05-08	1.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	
2021-05-09	0.0	1.0	1.0	1.0	0.0	1.0	1.0	2.0	
2021-05-10	2.0	1.0	1.0	2.0	1.0	2.0	2.0	2.0	
2021-05-11	1.0	1.0	2.0	2.0	1.0	1.0	0.0	0.0	
2021-05-12	1.0	2.0	3.0	5.0	6.0	5.0	2.0	3.0	D
2021-05-13	2.0	2.0	2.0	3.0	2.0	2.0	1.0	2.0	
2021-05-14	0.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	
2021-05-15	3.0	3.0	3.0	2.0	2.0	1.0	1.0	1.0	
2021-05-16	1.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	
2021-05-17	0.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	
2021-05-18	3.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	
2021-05-19	1.0	1.0	1.0	1.0	2.0	1.0	2.0	2.0	
2021-05-20	3.0	1.0	2.0	3.0	4.0	3.0	4.0	3.0	
2021-05-21	2.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0	
2021-05-22	2.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	
2021-05-23	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	
2021-05-24	1.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	Q
2021-05-25	1.0	1.0	1.0	1.0	1.0	1.0	0.0	2.0	
2021-05-26	1.0	2.0	1.0	0.0	3.0	3.0	4.0	3.0	
2021-05-27	5.0	3.0	4.0	3.0	2.0	3.0	3.0	1.0	
2021-05-28	1.0	2.0	1.0	1.0	1.0	1.0	0.0	0.0	
2021-05-29	0.0	1.0	1.0	2.0	3.0	2.0	2.0	3.0	
2021-05-30	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	
2021-05-31	1.0	2.0	1.0	0.0	1.0	1.0	1.0	0.0	
2021-06-01	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	Q
2021-06-02	0.0	1.0	0.0	1.0	3.0	3.0	2.0	1.0	
2021-06-03	2.0	2.0	3.0	2.0	2.0	2.0	1.0	0.0	
2021-06-04	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	
2021-06-05	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	
2021-06-06	1.0	1.0	1.0	0.0	1.0	1.0	2.0	2.0	
2021-06-07	0.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	
2021-06-08	2.0	2.0	3.0	2.0	1.0	1.0	1.0	1.0	

Table 8.1 (cont'd)

Date	1:30	4:30	7:30	10:30	13:30	16:30	19:30	22:30	Activity
2021-06-09	1.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0	
2021-06-10	1.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	
2021-06-11	2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
2021-06-12	2.0	3.0	2.0	2.0	3.0	2.0	2.0	2.0	
2021-06-13	3.0	2.0	1.0	1.0	1.0	1.0	1.0	0.0	
2021-06-14	0.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	
2021-06-15	2.0	2.0	1.0	2.0	3.0	3.0	3.0	3.0	
2021-06-16	3.0	2.0	3.0	3.0	2.0	3.0	2.0	3.0	
2021-06-17	2.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	
2021-06-18	2.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0	
2021-06-19	1.0	1.0	1.0	1.0	0.0	1.0	2.0	0.0	
2021-06-20	0.0	1.0	1.0	1.0	0.0	0.0	1.0	3.0	
2021-06-21	0.0	2.0	1.0	3.0	2.0	1.0	2.0	1.0	
2021-06-22	1.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	
2021-06-23	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	
2021-06-24	0.0	1.0	2.0	2.0	2.0	1.0	2.0	2.0	
2021-06-25	3.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0	
2021-06-26	0.0	2.0	2.0	1.0	2.0	2.0	0.0	0.0	
2021-06-27	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
2021-06-28	1.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	
2021-06-29	0.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	
2021-06-30	0.0	2.0	3.0	4.0	3.0	3.0	3.0	3.0	
2021-07-01	3.0	2.0	2.0	1.0	0.0	1.0	1.0	1.0	
2021-07-02	1.0	1.0	2.0	2.0	1.0	3.0	2.0	1.0	
2021-07-03	1.0	2.0	2.0	1.0	1.0	2.0	0.0	1.0	
2021-07-04	0.0	2.0	2.0	1.0	1.0	1.0	1.0	0.0	
2021-07-05	1.0	2.0	1.0	3.0	2.0	2.0	2.0	2.0	
2021-07-06	2.0	1.0	2.0	1.0	2.0	2.0	2.0	1.0	
2021-07-07	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
2021-07-08	1.0	1.0	2.0	1.0	1.0	1.0	1.0	0.0	
2021-07-09	1.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	
2021-07-10	2.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	
2021-07-11	0.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	
2021-07-12	2.0	2.0	2.0	1.0	2.0	3.0	2.0	2.0	
2021-07-13	2.0	0.0	1.0	2.0	1.0	1.0	1.0	2.0	
2021-07-14	1.0	2.0	1.0	3.0	3.0	4.0	4.0	3.0	
2021-07-15	2.0	1.0	2.0	3.0	3.0	2.0	3.0	3.0	
2021-07-16	1.0	1.0	1.0	1.0	0.0	1.0	3.0	1.0	
2021-07-17	2.0	1.0	3.0	1.0	2.0	2.0	2.0	0.0	
2021-07-18	0.0	1.0	1.0	1.0	2.0	2.0	1.0	2.0	
2021-07-19	2.0	1.0	3.0	1.0	1.0	2.0	2.0	1.0	
2021-07-20	2.0	2.0	3.0	3.0	2.0	3.0	3.0	3.0	
2021-07-21	1.0	2.0	2.0	2.0	3.0	3.0	1.0	0.0	
2021-07-22	2.0	2.0	3.0	2.0	3.0	1.0	2.0	1.0	
2021-07-23	0.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	
2021-07-24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Q
2021-07-25	0.0	0.0	2.0	3.0	3.0	0.0	0.0	2.0	
2021-07-26	2.0	2.0	2.0	1.0	0.0	0.0	1.0	0.0	
2021-07-27	0.0	1.0	1.0	2.0	1.0	2.0	1.0	3.0	
2021-07-28	4.0	3.0	3.0	3.0	3.0	3.0	3.0	1.0	
2021-07-29	2.0	3.0	2.0	2.0	0.0	2.0	2.0	2.0	
2021-07-30	0.0	1.0	2.0	2.0	3.0	2.0	2.0	2.0	
2021-07-31	1.0	0.0	2.0	2.0	2.0	1.0	2.0	1.0	

Table 8.1 (cont'd)

Date	1:30	4:30	7:30	10:30	13:30	16:30	19:30	22:30	Activity
2021-08-01	1.0	1.0	1.0	1.0	2.0	1.0	2.0	1.0	
2021-08-02	2.0	2.0	2.0	2.0	3.0	3.0	3.0	4.0	
2021-08-03	3.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	
2021-08-04	1.0	1.0	1.0	2.0	1.0	2.0	1.0	0.0	
2021-08-05	0.0	1.0	2.0	0.0	1.0	1.0	1.0	0.0	
2021-08-06	1.0	2.0	1.0	1.0	2.0	3.0	2.0	3.0	
2021-08-07	2.0	3.0	3.0	2.0	2.0	3.0	2.0	1.0	
2021-08-08	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0	
2021-08-09	1.0	1.0	2.0	1.0	1.0	0.0	1.0	0.0	
2021-08-10	2.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	
2021-08-11	2.0	2.0	2.0	1.0	1.0	0.0	1.0	0.0	
2021-08-12	0.0	1.0	1.0	1.0	1.0	2.0	2.0	3.0	
2021-08-13	2.0	2.0	3.0	3.0	2.0	1.0	0.0	1.0	
2021-08-14	1.0	1.0	1.0	1.0	1.0	2.0	1.0	0.0	
2021-08-15	3.0	2.0	3.0	2.0	1.0	2.0	2.0	3.0	
2021-08-16	2.0	2.0	2.0	1.0	2.0	2.0	0.0	2.0	
2021-08-17	0.0	1.0	2.0	2.0	2.0	2.0	1.0	2.0	
2021-08-18	2.0	2.0	2.0	2.0	1.0	1.0	1.0	0.0	
2021-08-19	0.0	2.0	2.0	2.0	1.0	1.0	2.0	1.0	
2021-08-20	0.0	1.0	2.0	1.0	2.0	2.0	2.0	0.0	
2021-08-21	0.0	1.0	2.0	1.0	2.0	2.0	1.0	0.0	
2021-08-22	0.0	2.0	2.0	0.0	1.0	1.0	0.0	0.0	
2021-08-23	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	
2021-08-24	1.0	1.0	2.0	2.0	1.0	1.0	2.0	2.0	
2021-08-25	2.0	3.0	2.0	1.0	1.0	2.0	1.0	1.0	
2021-08-26	2.0	2.0	2.0	2.0	2.0	1.0	1.0	0.0	
2021-08-27	3.0	2.0	2.0	3.0	4.0	3.0	3.0	4.0	
2021-08-28	4.0	1.0	3.0	3.0	1.0	2.0	2.0	1.0	
2021-08-29	2.0	1.0	2.0	1.0	1.0	2.0	4.0	3.0	
2021-08-30	0.0	1.0	2.0	2.0	2.0	1.0	2.0	3.0	
2021-08-31	2.0	1.0	1.0	1.0	2.0	1.0	1.0	2.0	
2021-09-01	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	
2021-09-02	0.0	1.0	2.0	1.0	1.0	1.0	1.0	0.0	
2021-09-03	1.0	1.0	1.0	2.0	2.0	2.0	1.0	3.0	
2021-09-04	3.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
2021-09-05	2.0	2.0	2.0	1.0	2.0	2.0	0.0	1.0	
2021-09-06	2.0	2.0	1.0	2.0	1.0	2.0	2.0	3.0	
2021-09-07	0.0	1.0	2.0	3.0	2.0	2.0	3.0	4.0	
2021-09-08	4.0	2.0	3.0	3.0	3.0	2.0	2.0	1.0	
2021-09-09	0.0	1.0	2.0	1.0	1.0	0.0	1.0	2.0	
2021-09-10	2.0	2.0	2.0	1.0	2.0	1.0	2.0	3.0	
2021-09-11	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	
2021-09-12	1.0	2.0	2.0	2.0	1.0	2.0	1.0	3.0	
2021-09-13	1.0	1.0	2.0	2.0	3.0	2.0	0.0	3.0	
2021-09-14	1.0	1.0	2.0	2.0	3.0	1.0	2.0	1.0	
2021-09-15	2.0	2.0	2.0	1.0	1.0	1.0	1.0	2.0	
2021-09-16	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	
2021-09-17	1.0	2.0	2.0	3.0	3.0	3.0	4.0	4.0	
2021-09-18	2.0	2.0	2.0	2.0	1.0	0.0	0.0	1.0	
2021-09-19	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	Q
2021-09-20	1.0	1.0	2.0	2.0	1.0	0.0	0.0	1.0	
2021-09-21	2.0	1.0	1.0	1.0	0.0	2.0	2.0	3.0	
2021-09-22	3.0	2.0	4.0	3.0	2.0	2.0	2.0	3.0	

Table 8.1 (cont'd)

Date	1:30	4:30	7:30	10:30	13:30	16:30	19:30	22:30	Activity
2021-09-23	2.0	3.0	3.0	1.0	2.0	2.0	2.0	0.0	
2021-09-24	1.0	1.0	1.0	1.0	1.0	3.0	2.0	1.0	
2021-09-25	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	
2021-09-26	1.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0	
2021-09-27	2.0	2.0	1.0	2.0	1.0	2.0	2.0	3.0	
2021-09-28	1.0	1.0	2.0	2.0	2.0	2.0	4.0	2.0	
2021-09-29	1.0	1.0	2.0	1.0	2.0	1.0	2.0	2.0	
2021-09-30	1.0	1.0	1.0	1.0	1.0	2.0	4.0	3.0	
2021-10-01	2.0	2.0	3.0	3.0	2.0	2.0	2.0	0.0	
2021-10-02	0.0	0.0	1.0	3.0	3.0	2.0	1.0	0.0	
2021-10-03	0.0	2.0	1.0	2.0	1.0	2.0	2.0	2.0	
2021-10-04	3.0	0.0	1.0	1.0	1.0	2.0	1.0	3.0	
2021-10-05	1.0	2.0	2.0	1.0	1.0	2.0	1.0	2.0	
2021-10-06	1.0	1.0	1.0	2.0	2.0	2.0	3.0	2.0	
2021-10-07	1.0	1.0	1.0	0.0	2.0	2.0	1.0	0.0	
2021-10-08	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	Q
2021-10-09	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
2021-10-10	1.0	1.0	1.0	1.0	2.0	3.0	3.0	4.0	
2021-10-11	2.0	2.0	2.0	2.0	3.0	2.0	4.0	4.0	
2021-10-12	4.0	4.0	3.0	5.0	4.0	4.0	4.0	3.0	D
2021-10-13	2.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	
2021-10-14	2.0	1.0	0.0	2.0	2.0	2.0	3.0	3.0	
2021-10-15	1.0	1.0	2.0	2.0	1.0	1.0	2.0	3.0	
2021-10-16	2.0	1.0	1.0	2.0	1.0	2.0	1.0	1.0	
2021-10-17	0.0	1.0	1.0	2.0	1.0	2.0	3.0	2.0	
2021-10-18	2.0	1.0	1.0	1.0	2.0	2.0	2.0	3.0	
2021-10-19	1.0	2.0	1.0	1.0	1.0	4.0	4.0	2.0	
2021-10-20	1.0	1.0	0.0	1.0	1.0	2.0	1.0	2.0	
2021-10-21	1.0	1.0	1.0	2.0	1.0	2.0	1.0	3.0	
2021-10-22	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	
2021-10-23	2.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	
2021-10-24	1.0	1.0	1.0	1.0	0.0	2.0	1.0	1.0	
2021-10-25	1.0	0.0	1.0	1.0	0.0	3.0	2.0	1.0	
2021-10-26	1.0	2.0	1.0	1.0	1.0	1.0	1.0	2.0	
2021-10-27	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	
2021-10-28	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	Q
2021-10-29	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	Q
2021-10-30	2.0	0.0	2.0	1.0	1.0	2.0	3.0	3.0	
2021-10-31	1.0	2.0	1.0	3.0	4.0	2.0	3.0	3.0	
2021-11-01	2.0	2.0	1.0	2.0	1.0	1.0	3.0	3.0	
2021-11-02	3.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	
2021-11-03	2.0	1.0	2.0	2.0	1.0	0.0	4.0	6.0	
2021-11-04	5.0	4.0	5.0	5.0	3.0	2.0	2.0	2.0	D
2021-11-05	1.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0	
2021-11-06	4.0	3.0	3.0	2.0	1.0	4.0	4.0	4.0	D
2021-11-07	3.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	
2021-11-08	0.0	0.0	0.0	2.0	2.0	1.0	2.0	3.0	
2021-11-09	2.0	0.0	2.0	1.0	1.0	1.0	2.0	3.0	
2021-11-10	3.0	2.0	2.0	1.0	1.0	1.0	1.0	0.0	
2021-11-11	1.0	0.0	1.0	2.0	2.0	1.0	1.0	1.0	
2021-11-12	1.0	0.0	1.0	1.0	0.0	0.0	0.0	1.0	
2021-11-13	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	
2021-11-14	1.0	0.0	0.0	1.0	0.0	1.0	0.0	2.0	

Table 8.1 (cont'd)

Date	1:30	4:30	7:30	10:30	13:30	16:30	19:30	22:30	Activity
2021-11-15	0.0	0.0	0.0	1.0	1.0	3.0	3.0	3.0	
2021-11-16	2.0	3.0	1.0	2.0	1.0	3.0	2.0	2.0	
2021-11-17	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	
2021-11-18	2.0	2.0	1.0	1.0	0.0	1.0	1.0	2.0	
2021-11-19	1.0	0.0	1.0	0.0	2.0	2.0	1.0	2.0	
2021-11-20	2.0	0.0	1.0	1.0	2.0	3.0	3.0	3.0	
2021-11-21	3.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	
2021-11-22	3.0	2.0	1.0	1.0	1.0	2.0	3.0	2.0	
2021-11-23	1.0	1.0	2.0	3.0	2.0	3.0	3.0	3.0	
2021-11-24	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	
2021-11-25	2.0	2.0	1.0	1.0	0.0	0.0	1.0	1.0	
2021-11-26	0.0	0.0	1.0	1.0	0.0	1.0	0.0	1.0	
2021-11-27	0.0	0.0	1.0	1.0	1.0	0.0	1.0	3.0	
2021-11-28	3.0	2.0	1.0	1.0	1.0	1.0	2.0	2.0	
2021-11-29	4.0	3.0	1.0	2.0	1.0	1.0	2.0	2.0	
2021-11-30	0.0	0.0	0.0	1.0	0.0	1.0	3.0	4.0	
2021-12-01	2.0	3.0	2.0	1.0	3.0	3.0	3.0	3.0	
2021-12-02	2.0	0.0	2.0	1.0	2.0	3.0	2.0	2.0	
2021-12-03	0.0	0.0	0.0	1.0	3.0	3.0	4.0	2.0	
2021-12-04	2.0	2.0	2.0	0.0	1.0	1.0	2.0	1.0	
2021-12-05	1.0	1.0	1.0	1.0	1.0	3.0	2.0	2.0	
2021-12-06	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	
2021-12-07	2.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	
2021-12-08	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	
2021-12-09	1.0	1.0	0.0	1.0	1.0	1.0	1.0	0.0	
2021-12-10	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	
2021-12-11	2.0	3.0	0.0	0.0	0.0	0.0	0.0	1.0	
2021-12-12	1.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	
2021-12-13	0.0	2.0	1.0	1.0	0.0	0.0	0.0	1.0	
2021-12-14	2.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	
2021-12-15	0.0	1.0	2.0	2.0	2.0	3.0	2.0	2.0	
2021-12-16	2.0	2.0	1.0	1.0	1.0	1.0	2.0	1.0	
2021-12-17	1.0	0.0	1.0	1.0	0.0	1.0	0.0	1.0	
2021-12-18	0.0	0.0	1.0	1.0	1.0	1.0	2.0	1.0	
2021-12-19	0.0	0.0	1.0	1.0	2.0	4.0	4.0	4.0	
2021-12-20	3.0	2.0	3.0	3.0	2.0	3.0	3.0	2.0	
2021-12-21	2.0	1.0	2.0	2.0	2.0	2.0	3.0	0.0	
2021-12-22	2.0	1.0	2.0	1.0	3.0	2.0	3.0	3.0	
2021-12-23	2.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	
2021-12-24	1.0	0.0	1.0	1.0	1.0	1.0	1.0	2.0	
2021-12-25	1.0	1.0	2.0	1.0	2.0	2.0	2.0	1.0	
2021-12-26	0.0	0.0	1.0	1.0	0.0	0.0	2.0	0.0	
2021-12-27	1.0	1.0	1.0	2.0	4.0	3.0	3.0	1.0	
2021-12-28	2.0	1.0	1.0	1.0	2.0	2.0	2.0	0.0	
2021-12-29	1.0	1.0	1.0	1.0	0.0	2.0	2.0	2.0	
2021-12-30	3.0	2.0	1.0	2.0	2.0	1.0	1.0	0.0	

Table 8.2. Thunder and lightning: Date of thunder storms near the observatory and approximate amount of lightnings causing measureable spikes in our records.

Date	Amount
2021-04-22	24
2021-06-05	61
2021-06-10	13
2021-06-21	35
2021-06-30	37
2021-07-14	33
2021-07-17	255
2021-07-18	16
2021-07-22	2
2021-07-24	189
2021-07-25	130
2021-07-28	28
2021-07-31	379
2021-08-01	68
2021-08-08	28
2021-08-10	36
2021-08-16	126
2021-09-12	4

Table 8.3. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
2021, Field component: X, Base: 20900.0, Unit: nT																										
Jan01	106	107	108	108	109	110	111	108	106	104	107	112	114	114	110	106	101	106	109	111	106	105	111	109	108	
Jan02	107	108	109	110	110	111	108	104	99	96	99	107	114	115	115	114	112	112	112	111	110	108	109	108	109	
Jan03	109	112	113	114	114	115	112	107	100	99	107	114	119	119	116	112	112	109	110	112	110	110	110	110	111	
Jan04	113	114	114	115	116	117	114	110	103	99	99	106	114	117	114	110	110	112	114	114	114	113	114	112	111	
Jan05	112	113	113	116	117	115	115	112	107	105	105	118	129	120	103	97	99	108	105	103	99	102	103	116	110	
Jan06	100	109	104	102	105	102	104	112	105	100	101	102	109	103	96	95	97	100	100	100	100	103	107	110	107	103
Jan07	103	102	100	101	107	112	115	114	109	109	108	109	115	116	113	111	109	101	97	95	99	124	106	103	107	
Jan08	103	104	104	106	109	113	116	115	111	111	113	119	121	117	110	109	110	109	110	109	108	107	106	105	110	
Jan09	105	103	103	104	111	109	112	116	113	110	110	112	112	113	112	113	112	111	111	109	108	108	107	106	110	
Jan10	105	105	106	107	109	111	113	116	119	115	114	114	112	114	113	111	105	100	95	98	98	105	105	104	108	
Jan11	104	104	105	107	110	112	115	117	112	115	125	127	133	133	110	73	52	34	67	70	58	73	62	71	95	
Jan12	83	108	95	89	95	95	98	106	108	107	98	100	98	97	...	95	99	100	99	99	101	101	99	101	...	
Jan13	103	102	102	102	104	104	107	108	109	104	99	99	97	98	97	95	96	95	97	98	104	102	108	105	102	
Jan14	105	107	108	109	109	109	110	115	116	120	122	121	119	117	112	108	107	108	107	108	107	105	107	107	106	111
Jan15	107	109	114	111	112	114	114	117	116	114	115	117	118	118	115	111	105	103	100	103	107	109	108	107	111	
Jan16	106	107	109	109	111	114	115	118	117	112	112	116	114	111	109	108	108	106	105	107	106	105	110	106	110	
Jan17	107	107	106	107	109	110	112	115	114	113	113	117	118	117	114	111	110	110	111	110	110	110	109	110	111	
Jan18	108	106	105	106	112	115	115	113	112	114	118	119	119	120	115	111	108	105	104	103	101	100	100	100	110	
Jan19	100	108	103	103	104	107	106	107	107	107	112	118	110	112	112	110	108	108	105	103	105	109	109	108	108	
Jan20	108	110	113	112	112	110	110	102	102	106	105	107	106	105	100	104	112	111	112	106	105	106	107	109	107	
Jan21	110	109	110	112	114	115	115	119	120	120	119	125	124	120	115	110	111	113	112	111	110	109	112	111	114	
Jan22	111	111	113	114	114	115	114	114	115	116	117	120	124	121	118	117	112	113	112	112	112	109	107	108	114	
Jan23	112	111	112	115	116	120	122	123	122	118	117	118	120	117	112	112	112	109	107	105	104	99	103	105	113	
Jan24	106	109	110	111	114	113	115	111	109	106	108	112	115	117	114	120	123	119	107	103	100	103	95	97	110	
Jan25	103	104	105	107	108	115	123	108	98	78	72	92	98	95	88	84	81	86	91	90	87	108	108	73	96	
Jan26	94	88	85	91	100	95	90	91	91	87	86	92	95	97	96	95	91	97	89	84	88	94	98	96	92	
Jan27	95	96	97	100	104	97	97	95	94	91	86	84	96	95	95	86	87	87	98	100	102	101	97	91	95	
Jan28	94	103	102	100	100	98	97	96	91	89	95	102	108	110	105	99	100	101	102	103	104	104	104	103	100	
Jan29	104	103	101	101	102	101	102	104	99	99	104	107	110	110	110	106	101	102	101	100	100	100	100	99	102	
Jan30	101	103	104	103	106	104	102	97	94	95	101	108	113	116	114	105	101	99	103	105	106	106	103	104	104	
Jan31	105	105	106	108	110	111	111	108	101	99	104	110	118	124	125	118	114	113	113	113	112	112	111	110	111	
2021, Field component: Y, Base: 1600.0, Unit: nT																										
Jan01	90	89	88	87	89	91	92	90	89	81	74	80	85	86	85	88	87	88	89	91	94	93	90	88		
Jan02	89	87	87	89	90	93	94	95	92	79	77	83	88	90	89	89	88	88	89	90	91	91	90	89		
Jan03	89	87	86	85	86	89	92	95	94	87	79	81	88	93	90	86	85	87	89	89	90	91	91	88		

Table 8.3 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Jan04	87	88	86	87	87	89	93	95	92	84	79	74	80	87	90	88	87	87	88	89	89	90	88	88	87	
Jan05	88	89	87	88	87	88	89	93	92	88	83	76	78	76	71	67	77	86	89	90	92	95	92	104	86	
Jan06	100	105	98	108	93	90	91	95	89	84	81	80	81	84	90	90	92	98	96	94	94	94	93	94	92	
Jan07	94	93	94	92	92	94	94	92	87	83	80	75	83	90	94	91	90	90	98	95	98	105	97	96	92	
Jan08	93	91	91	89	89	89	90	94	94	90	88	86	86	94	93	90	91	90	91	92	94	94	94	95	91	
Jan09	97	95	94	93	92	92	92	95	93	88	87	85	86	87	89	89	91	92	92	93	93	93	94	96	92	
Jan10	94	91	91	90	89	91	91	95	96	93	87	83	80	80	82	85	83	83	88	98	103	98	97	97	90	
Jan11	96	91	90	88	88	88	91	95	96	91	82	73	64	69	74	71	78	97	106	107	129	138	141	129	95	
Jan12	109	94	103	88	87	88	89	94	95	94	97	95	90	86	...	89	90	90	91	94	99	95	95	95	...	
Jan13	94	91	89	89	88	90	92	93	92	91	88	82	85	86	88	89	90	90	92	96	97	96	96	94	91	
Jan14	93	91	91	89	89	90	91	91	90	89	87	82	81	87	92	89	90	89	91	92	96	94	93	92	90	
Jan15	90	88	89	89	88	89	90	91	90	87	87	84	82	85	89	88	89	85	91	93	96	96	96	95	89	
Jan16	93	90	89	87	89	90	90	89	91	92	88	84	82	88	87	85	87	88	91	91	95	96	96	98	90	
Jan17	96	96	94	95	96	93	93	91	89	88	88	85	84	89	91	88	88	89	91	92	93	94	95	96	91	
Jan18	95	94	93	91	88	92	92	91	89	88	88	84	81	83	86	87	87	89	89	91	99	97	105	106	91	
Jan19	101	109	104	97	95	93	94	92	88	86	85	78	79	82	82	81	83	82	85	88	92	96	95	95	90	
Jan20	94	92	91	92	94	95	94	96	92	88	85	84	83	85	90	89	86	88	88	90	92	96	94	93	91	
Jan21	92	90	89	89	90	92	91	86	83	82	83	81	81	86	88	88	87	89	89	90	91	92	91	92	88	
Jan22	93	92	90	92	92	91	92	89	85	84	84	82	83	86	90	87	88	87	87	92	90	90	92	93	89	
Jan23	91	92	90	88	89	90	90	90	90	86	84	86	83	86	87	85	86	87	92	92	92	95	94	93	89	
Jan24	91	91	92	92	92	91	93	93	88	86	85	86	85	85	92	88	86	83	85	90	89	95	98	95	90	
Jan25	94	94	94	91	90	90	94	95	91	89	87	91	90	88	86	91	80	93	89	98	100	135	151	125	97	
Jan26	122	109	102	99	101	98	99	97	95	92	91	89	89	88	92	92	91	101	104	107	102	106	108	100	99	
Jan27	94	96	94	86	99	100	97	99	95	89	82	87	84	83	92	88	101	92	97	96	97	101	127	103	95	
Jan28	105	101	100	99	99	99	101	99	97	91	86	88	90	94	96	92	91	93	94	95	96	97	98	96	96	
Jan29	94	95	94	95	97	97	98	98	94	85	81	83	82	82	86	89	88	91	92	94	96	99	98	97	92	
Jan30	94	94	95	92	96	97	99	96	90	83	83	83	85	90	96	93	90	89	91	94	95	96	97	97	92	
Jan31	97	97	96	95	95	96	99	100	99	91	84	80	81	87	92	91	89	89	90	91	93	94	94	97	92	
2021, Field component: Z, Base: 43900.0, Unit: nT																										
Jan01	70	69	70	69	70	69	69	70	70	68	64	68	71	70	69	70	71	71	70	70	70	70	69	69	69	
Jan02	69	69	69	69	69	69	70	71	72	70	68	70	72	71	69	69	69	69	69	69	69	70	69	69	70	
Jan03	69	69	68	68	68	69	70	71	72	71	71	74	73	70	67	68	69	70	70	69	69	69	69	69	70	
Jan04	68	68	68	68	68	68	69	69	68	69	69	70	71	70	67	67	68	68	69	68	68	68	68	67	69	
Jan05	67	67	68	68	68	68	69	69	70	69	64	63	64	66	66	69	72	72	72	72	72	72	71	67	69	
Jan06	70	69	70	68	69	69	70	68	68	71	69	68	71	72	72	73	74	74	74	74	73	72	71	70	71	
Jan07	71	71	71	71	71	71	70	69	66	67	68	68	68	71	69	69	70	71	72	72	73	74	69	69	70	

Table 8.3 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Jan08	70	70	70	70	70	70	69	69	68	70	69	67	71	71	68	69	69	70	71	71	71	71	71	71	71	70
Jan09	71	71	71	70	70	70	69	68	66	67	69	68	69	70	68	69	69	70	70	70	71	71	71	71	71	69
Jan10	71	71	70	70	70	69	69	68	67	68	69	69	70	72	70	70	71	73	75	76	76	75	74	73	71	71
Jan11	72	72	71	71	70	70	69	68	67	66	66	60	62	64	64	72	80	89	87	84	84	81	80	80	73	...
Jan12	78	68	69	73	74	74	74	74	73	75	75	74	75	76	...	75	76	75	75	75	74	74	74	74	74	...
Jan13	73	74	74	74	73	73	73	72	72	75	74	73	75	78	75	75	76	76	76	76	75	74	73	73	74	...
Jan14	73	73	73	73	72	72	71	69	70	70	68	66	71	73	72	71	72	72	72	72	72	73	72	72	71	71
Jan15	71	71	70	71	71	71	70	68	68	70	71	66	67	71	70	70	71	73	73	74	74	72	71	71	71	71
Jan16	71	72	71	71	71	71	69	68	69	71	68	66	67	70	70	71	73	73	74	74	74	74	73	72	71	71
Jan17	72	72	72	72	72	72	70	68	67	70	69	65	67	69	69	68	70	71	71	72	72	71	71	71	71	70
Jan18	71	71	71	71	71	70	69	68	68	70	69	67	67	70	70	68	70	71	72	73	74	75	75	75	71	71
Jan19	74	72	72	72	72	72	72	71	71	72	71	66	65	70	71	71	72	73	74	76	76	75	74	73	72	72
Jan20	73	72	71	71	71	71	71	70	70	72	73	73	73	73	74	73	73	73	73	74	74	74	73	73	72	72
Jan21	72	72	72	71	71	71	70	69	71	72	70	67	69	72	71	70	71	71	71	71	72	72	72	71	71	71
Jan22	70	71	71	70	70	70	70	69	70	72	70	70	69	68	68	69	71	71	71	72	72	72	72	72	71	71
Jan23	70	70	70	70	70	70	69	68	69	70	69	67	69	70	70	70	71	71	72	73	73	73	74	73	70	70
Jan24	72	72	72	72	72	72	72	70	68	70	72	69	69	71	70	69	69	70	71	73	75	76	76	77	72	72
Jan25	76	75	74	74	72	71	69	69	69	72	78	75	74	76	76	78	81	81	81	81	81	81	80	78	77	72
Jan26	73	75	76	75	73	74	76	75	75	76	78	78	77	78	78	77	79	79	79	82	81	80	78	77	77	75
Jan27	78	78	77	75	73	75	74	74	75	76	78	80	83	84	81	81	82	82	80	79	78	78	77	80	78	78
Jan28	78	78	76	77	77	77	77	77	76	76	77	78	77	76	76	75	77	77	77	77	77	76	76	76	77	77
Jan29	76	76	76	76	76	76	76	75	78	80	80	78	76	76	75	74	76	77	77	78	78	78	78	77	77	77
Jan30	77	76	76	76	76	76	77	78	79	80	81	82	80	78	77	75	77	78	77	77	77	77	77	77	78	78
Jan31	76	76	76	76	76	75	76	77	78	77	74	73	72	71	72	70	72	74	74	74	74	74	73	74	74	74

2021, Field component: F, Base: 48700.0, Unit: nT

Table 8.3 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Jan12	58	59	54	54	58	58	60	63	63	65	61	60	60	61	60	59	62	61	61	61	61	61	60	61	60	
Jan13	61	61	61	61	61	62	62	62	62	63	60	59	60	63	60	59	61	60	61	61	62	63	62	63	62	61
Jan14	62	62	63	63	63	62	62	62	63	66	65	62	65	67	63	61	62	62	62	62	62	61	62	62	61	63
Jan15	60	61	63	62	63	63	63	62	61	63	64	60	62	65	64	61	60	61	60	60	62	62	62	62	61	62
Jan16	61	61	62	61	62	63	62	62	63	63	60	59	60	61	60	61	62	62	62	62	63	63	62	64	62	62
Jan17	62	62	61	61	63	63	62	61	61	63	61	59	61	63	61	60	61	62	63	63	63	62	62	62	62	62
Jan18	61	60	60	60	63	63	63	61	60	62	62	61	62	65	65	62	61	61	61	61	61	62	61	62	62	62
Jan19	61	62	61	60	60	62	61	61	61	62	63	61	56	61	63	62	62	63	63	63	63	64	65	65	63	62
Jan20	63	63	64	63	63	62	62	58	58	61	61	62	62	61	60	62	64	64	65	63	62	63	63	63	62	62
Jan21	63	62	63	63	63	64	63	64	66	66	65	65	66	67	64	61	62	63	63	63	63	62	63	62	64	64
Jan22	62	62	63	63	63	64	63	62	63	65	64	65	67	65	63	63	62	63	63	63	64	64	63	62	62	63
Jan23	62	62	62	63	64	65	65	65	65	64	63	62	64	64	62	62	62	61	61	62	62	60	61	61	61	63
Jan24	62	63	63	63	64	64	63	60	59	59	61	61	62	64	63	65	66	65	61	61	62	62	62	62	62	62
Jan25	64	63	63	63	62	64	66	60	56	50	52	58	59	60	57	57	58	61	63	62	62	70	64	47	60	
Jan26	58	57	56	58	60	58	58	57	57	57	58	60	61	63	62	61	61	63	61	61	62	64	64	63	60	
Jan27	62	62	62	61	61	60	60	58	59	58	57	59	67	67	65	61	62	62	65	65	65	65	63	62	62	
Jan28	62	65	63	63	63	63	62	61	59	59	62	65	66	67	64	61	63	64	64	64	64	65	64	65	64	63
Jan29	64	63	63	63	63	63	63	63	63	65	66	65	65	66	65	63	62	64	64	64	64	64	64	64	63	64
Jan30	64	64	64	64	65	64	64	63	62	64	67	71	71	71	69	63	63	63	65	65	66	66	66	65	65	
Jan31	65	65	65	65	66	66	67	67	65	62	61	63	66	68	69	65	65	65	66	66	66	65	65	64	65	

Table 8.4. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
2021, Field component: X, Base: 20900.0, Unit: nT																										
Feb01	107	109	113	109	108	113	112	111	107	103	108	114	116	116	110	104	92	90	103	101	100	110	110	111	118	108
Feb02	115	123	120	97	102	99	110	121	117	110	104	99	105	94	79	95	98	96	99	100	102	103	104	104	104	104
Feb03	100	96	99	98	107	107	109	102	97	100	104	111	112	113	110	102	87	95	90	78	66	84	92	91	98	
Feb04	93	93	95	97	100	105	101	98	88	93	95	98	95	100	107	106	106	104	...	...	...	...	...	...	...
Feb05	103	112	107	103	99	100	101	102	98	91	91	95	94	95	99	102	100	100	102	100	103	103	102	107	100	
Feb06	100	100	101	103	104	104	106	108	108	107	108	110	109	111	111	108	96	92	80	67	84	93	104	108	101	
Feb07	104	116	126	121	110	100	94	100	85	77	77	63	95	100	96	95	95	96	96	102	102	100	101	101	98	
Feb08	103	104	103	104	103	104	109	110	113	112	107	102	108	110	108	104	...	...	...	...	...	...	...	...	...
Feb09	102	102	103	104	103	104	106	110	106	104	103	108	110	108	104	101	98	100	102	105	107	107	106	107	106	
Feb10	104	105	107	108	109	110	111	112	109	110	107	106	106	106	110	106	101	98	100	102	105	107	107	106	107	
Feb11	108	108	109	111	113	116	119	120	112	105	104	108	114	115	115	114	111	109	111	112	112	111	111	111	112	
Feb12	...	...	...	...	...	...	...	...	...	...	...	113	110	109	111	110	110	95	85	87	87	101	99	103	...	
Feb13	...	110	108	109	110	113	126	131	127	115	84	88	101	101	98	95	95	96	98	100	99	110	104	100	...	
Feb14	99	98	100	100	100	101	107	113	109	108	106	107	107	103	101	105	107	108	105	104	105	106	106	106	105	
Feb15	107	107	106	107	108	109	107	104	102	100	101	105	113	111	116	112	111	108	109	107	116	114	105	104	108	
Feb16	104	105	105	109	105	98	104	98	100	71	89	98	98	94	86	83	86	93	94	95	99	102	104	105	97	
Feb17	102	102	103	102	100	99	103	107	107	103	100	103	110	103	106	104	100	104	107	100	88	94	92	100	102	
Feb18	101	100	102	106	104	108	110	111	107	107	107	110	115	117	111	107	105	106	106	107	107	106	106	108	107	
Feb19	105	107	103	108	108	110	113	111	110	107	105	100	106	103	76	71	79	55	60	65	78	77	85	87	93	
Feb20	95	92	89	91	96	98	102	122	117	115	113	104	108	96	82	76	72	64	78	97	88	84	91	111	95	
Feb21	90	98	101	99	101	88	92	99	91	80	101	100	80	64	75	80	92	93	92	96	98	95	95	120	93	
Feb22	125	103	96	89	92	99	96	91	89	86	96	96	97	93	91	100	99	102	101	99	112	106	103	106	99	
Feb23	118	109	99	93	97	96	94	100	101	96	91	102	96	94	88	96	96	95	103	106	101	102	99	101	99	
Feb24	97	107	102	101	102	100	91	83	100	80	89	97	103	106	103	102	99	83	78	60	90	85	74	80	92	
Feb25	80	83	86	87	102	106	98	99	97	87	88	98	102	100	97	95	88	79	87	92	103	100	100	107	94	
Feb26	105	96	95	96	98	103	105	105	102	97	90	97	110	104	97	103	103	101	111	113	113	115	124	114	104	
Feb27	105	106	109	111	112	116	116	121	123	120	116	118	118	115	109	108	104	108	109	108	108	110	108	108	112	
Feb28	109	108	109	108	108	108	117	116	113	110	109	113	114	113	114	112	109	106	105	104	100	96	104	114	109	
2021, Field component: Y, Base: 1600.0, Unit: nT																										
Feb01	96	93	96	99	93	95	97	97	94	89	86	85	86	89	89	87	87	85	90	93	94	100	96	94	92	
Feb02	100	89	109	114	114	106	98	91	89	90	91	90	85	79	93	83	85	86	90	92	95	97	102	103	95	
Feb03	104	102	108	111	100	98	97	95	94	91	89	86	87	87	90	86	94	87	89	125	119	104	102	97	98	
Feb04	102	108	107	105	109	100	101	101	99	87	85	79	85	92	95	96	94	94	...	...	...	...	...	...	...
Feb05	100	91	100	102	101	100	100	101	99	92	85	82	80	86	91	91	92	96	94	97	104	104	104	106	96	
Feb06	101	97	97	96	97	97	99	102	104	99	90	86	86	81	79	83	89	89	90	106	112	99	96	95	94	

Table 8.4 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Feb07 105	83	83	101	83	92	97	103	100	93	84	88	90	91	95	97	97	97	96	100	96	97	97	102	99	95
Feb08 97	96	95	94	95	94	95	96	97	97	92	86	83	86	89	92	93	93	93	91	93	96	128	115	100	96
Feb09 96	96	94	93	94	94	97	98	98	92	91	91	90	91	91	94	...	...	...	...	...	...	...	...	...	...
Feb10 96	94	94	93	94	96	98	101	101	95	89	89	94	94	94	96	95	92	95	97	98	97	97	97	97	92
Feb11 95	94	93	93	92	93	95	97	97	94	85	83	83	83	87	86	91	91	94	94	95	112	121	111	106	...
Feb12 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Feb13 ...	106	102	99	104	96	98	102	103	97	91	75	74	79	84	90	91	94	97	99	100	108	112	107	...	...
Feb14 101	99	97	97	101	101	101	104	105	100	92	87	85	88	94	93	92	93	94	96	97	98	99	99	96	...
Feb15 98	98	98	96	95	97	102	107	105	100	90	83	80	83	87	88	89	85	85	89	104	106	104	120	106	96
Feb16 103	99	100	104	102	95	96	106	101	86	78	81	80	83	88	91	88	91	88	90	94	93	97	97	98	94
Feb17 101	99	100	100	102	102	101	103	105	102	94	90	85	88	91	93	97	96	93	96	104	105	105	105	99	98
Feb18 99	102	99	105	105	102	100	101	98	90	83	81	83	89	95	96	94	95	95	95	95	96	98	99	100	96
Feb19 100	99	104	102	104	103	102	104	105	100	86	76	73	74	89	94	75	75	86	106	106	122	117	130	119	98
Feb20 102	103	106	104	106	104	100	87	95	92	85	85	83	76	79	106	116	116	98	100	106	118	117	107	114	100
Feb21 116	122	104	111	116	107	97	97	91	95	88	84	83	94	96	99	99	101	101	101	102	99	103	102	106	101
Feb22 121	123	124	118	122	114	107	107	105	102	97	87	86	78	96	100	98	96	97	100	128	109	106	96	105	105
Feb23 98	98	104	104	104	101	106	111	111	103	88	78	75	77	91	92	89	93	108	102	103	109	114	114	99	
Feb24 105	97	99	104	101	102	102	89	95	95	81	70	82	85	88	88	87	101	120	124	131	121	133	135	101	
Feb25 131	109	113	101	116	110	104	107	108	100	95	89	89	89	91	94	94	110	106	96	111	107	107	107	113	104
Feb26 100	102	103	101	100	99	106	112	114	108	96	91	84	80	81	80	85	91	92	92	97	98	101	107	97	
Feb27 101	97	96	95	96	97	102	110	116	110	101	91	86	87	87	92	93	96	95	96	97	98	102	98	98	
Feb28 98	97	97	97	98	97	100	107	111	107	101	93	86	82	84	90	90	93	93	99	117	124	118	117	106	101

2021, Field component: Z, Base: 43900.0, Unit: nT

Feb01 74	74	73	73	75	74	75	76	77	77	77	75	74	75	72	72	72	76	78	77	78	77	76	75	75
Feb02 73	72	67	70	71	73	71	71	73	74	74	73	73	76	80	77	77	78	79	79	79	79	78	77	75
Feb03 77	77	76	76	76	75	74	76	77	78	77	74	73	74	74	74	76	79	80	82	83	87	84	81	78
Feb04 79	78	78	78	78	77	76	76	77	78	78	79	79	80	78	77	77	77	77	...	...	...	...	...	...
Feb05 77	75	74	75	77	77	77	76	75	77	80	80	79	77	76	77	77	78	78	78	79	79	77	77	77
Feb06 77	77	77	77	77	77	77	76	74	73	74	76	76	74	71	73	77	77	81	83	87	88	85	82	80
Feb07 78	77	70	66	71	72	74	74	73	77	80	82	83	79	78	78	78	80	81	80	80	80	80	79	79
Feb08 79	78	78	78	78	77	76	77	79	80	78	75	72	72	74	...	...	...	...	...	...	...	...	...	...
Feb09 78	78	78	78	78	77	76	76	76	74	74	75	72	72	74	...	...	...	...	...	...	...	...	...	...
Feb10 78	78	77	77	77	77	76	77	76	79	80	80	80	80	78	76	75	75	76	76	76	76	76	76	76
Feb11 77	77	77	76	76	76	75	74	74	73	77	76	75	76	76	75	75	76	78	82	83	84	82	82	80
Feb12 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Feb13 ...	77	77	76	76	75	75	73	72	71	72	74	75	76	74	74	76	79	81	81	81	81	79	78	78

Table 8.4 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Feb14 79	79	79	79	79	79	79	78	78	77	73	73	74	73	75	76	76	78	79	79	79	79	78	78	78	77	77
Feb15 78	78	78	78	78	78	78	79	81	80	79	81	78	74	74	74	75	77	78	78	79	78	77	76	76	77	78
Feb16 78	78	78	78	77	78	79	78	78	77	75	73	72	73	78	81	82	83	85	85	85	84	84	82	82	82	79
Feb17 81	81	80	80	80	80	79	79	78	74	74	74	73	75	77	79	79	79	81	81	81	84	84	84	84	79	78
Feb18 82	81	81	79	80	79	78	78	77	75	74	73	73	75	75	78	78	78	80	80	80	80	80	80	79	78	78
Feb19 79	78	79	78	78	78	78	78	78	76	75	76	75	76	78	84	89	87	93	97	97	97	97	93	90	90	83
Feb20 87	85	85	84	83	83	83	82	79	78	77	73	75	80	83	86	87	91	93	92	89	90	89	88	79	84	
Feb21 79	80	79	78	77	79	79	78	79	79	79	79	80	85	90	91	89	86	86	87	86	86	86	86	81	83	
Feb22 75	75	76	79	79	79	80	80	79	78	79	81	82	83	84	85	84	84	83	84	84	83	83	82	82	81	
Feb23 78	76	77	80	81	82	81	82	81	78	79	80	81	84	87	86	84	85	84	84	84	84	84	84	84	82	82
Feb24 85	82	80	80	82	83	85	88	82	78	72	74	75	80	81	81	81	83	87	92	96	92	90	88	85	83	
Feb25 85	86	85	85	81	81	83	82	79	77	75	76	78	82	82	84	86	87	90	88	86	85	84	83	83	83	
Feb26 81	81	82	83	83	82	84	82	76	72	72	74	76	78	80	81	80	82	83	82	82	82	82	79	79	80	
Feb27 80	81	81	80	80	80	81	80	75	71	70	71	72	71	74	79	81	81	81	81	81	81	81	81	81	78	
Feb28 81	81	81	81	81	81	80	78	77	77	73	66	65	67	71	76	78	79	81	81	82	82	83	82	80	78	
2021, Field component: F, Base: 48700.0, Unit: nT																										
Feb01 64	64	65	64	64	66	66	66	67	66	64	66	67	67	68	63	60	58	60	65	64	64	68	67	69	65	
Feb02 66	68	63	56	59	60	62	66	66	66	65	62	59	61	59	57	61	63	63	64	65	66	66	66	65	63	
Feb03 64	62	63	62	65	65	65	63	62	64	65	65	65	65	66	65	63	59	63	63	60	58	63	64	63	63	
Feb04 62	61	62	64	64	65	63	62	58	61	62	64	62	64	66	67	66	66	65	65	65	65	65	65	66	64	
Feb05 65	66	64	63	63	63	64	63	60	59	61	64	62	61	62	63	64	64	64	65	65	66	66	66	67	64	
Feb06 64	63	64	64	65	65	65	65	65	62	64	67	66	66	65	62	63	61	63	60	59	67	68	70	70	64	
Feb07 66	70	67	62	61	58	58	61	54	53	56	51	66	64	63	62	64	65	65	67	67	66	66	66	66	62	
Feb08 66	66	65	65	66	67	67	67	69	70	68	66	64	66	66	65	64	63	63	67	67	66	63	67	64	66	
Feb09 65	65	65	66	65	65	65	65	65	62	62	64	63	62	62	62	62	64	66	66	66	66	66	66	66	65	
Feb10 66	66	66	66	67	67	67	68	68	67	68	68	68	69	70	66	62	63	65	66	67	67	67	67	67	67	
Feb11 67	67	67	67	67	68	69	70	69	66	62	64	66	67	68	69	67	66	66	67	68	68	67	67	67	67	
Feb12 67	67	67	66	67	68	69	70	68	61	63	66	64	66	64	66	66	66	62	61	63	64	69	68	67	66	
Feb13 68	68	67	66	66	67	71	72	70	65	54	56	62	61	60	60	60	63	65	66	67	66	69	66	65	65	
Feb14 65	65	65	65	65	65	66	68	70	67	63	62	63	63	63	62	65	67	68	67	67	67	67	67	67	65	
Feb15 67	67	66	67	67	67	68	69	69	67	65	67	66	66	67	67	67	66	66	67	68	69	71	70	65	66	
Feb16 66	66	66	68	66	64	66	64	64	64	54	57	58	62	61	60	63	67	67	68	68	69	70	70	70	64	
Feb17 68	68	67	67	66	66	67	69	68	62	61	61	61	65	64	68	67	65	68	69	67	65	67	66	68	66	
Feb18 68	67	68	68	68	68	68	69	69	67	64	63	64	66	69	69	67	67	68	68	69	69	68	68	69	67	
Feb19 67	67	66	68	68	68	69	70	69	67	65	64	61	64	65	59	62	63	57	63	67	73	68	69	71	66	
Feb20 70	67	66	66	67	68	69	74	72	69	65	65	63	69	66	62	62	65	63	67	73	71	68	70	71	68	

Table 8.4 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Feb21	61	66	66	64	65	60	61	65	61	56	65	66	61	59	66	66	68	68	69	70	70	69	69	76	65
Feb22	73	64	62	61	62	65	64	62	61	58	64	65	66	65	66	70	69	70	69	69	75	72	69	70	66
Feb23	72	66	63	64	66	66	65	68	68	63	60	66	64	66	67	69	67	68	71	72	70	71	70	71	67
Feb24	69	71	67	67	68	69	67	66	67	55	53	58	62	68	68	68	68	65	68	64	74	70	63	63	66
Feb25	63	64	65	65	69	70	68	68	64	58	56	61	65	67	66	67	66	64	69	70	73	71	70	72	66
Feb26	69	66	66	67	68	70	72	70	64	57	54	59	66	65	65	68	67	68	73	73	73	74	76	71	68
Feb27	69	69	71	71	71	73	74	75	72	67	64	65	66	64	64	69	68	70	71	70	70	71	70	70	69
Feb28	70	70	70	70	70	69	72	71	69	64	58	58	60	63	68	69	69	69	69	70	69	68	70	72	68

Table 8.5. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
2021, Field component: X, Base: 20900.0, Unit: nT																										
Mar01	115	114	114	92	125	106	...	106	95	88	68	82	97	100	99	85	89	88	81	84	99	86	90	91	...	...
Mar02	91	93	94	95	101	107	112	106	103	107	109	105	107	108	86	90	89	84	88	126	123	91	83	100	...	100
Mar03	83	82	92	102	90	88	87	82	93	78	82	88	89	90	95	91	97	98	101	101	95	112	95	98	92	98
Mar04	106	114	101	88	92	99	98	98	98	88	100	104	110	111	98	82	85	90	98	97	99	94	98	101	98	98
Mar05	110	106	102	102	100	100	101	99	101	96	98	102	107	111	107	106	104	107	107	105	103	107	104	110	104	104
Mar06	107	116	118	126	112	114	104	106	93	92	99	95	95	116	111	106	103	102	101	101	96	94	100	104	105	105
Mar07	104	102	99	101	103	107	110	110	109	101	94	99	103	106	108	106	96	91	97	103	106	108	112	100	103	103
Mar08	101	101	103	105	107	108	111	110	106	100	96	97	102	110	114	112	105	106	106	108	97	98	101	98	104	104
Mar09	100	101	103	105	107	108	111	112	111	101	95	96	100	103	106	104	104	106	109	109	109	109	109	110	105	105
Mar10	109	110	109	109	111	113	111	112	111	105	104	108	110	113	114	110	110	111	112	114	112	112	113	112	111	111
Mar11	112	112	111	110	111	113	115	111	104	98	92	93	99	106	109	108	112	114	115	118	121	119	122	111	110	110
Mar12	110	121	115	119	119	117	107	107	99	97	88	92	97	100	94	87	96	92	80	76	85	88	89	89	98	98
Mar13	84	97	97	103	99	117	109	106	110	98	97	107	108	110	110	108	97	88	86	92	136	114	97	108	103	103
Mar14	105	114	111	96	99	106	109	104	94	88	86	99	106	106	94	83	70	74	86	112	87	83	98	107	97	97
Mar15	93	93	92	94	98	98	97	98	92	84	90	93	97	101	104	99	96	99	102	100	102	105	105	104	97	97
Mar16	100	101	102	101	101	102	102	100	96	93	95	100	105	111	113	108	103	104	106	105	106	107	109	109	103	103
Mar17	110	113	108	106	109	112	111	109	104	98	98	101	105	108	111	102	83	85	89	102	107	108	108	110	104	104
Mar18	108	107	108	114	112	112	112	109	103	97	94	98	101	107	110	111	110	110	110	110	111	112	111	108	108	108
Mar19	119	111	108	107	110	113	114	116	113	111	110	110	105	104	103	100	100	104	112	108	110	114	131	123	111	111
Mar20	127	127	122	126	132	130	106	73	94	82	86	91	84	84	80	83	74	53	81	89	94	98	101	103	97	97
Mar21	106	93	101	93	90	92	91	92	95	100	100	100	93	80	58	50	82	83	104	76	88	111	88	87	89	89
Mar22	102	100	95	93	92	91	92	90	87	84	84	91	97	97	98	96	95	94	101	106	108	106	108	108	96	96
Mar23	107	110	107	103	92	100	99	95	95	96	97	96	99	103	98	92	87	87	89	86	90	98	100	98	97	97
Mar24	103	103	101	104	101	103	96	92	94	91	93	91	93	103	108	108	107	109	111	115	113	113	112	99	103	103
Mar25	93	114	101	95	100	102	107	95	85	98	107	109	100	85	93	99	101	102	102	105	106	108	106	124	101	101
Mar26	113	109	105	106	105	109	99	87	83	87	83	88	85	87	87	85	78	80	88	93	97	98	101	99	94	94
Mar27	100	102	104	106	106	106	105	103	97	91	95	98	103	109	108	106	106	107	109	114	115	119	113	108	105	105
Mar28	95	117	105	102	103	107	107	100	96	96	99	104	108	110	109	104	101	103	105	108	110	110	113	111	105	105
Mar29	110	108	108	107	113	113	116	114	111	107	105	109	111	112	108	107	105	103	105	108	107	114	109	107	109	109
Mar30	108	107	107	109	112	115	118	116	113	110	109	112	117	119	116	113	112	111	107	107	104	104	105	105	111	111
Mar31	...	...	...	...	...	...	...	...	...	96	98	105	104	105	100	96	88	99	108	113	112	114	110	112	...	...
2021, Field component: Y, Base: 1600.0, Unit: nT																										
Mar01	100	105	114	116	100	82	...	113	115	105	95	88	84	83	87	96	103	98	98	111	114	112	111	110	...	...
Mar02	112	105	105	103	104	101	107	109	110	102	92	79	78	80	76	76	105	98	92	107	154	156	138	137	105	105
Mar03	110	111	86	104	102	104	101	99	82	86	83	89	80	89	90	101	98	95	96	98	108	121	110	109	98	98

Table 8.5 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean		
Mar04114	102	119	107	99	101	105	109	110	107	99	88	81	79	84	90	95	94	94	106	103	102	109	105	99	100		
Mar05100	99	102	103	102	103	106	109	109	102	89	82	81	81	89	95	96	95	97	107	108	108	107	104	99			
Mar06103	101	85	91	99	103	105	112	112	101	84	70	76	77	82	93	94	96	105	105	118	113	103	101	97			
Mar07102	103	102	100	101	100	103	109	112	107	99	86	80	80	85	97	101	121	100	100	101	109	117	102	101			
Mar0899	99	99	99	97	98	104	113	120	119	105	87	74	74	83	99	99	99	121	114	119	109	111	112	102			
Mar09104	100	98	99	99	98	105	114	116	113	99	84	75	77	85	96	100	98	99	98	99	99	99	98	98			
Mar1098	98	97	98	98	100	108	117	123	116	100	85	79	78	83	92	96	97	98	98	98	98	98	98	97	98		
Mar1197	97	98	100	101	104	109	117	115	105	91	78	72	72	80	91	95	97	98	97	95	96	96	106	99	96		
Mar1297	94	100	101	98	99	95	93	98	89	77	76	75	73	75	84	91	92	120	110	124	126	132	136	98			
Mar13125	112	103	111	114	103	113	116	111	109	95	81	75	72	77	88	91	97	105	100	121	111	114	99	102			
Mar14100	102	103	112	95	89	83	100	108	100	93	82	82	80	89	96	95	113	108	110	120	128	118	116	101			
Mar15109	110	106	104	109	110	113	117	115	107	93	83	78	82	91	101	105	110	101	101	101	103	103	102	102			
Mar16103	101	100	101	103	105	116	126	128	115	97	82	76	78	88	98	105	101	103	102	101	100	100	101	101			
Mar17102	104	105	103	100	102	109	119	122	115	100	84	77	75	80	88	98	97	101	102	100	100	100	100	99			
Mar18100	101	96	97	100	102	110	120	123	116	104	87	75	73	80	89	96	97	98	99	99	101	107	107	99			
Mar19105	106	105	104	103	104	108	116	117	108	94	82	75	69	76	87	91	93	99	97	98	100	99	107	98			
Mar20108	104	103	101	100	100	119	108	88	95	76	68	88	92	95	99	104	131	123	103	120	131	132	120	105			
Mar21134	118	107	105	109	113	119	120	113	105	92	79	68	61	68	89	120	101	142	107	123	135	120	107	106			
Mar22100	104	108	110	109	112	118	122	115	104	93	84	81	81	88	99	103	100	102	101	103	101	101	101	102			
Mar23102	93	104	112	106	105	115	115	114	105	95	88	84	84	89	105	99	95	103	108	105	109	113	105	102			
Mar2498	118	113	121	114	113	117	113	110	100	86	80	76	80	86	92	95	94	94	95	98	112	114	125	102			
Mar2596	105	135	111	110	101	110	118	111	103	87	78	70	79	82	92	98	96	97	99	101	100	105	118	100			
Mar26100	105	112	114	104	108	113	117	112	107	100	86	79	81	86	94	98	108	105	103	101	104	106	103	102			
Mar27102	103	103	103	105	109	118	126	128	118	101	88	81	80	85	95	99	97	97	97	99	107	120	118	103			
Mar28116	101	107	108	107	111	118	123	120	107	96	85	79	81	86	94	97	95	104	102	101	102	102	103	102			
Mar29103	102	103	105	102	108	119	127	126	114	96	80	71	68	75	87	96	98	97	100	102	103	105	102	99			
Mar30101	103	103	104	105	106	115	125	126	114	97	83	76	76	81	89	94	96	100	109	107	110	108	104	101			
Mar31...	...	...	...	...	...	...	...	...	...	107	94	75	70	71	74	81	101	96	95	98	108	111	117	114	...
2021, Field component: Z, Base: 43900.0, Unit: nT																											
Mar0179	79	76	78	71	72	...	75	77	73	70	73	76	76	79	84	86	87	89	89	87	87	86	86	86	...		
Mar0286	86	86	85	85	84	83	82	81	79	75	74	77	78	83	86	88	88	91	91	90	85	80	81	83			
Mar0385	86	82	78	80	78	79	79	77	70	69	73	80	74	88	88	87	86	86	86	87	84	85	85	82			
Mar0483	79	79	82	83	84	87	88	85	81	76	76	79	83	86	86	87	88	88	87	88	87	87	86	84			
Mar0582	82	82	83	84	85	87	87	82	74	72	74	75	75	78	81	82	83	83	84	85	85	85	84	81			
Mar0683	83	82	76	77	79	82	83	82	77	72	76	80	82	82	84	84	84	84	85	86	86	87	86	85	82		
Mar0784	83	84	84	84	84	84	85	86	83	76	68	74	77	80	83	85	85	87	87	85	84	84	80	83			

Table 8.5 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Mar08	83	83	83	83	83	83	85	87	84	77	68	64	68	72	76	80	82	83	83	83	84	85	84	85	80	
Mar09	85	84	84	83	83	83	82	84	82	73	69	71	79	82	85	86	85	84	84	84	83	83	83	83	83	82
Mar10	83	83	82	82	82	83	86	87	83	77	73	76	79	81	82	83	82	82	82	82	82	82	82	82	82	82
Mar11	82	82	82	82	82	84	83	77	72	69	72	77	78	81	83	82	81	81	81	81	81	81	81	81	80	80
Mar12	81	79	79	79	80	84	83	83	77	76	70	71	74	77	81	86	86	88	86	88	91	93	91	90	89	88
Mar13	89	88	87	86	85	84	83	82	75	66	66	68	72	74	78	82	84	87	90	90	83	80	82	83	81	81
Mar14	80	76	74	75	78	78	75	78	76	72	69	72	73	76	82	89	95	96	95	89	89	91	89	85	81	
Mar15	86	86	87	86	86	87	87	86	83	78	78	80	82	83	87	88	88	87	88	87	87	86	86	85	85	
Mar16	85	86	85	86	86	89	90	88	80	71	71	74	79	83	85	86	85	85	86	86	86	86	85	85	84	84
Mar17	84	83	83	84	84	86	88	88	84	78	76	73	73	75	80	86	89	90	91	89	87	86	85	85	84	84
Mar18	85	84	85	83	83	85	86	85	79	72	66	64	68	72	75	79	81	81	83	83	83	84	83	84	80	80
Mar19	81	82	83	82	83	86	85	80	73	67	68	69	73	77	81	84	85	85	85	85	85	85	85	82	81	80
Mar20	81	81	79	78	77	77	80	87	81	77	79	77	79	82	84	88	91	98	98	94	95	93	88	87	84	84
Mar21	78	82	83	83	86	89	88	86	82	75	72	74	79	86	97	104	105	99	94	95	93	88	87	89	87	87
Mar22	88	86	87	88	89	90	91	90	86	79	75	78	81	85	86	89	90	89	89	89	89	87	87	86	86	86
Mar23	87	86	84	85	86	85	84	83	79	79	78	76	76	78	83	89	92	92	92	92	93	93	91	90	90	85
Mar24	87	86	86	86	86	87	89	89	89	87	86	85	85	87	89	89	87	86	86	86	86	86	86	82	82	86
Mar25	85	75	78	83	84	87	87	88	86	82	77	75	77	85	89	89	88	88	88	88	88	88	88	88	85	84
Mar26	83	84	83	84	85	85	89	90	86	76	75	78	80	85	90	94	95	94	94	94	93	92	91	91	90	87
Mar27	90	89	88	87	88	87	88	91	90	85	78	77	80	84	87	88	87	85	86	86	86	87	87	87	87	86
Mar28	88	85	84	86	86	87	89	88	85	83	82	80	79	83	85	88	87	87	87	87	87	86	86	86	85	85
Mar29	86	86	87	86	87	86	87	90	89	85	76	69	70	75	81	87	88	87	88	88	88	88	87	86	87	84
Mar30	87	87	87	87	86	87	87	87	82	74	68	69	70	74	77	81	83	83	85	85	87	87	87	87	82	82
Mar31	...	...	...	...	...	...	...	...	...	74	70	73	76	80	86	89	93	91	89	88	88	88	86	86	...	

2021, Field component: F, Base: 48700.0, Unit: nT

Mar01	72	72	69	61	69	60	62	65	62	55	43	52	60	62	64	63	67	67	66	68	72	66	68	68	64	
Mar02	68	68	68	68	68	70	72	73	70	67	65	63	65	67	71	64	69	71	69	71	69	71	78	64	61	69
Mar03	64	64	63	65	62	60	60	57	59	47	48	54	61	65	70	69	71	70	72	72	71	76	69	70	64	
Mar04	72	71	66	63	65	70	72	72	70	66	63	64	67	69	67	63	65	68	72	72	72	70	72	72	69	
Mar05	72	71	69	69	70	71	73	73	68	59	57	61	64	65	67	69	69	71	72	72	72	74	72	74	69	
Mar06	72	76	75	73	69	71	70	71	65	60	58	59	63	72	72	71	71	71	71	71	71	70	72	72	70	
Mar07	71	70	69	70	71	72	75	77	73	63	52	55	61	66	69	71	69	69	71	72	73	73	72	68	69	
Mar08	69	70	70	71	72	72	75	77	73	64	54	50	62	68	71	70	71	72	73	73	69	70	71	70	68	
Mar09	71	71	71	71	72	72	73	75	73	60	54	55	64	68	72	73	72	73	74	73	73	73	72	73	70	
Mar10	72	72	72	72	73	74	76	78	74	66	62	65	69	72	74	73	72	72	73	74	73	73	73	73	72	
Mar11	73	73	73	72	72	72	74	77	74	66	58	55	62	66	70	72	73	73	74	74	75	75	75	75	71	70

Table 8.5 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Mar1271	74	72	73	74	74	74	72	72	68	60	51	53	58	62	63	65	70	69	68	68	71	71	71	69	68
Mar1368	72	72	73	71	77	73	71	66	53	52	58	58	61	64	68	71	68	67	69	72	85	72	67	72	68
Mar1468	69	65	60	64	66	65	66	60	53	50	58	61	64	65	67	66	66	70	74	79	70	69	73	74	66
Mar1569	69	69	69	71	72	72	72	66	58	60	62	66	69	73	73	72	72	72	74	72	73	74	73	72	70
Mar1670	72	72	72	72	72	75	77	74	65	56	56	59	67	73	75	75	72	72	74	74	74	74	74	74	71
Mar1774	74	72	72	73	77	79	78	72	64	61	59	61	64	70	72	67	68	71	75	76	75	75	75	75	71
Mar1874	73	74	75	74	76	77	75	67	58	51	51	55	60	65	69	71	72	73	73	73	74	74	74	73	69
Mar1975	72	72	72	72	72	74	77	78	72	65	59	59	58	60	64	67	69	72	75	74	75	77	81	78	71
Mar2079	79	76	77	78	77	77	70	61	64	56	58	58	60	61	66	65	63	63	75	75	74	73	72	69	68
Mar2168	65	70	66	67	71	71	68	65	59	59	60	62	62	62	66	82	76	82	69	73	80	80	68	69	68
Mar2274	72	71	71	71	71	72	73	71	67	59	55	60	65	68	70	73	73	72	75	76	76	75	76	75	70
Mar2375	76	73	72	68	71	70	67	64	63	62	60	61	65	67	71	71	71	71	72	72	72	74	75	76	70
Mar2474	73	73	74	73	74	73	71	72	69	68	67	67	73	77	77	77	75	75	76	78	77	78	74	68	73
Mar2568	67	66	67	70	73	75	71	65	67	66	64	62	63	70	73	74	73	74	74	75	76	77	76	81	71
Mar2675	73	72	73	73	73	75	74	70	65	57	54	58	59	64	69	72	70	70	74	75	76	76	76	75	70
Mar2775	75	76	76	76	76	77	78	77	70	61	60	62	66	72	76	76	74	74	76	78	79	81	79	76	74
Mar2872	78	72	72	73	76	78	74	70	67	67	67	67	68	72	74	75	73	73	75	76	76	76	77	76	73
Mar2975	75	75	75	75	77	79	82	81	76	66	59	59	60	65	69	75	75	73	75	77	76	78	76	75	73
Mar3076	75	75	76	77	79	81	80	74	65	59	61	63	68	69	72	73	74	74	74	75	74	75	75	75	73
Mar3178	74	73	74	74	75	77	77	73	65	59	56	61	63	67	70	72	73	76	78	79	78	79	76	77	72

Table 8.6. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
2021, Field component: X, Base: 20900.0, Unit: nT																										
Apr01	119	106	105	106	109	113	111	106	101	97	99	104	107	109	109	108	107	108	107	110	113	107	105	104	107	
Apr02	110	107	106	107	108	111	111	107	104	106	108	111	113	114	109	106	94	78	78	99	105	107	107	107	105	
Apr03	105	102	104	105	107	107	106	104	98	98	101	101	106	107	108	110	110	108	107	110	115	118	110	110	107	
Apr04	108	105	105	105	104	104	106	107	106	108	108	107	108	110	112	110	111	110	114	115	115	119	118	120	110	
Apr05	119	119	118	119	118	119	120	121	121	120	120	118	113	106	105	107	104	109	113	114	116	119	118	118	115	
Apr06	118	118	118	118	118	119	122	117	114	119	127	132	134	130	126	122	119	116	114	113	108	112	114	113	119	
Apr07	112	114	114	117	116	117	119	124	121	100	103	104	110	109	81	48	82	93	94	100	101	103	103	105	104	
Apr08	106	105	103	102	100	101	104	102	101	98	94	93	98	101	100	99	102	103	108	110	116	112	109	109	103	
Apr09	110	109	108	107	113	114	113	108	102	99	100	103	109	113	112	108	108	109	110	111	112	112	111	111	109	
Apr10	110	110	111	113	112	112	113	110	104	101	101	103	108	108	110	108	97	102	111	112	112	110	107	111	108	
Apr11	108	108	111	114	116	113	108	104	99	95	97	103	106	107	109	109	110	108	107	114	104	101	108	116	107	
Apr12	112	110	113	113	115	113	111	110	108	109	119	117	118	114	111	104	102	103	110	111	111	111	111	113	111	
Apr13	113	113	112	113	112	111	112	106	102	103	98	98	112	112	114	116	115	110	113	109	111	112	118	115	110	
Apr14	113	114	113	115	115	116	118	115	109	105	112	119	116	119	118	115	112	111	120	122	122	125	121	141	117	
Apr15	126	111	115	119	120	111	101	112	112	117	118	119	126	125	118	120	113	113	115	114	118	116	115	113	116	
Apr16	125	123	120	110	107	107	112	111	102	107	110	114	97	82	85	101	110	105	85	51	67	89	112	92	101	
Apr17	89	116	123	104	90	97	95	74	60	80	91	93	85	104	100	92	96	75	93	108	92	102	104	111	95	
Apr18	121	129	112	98	101	92	83	83	80	66	83	101	94	95	94	93	95	101	96	98	113	113	97	100	97	
Apr19	99	98	115	115	110	99	89	88	81	70	89	103	100	89	92	86	92	101	116	125	100	92	104	108	98	
Apr20	108	104	102	99	104	104	105	93	86	86	98	102	102	101	102	106	108	100	119	98	95	98	104	107	101	
Apr21	105	98	97	98	102	99	102	94	95	93	102	104	103	103	100	98	98	100	103	105	104	106	105	104	101	
Apr22	106	109	105	106	106	105	102	96	89	94	104	116	...	114	111	109	108	111	111	113	113	114	112	120	...	
Apr23	112	116	114	107	108	105	104	108	105	104	113	118	121	113	107	108	102	108	116	123	124	121	121	135	113	
Apr24	102	104	99	99	101	91	92	88	88	96	101	107	109	102	97	98	101	105	111	106	102	103	102	112	101	
Apr25	140	126	112	109	112	91	83	84	82	79	76	78	84	90	88	88	89	93	101	108	108	105	107	105	97	
Apr26	126	134	116	118	118	112	103	85	81	87	96	99	94	93	92	96	98	98	100	100	100	102	101	102	102	
Apr27	102	119	107	103	92	92	87	85	80	82	99	105	103	98	96	99	101	101	102	103	104	102	102	98		
Apr28	103	101	101	101	98	94	89	85	85	92	100	110	116	115	112	114	113	112	112	111	111	110	109	109	104	
Apr29	109	110	108	109	109	106	103	96	89	88	102	114	113	109	106	102	108	109	114	119	125	124	124	124	109	
Apr30	122	120	123	124	125	121	115	106	100	99	104	117	126	124	123	125	123	109	108	119	120	121	120	124	118	
2021, Field component: Y, Base: 1600.0, Unit: nT																										
Apr01	116	104	105	108	103	105	111	120	118	108	92	81	76	78	86	94	95	97	99	108	104	105	110	108	101	
Apr02	102	105	106	106	105	109	118	123	121	112	95	80	74	74	80	83	96	91	99	100	100	103	102	103	99	
Apr03	105	108	107	108	108	108	115	116	114	109	96	83	79	85	95	98	99	99	98	100	103	108	104	105	102	
Apr04	104	105	106	107	109	111	117	119	114	104	95	84	78	83	87	96	97	99	99	99	100	99	99	96	100	

Table 8.6 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Apr05 99	102	105	108	110	109	113	119	116	102	86	74	71	79	91	101	101	101	99	99	99	99	97	97	98	99
Apr06 99	101	104	105	107	106	109	113	110	102	91	80	77	81	87	94	97	96	96	96	97	101	100	99	99	98
Apr07 101	102	101	105	111	111	110	112	109	101	88	78	77	75	77	93	94	103	129	107	103	101	102	102	100	
Apr08 102	103	106	108	109	110	117	121	121	115	104	88	78	80	89	98	101	103	106	105	109	101	101	103	103	
Apr09 103	104	105	105	106	110	118	124	124	119	107	91	82	84	89	95	101	99	100	101	101	101	101	102	104	103
Apr10 102	102	101	104	108	112	117	120	115	107	97	87	78	77	83	89	99	97	100	101	103	114	109	114	102	
Apr11 109	102	103	108	110	117	125	129	130	123	107	87	76	75	82	90	95	99	99	102	107	108	104	103	104	
Apr12 102	103	103	103	105	107	114	119	117	113	104	80	72	69	75	86	92	113	106	103	104	106	107	106	100	
Apr13 105	105	103	105	107	109	112	118	122	120	107	85	65	65	72	82	87	89	92	101	108	106	103	104	99	
Apr14 104	103	104	105	105	106	113	119	120	116	104	83	69	71	75	84	92	100	99	100	101	101	103	101	99	
Apr15 113	108	104	103	106	109	97	109	117	105	92	81	75	76	82	84	92	97	100	100	101	104	105	106	99	
Apr16 104	107	105	109	113	114	120	129	130	115	96	71	57	53	65	80	88	96	136	153	129	122	126	143	107	
Apr17 132	118	132	132	127	116	124	122	106	99	90	74	80	73	81	96	122	110	125	126	114	107	103	94	108	
Apr18 106	123	113	117	116	114	112	111	107	101	97	87	84	80	82	93	97	109	113	113	110	117	125	126	110	107
Apr19 110	111	107	115	118	122	128	125	114	104	96	87	76	84	87	93	100	110	120	131	131	133	121	104	109	
Apr20 103	115	117	117	114	119	126	131	121	110	100	84	71	76	84	99	105	108	132	123	120	127	122	110	110	
Apr21 105	108	111	113	120	116	119	120	116	104	90	77	71	81	88	98	105	109	111	110	107	107	106	106	104	
Apr22 102	102	105	110	115	121	124	122	110	93	82	72	...	82	89	97	102	102	101	101	101	103	103	114	...	
Apr23 108	99	105	116	118	123	119	113	108	100	89	82	78	80	85	87	110	108	98	97	105	117	107	125	103	
Apr24 123	119	118	118	118	118	115	111	109	101	96	93	88	88	91	99	100	102	108	114	116	114	113	115	110	108
Apr25 108	134	121	123	144	129	135	136	118	100	88	75	67	82	88	92	100	105	117	106	106	111	110	111	109	
Apr26 111	118	123	110	97	102	111	121	120	111	98	81	76	78	86	95	102	108	108	108	109	110	113	119	105	
Apr27 119	121	124	117	114	119	128	128	116	107	95	87	82	82	89	100	105	108	109	109	112	113	111	112	109	
Apr28 112	114	110	115	119	123	125	121	110	98	85	72	66	70	82	91	97	100	101	103	105	110	108	109	102	
Apr29 109	108	110	107	117	121	125	122	109	91	73	62	60	68	81	90	99	102	101	100	98	99	101	102	98	
Apr30 104	105	106	109	114	121	126	123	111	95	81	71	72	77	86	95	103	105	105	105	95	96	99	101	104	100
2021, Field component: Z, Base: 43900.0, Unit: nT																									
Apr01 83	85	85	86	86	87	88	88	83	72	70	72	73	76	82	85	86	86	88	87	87	87	87	87	88	83
Apr02 87	86	87	87	87	89	90	88	83	77	72	75	79	83	85	89	94	98	99	96	93	91	90	89	87	87
Apr03 89	88	88	88	88	88	89	85	79	75	71	72	76	81	84	87	87	87	88	88	87	85	86	86	84	84
Apr04 86	86	87	87	87	88	88	85	80	75	70	69	71	74	78	82	85	85	86	86	86	86	85	85	82	82
Apr05 84	84	84	84	83	85	87	84	77	71	65	67	74	81	83	85	86	86	86	86	85	85	85	85	82	82
Apr06 85	85	85	85	84	83	83	83	82	79	75	71	69	73	76	80	82	83	85	86	87	87	87	87	86	81
Apr07 86	86	86	85	84	83	83	81	77	75	72	69	73	83	94	104	96	95	96	94	91	91	90	90	86	86
Apr08 89	89	89	89	89	89	89	90	85	80	74	73	77	81	85	89	89	88	88	88	87	86	87	87	86	86
Apr09 87	87	87	87	87	87	88	89	88	85	81	74	70	72	75	81	86	87	86	87	87	87	87	87	87	84

Table 8.6 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Apr10 87	87	87	87	87	87	87	88	86	86	82	75	72	73	76	80	85	90	89	88	88	88	87	88	86	85	
Apr11 87	88	87	87	87	87	90	94	94	89	83	75	71	71	74	79	83	86	88	89	88	90	91	90	90	88	85
Apr12 88	87	88	87	87	87	87	85	83	85	82	75	72	71	79	85	87	90	91	92	91	90	90	89	89	85	
Apr13 89	88	88	87	86	86	86	86	87	86	78	68	68	69	69	82	86	89	88	89	89	89	89	87	87	85	
Apr14 87	87	87	87	86	87	88	88	88	85	79	68	61	59	69	78	83	86	86	86	85	86	86	86	82	82	
Apr15 80	83	85	84	83	86	87	79	80	78	69	61	62	68	75	82	84	86	86	86	86	86	86	86	80	80	
Apr16 86	85	85	86	87	88	86	84	84	78	70	67	72	83	86	88	88	89	95	98	101	103	99	88	89	86	
Apr17 91	89	79	81	81	80	80	80	83	87	83	78	75	78	85	87	94	101	105	100	97	96	95	94	90	88	
Apr18 84	80	79	85	87	89	91	91	89	89	86	84	87	87	87	91	94	95	96	97	96	97	95	90	90	90	
Apr19 90	90	88	83	83	83	88	90	91	88	87	82	77	78	85	93	96	97	97	94	92	93	93	90	90	89	
Apr20 89	88	89	89	88	90	91	88	88	88	80	73	75	80	85	92	96	99	96	99	96	95	94	93	91	89	
Apr21 89	91	92	93	93	94	94	94	94	89	81	76	79	86	91	93	95	94	93	93	93	93	93	92	92	91	
Apr22 92	91	91	90	91	92	92	92	89	85	81	75	71	...	78	81	85	88	89	89	90	90	90	91	88	...	
Apr23 89	88	86	88	89	87	86	83	81	79	71	63	67	73	79	85	91	93	93	90	91	91	91	91	82	84	
Apr24 86	88	90	92	93	93	93	92	90	86	82	78	75	77	83	90	91	93	93	92	93	94	94	93	93	89	
Apr25 84	76	79	79	78	83	89	89	87	83	86	85	87	91	96	98	98	98	98	97	95	95	95	94	94	89	
Apr26 91	81	81	81	77	79	84	89	86	83	81	82	85	90	91	92	94	94	94	93	94	94	93	94	93	88	
Apr27 93	89	88	89	93	96	97	96	94	92	90	83	84	89	88	91	93	93	93	93	93	93	93	93	93	91	
Apr28 93	93	93	93	94	93	94	93	91	84	75	70	67	72	78	84	89	90	90	90	90	91	91	92	91	87	
Apr29 92	91	91	92	92	92	90	87	83	78	70	66	73	76	82	86	90	91	90	90	90	90	90	90	90	86	
Apr30 90	90	90	91	92	90	91	91	90	88	79	72	71	76	84	88	88	91	92	92	91	90	90	90	89	87	
2021, Field component: F, Base: 48700.0, Unit: nT																										
Apr01 77	73	73	74	76	78	78	78	76	70	58	56	60	62	65	71	74	74	75	76	77	78	76	75	75	72	
Apr02 77	75	75	76	76	79	80	77	71	66	63	66	66	70	74	74	76	76	73	74	80	80	79	79	78	75	
Apr03 76	75	76	75	76	77	77	73	65	61	58	58	58	64	70	73	77	77	76	76	77	79	79	76	76	73	
Apr04 75	74	75	75	74	75	76	74	69	65	60	59	61	64	69	72	75	75	75	77	78	77	79	78	79	72	
Apr05 78	78	78	78	77	79	81	80	73	66	61	62	65	69	70	74	73	75	77	77	77	77	78	79	78	74	
Apr06 78	78	78	78	77	77	77	78	75	71	70	70	70	72	73	76	76	76	76	76	77	76	78	78	77	75	
Apr07 77	77	77	77	77	77	77	77	77	73	62	60	57	64	72	69	65	72	77	79	79	77	77	76	77	73	
Apr08 77	77	76	75	74	75	77	76	72	66	58	57	62	67	70	73	75	75	75	77	78	79	77	76	76	73	
Apr09 77	77	76	76	78	80	81	77	72	67	60	58	62	66	71	75	76	76	76	76	77	77	77	77	77	74	
Apr10 77	77	77	77	78	78	78	79	77	74	68	62	59	62	65	69	74	74	75	78	78	78	78	77	77	74	
Apr11 76	76	77	78	80	81	83	81	74	68	61	59	60	63	69	73	75	76	77	78	80	77	76	79	80	74	
Apr12 78	78	77	78	78	79	77	74	75	72	65	67	64	72	76	77	76	78	78	78	80	80	80	80	79	76	
Apr13 80	79	78	78	77	77	77	74	74	73	63	54	60	66	73	77	77	80	78	79	78	79	79	81	79	75	
Apr14 78	78	78	78	79	78	79	82	80	75	68	61	56	53	63	71	74	76	76	80	80	80	82	80	86	75	

Table 8.6 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Apr15 77	74	77	78	78	78	76	73	71	72	72	64	57	60	65	68	76	75	76	78	78	79	78	78	77	73	
Apr16 82	81	80	76	76	76	77	77	76	71	68	61	59	56	59	63	73	78	81	77	66	74	79	79	72	72	
Apr17 72	82	76	70	63	65	65	65	58	55	60	60	57	57	71	72	75	84	78	82	86	78	81	81	79	71	
Apr18 79	79	71	70	73	71	69	69	66	66	59	64	69	69	73	75	76	79	82	80	80	85	82	74	75	74	
Apr19 75	75	80	76	74	73	72	72	72	65	59	64	64	63	65	73	74	77	82	86	88	79	75	78	79	74	
Apr20 78	76	76	74	75	77	79	71	67	67	67	65	60	62	66	71	79	84	84	90	80	78	79	80	80	75	
Apr21 77	76	76	77	79	79	79	80	77	77	71	67	64	65	72	75	77	79	79	80	80	80	80	79	79	76	
Apr22 80	79	78	78	79	80	80	78	73	67	64	63	63	65	70	71	74	77	78	79	80	81	81	81	82	75	
Apr23 79	80	78	76	78	76	74	73	69	67	63	58	63	65	67	73	77	82	82	86	86	86	85	85	84	75	
Apr24 73	76	75	77	79	74	74	70	66	66	66	64	64	67	69	74	75	78	80	82	81	80	80	80	83	74	
Apr25 87	75	71	70	71	66	68	69	65	60	61	60	60	64	71	75	77	77	79	82	83	83	82	82	81	73	
Apr26 88	82	75	75	71	71	72	68	64	63	65	67	67	67	71	72	75	78	78	78	79	79	79	79	79	74	
Apr27 79	83	77	76	74	77	77	75	70	69	74	70	70	70	72	71	74	77	78	79	79	80	80	79	79	76	
Apr28 79	78	79	79	78	76	75	72	70	66	61	60	60	60	64	69	76	79	80	81	81	81	81	81	81	74	
Apr29 81	81	80	81	81	80	78	71	64	59	57	59	57	64	65	69	72	79	80	82	84	85	85	85	85	75	
Apr30 84	84	85	85	87	88	85	84	80	75	73	67	65	69	72	79	84	86	81	80	84	84	84	84	83	85	80

Table 8.7. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean		
2021, Field component: X, Base: 20900.0, Unit: nT																											
May01124	119	115	114	116	115	113	108	101	103	108	114	119	124	123	122	119	119	121	118	117	116	116	114	121	116	116	
May02111	109	119	125	112	105	97	105	110	108	111	112	112	109	109	111	112	120	119	121	123	124	124	124	132	114	114	
May03129	122	124	124	126	121	110	103	97	100	105	105	108	104	107	110	110	110	110	110	110	110	112	113	114	112	112	
May04113	117	114	114	114	110	110	111	108	105	107	115	116	114	111	112	114	115	110	112	115	116	116	115	115	113	113	
May05115	114	114	116	117	112	106	103	98	100	107	118	122	120	...	114	113	114	115	117	121	119	118	119	...	...	...
May06119	117	118	119	119	112	113	109	105	101	109	123	127	116	110	108	109	109	115	117	117	117	117	117	117	116	114	
May07115	115	114	117	118	113	106	99	99	108	120	131	129	119	112	115	116	115	115	119	121	119	119	119	118	116	116	
May08118	117	118	118	116	110	106	104	106	112	120	126	119	122	117	115	114	115	116	116	117	118	118	118	118	116	116	
May09116	117	116	117	116	109	104	102	103	111	119	125	125	123	117	115	114	114	121	125	125	128	128	125	117	117	117	
May10127	128	132	133	130	118	111	106	110	116	122	123	124	120	114	110	99	101	107	113	110	107	111	114	116	116	116	
May11114	115	115	118	116	110	104	96	89	96	110	118	121	119	115	114	114	115	117	118	118	118	118	116	113	113	113	
May12119	120	118	121	123	119	109	120	124	123	138	143	138	69	72	41	69	77	87	93	89	81	101	87	103	103	103	
May1387	86	93	101	100	95	...	...	...	...	89	90	100	102	100	100	98	95	95	101	101	103	99	105	108	...	...
May14101	102	103	105	106	101	94	88	85	87	98	107	108	109	108	109	111	113	114	113	109	103	104	109	104	104	104	
May15114	117	111	112	112	111	104	83	75	79	88	98	104	103	100	104	105	108	105	107	108	110	107	105	103	103	103	
May16105	105	104	107	108	103	97	86	80	85	96	100	105	113	115	115	114	111	106	99	98	98	98	100	102	102	102	
May17103	104	107	107	106	105	99	90	90	96	94	101	103	106	112	108	115	123	119	117	118	112	112	112	112	107	107	
May18112	110	119	117	117	109	94	93	100	99	99	100	109	110	106	108	109	110	111	111	111	113	114	113	113	108	108	
May19114	113	117	119	117	118	113	115	117	117	120	117	119	117	118	120	119	119	119	118	113	116	127	122	118	118	118	
May20133	123	118	120	114	111	104	98	100	99	97	94	75	103	98	85	90	86	117	97	97	111	99	110	103	103	103	
May21111	100	100	107	103	97	93	84	89	86	91	102	106	107	108	110	110	107	110	109	104	104	105	105	102	102	102	
May22108	109	106	107	107	105	97	95	95	93	96	106	115	120	117	108	107	109	110	109	118	108	107	106	107	107	107	
May23106	107	108	109	111	108	104	98	94	96	101	104	103	103	103	103	105	109	109	108	109	106	105	109	105	105	105	
May24109	106	109	109	106	99	94	93	96	103	110	117	119	111	111	111	111	111	111	115	115	112	110	111	112	109	109	
May25114	115	116	117	114	105	99	97	102	104	106	108	108	108	111	114	116	120	120	121	119	119	120	113	112	112	112	
May26116	114	116	119	118	109	96	91	92	95	97	100	107	121	127	137	146	141	146	115	123	124	135	132	117	117	117	
May27169	125	133	139	122	113	99	73	59	76	84	89	90	99	99	96	102	94	102	110	108	111	112	110	105	105	105	
May28110	112	111	113	115	106	99	90	87	92	99	106	109	104	103	104	107	110	109	112	112	113	113	111	110	106	106	
May29109	109	110	112	115	117	114	108	106	104	104	104	109	120	106	101	105	105	113	116	124	124	111	110	111	110	110	
May30113	114	111	113	116	113	107	102	96	94	93	99	103	104	104	108	113	117	119	120	123	118	117	121	110	110	110	
May31112	112	113	116	116	109	97	90	93	101	109	110	111	108	104	102	103	107	114	115	115	115	115	114	113	108	108	
2021, Field component: Y, Base: 1600.0, Unit: nT																											
May01106	105	106	109	117	124	130	129	120	105	96	89	85	85	88	92	96	98	96	97	100	102	106	111	104	104	104	104
May02110	109	104	121	134	134	136	125	114	99	83	76	70	72	78	88	97	99	99	100	101	102	103	104	102	102	102	102
May03107	108	107	109	116	122	123	123	113	104	91	86	82	86	92	97	102	105	105	104	105	103	104	105	104	105	104	104

Table 8.7 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean		
May04106	107	109	112	118	122	124	122	124	122	115	103	93	88	89	90	92	94	98	101	103	103	101	102	103	104	104	
May05106	108	109	111	119	123	120	119	110	97	86	80	81	90	90	...	101	103	105	103	103	103	102	101	104	103	...	
May06102	103	105	110	120	129	130	124	113	100	88	85	84	89	89	99	103	106	105	101	100	100	100	100	101	102	104	
May07103	103	105	111	119	123	125	127	122	110	96	87	89	89	93	97	102	107	105	104	103	102	102	101	103	106		
May08101	102	106	110	119	123	125	123	117	95	81	77	87	87	95	99	103	105	104	103	103	102	101	101	101	103		
May09104	105	107	111	122	131	135	132	119	100	86	78	79	82	87	90	94	97	98	98	98	99	99	100	103	102		
May10105	106	109	114	126	130	128	118	105	94	80	69	68	73	87	96	98	98	103	103	112	121	110	110	111	103		
May11107	108	107	113	126	128	127	121	108	88	70	60	60	71	83	94	103	104	101	102	103	105	105	105	100	100		
May12107	105	107	112	119	127	134	116	102	86	64	50	23	39	69	81	103	101	104	104	108	117	117	117	115	96		
May13117	119	124	127	131	131	...	...	...	94	80	73	81	93	101	104	106	107	112	115	111	113	112	112	...	...
May14116	115	116	118	121	125	128	127	120	106	91	84	83	85	92	98	102	101	101	107	115	115	112	112	108	108		
May15107	108	113	113	119	127	137	136	119	104	89	75	68	71	79	88	98	105	109	108	109	112	111	110	105	105		
May16111	111	112	114	122	131	138	138	126	108	96	81	79	86	90	96	100	106	113	115	112	112	112	109	110	109		
May17112	114	115	118	124	132	131	129	123	111	99	89	84	83	86	93	98	97	110	112	111	116	111	109	109	109		
May18111	114	107	113	137	142	142	134	128	113	91	79	76	77	84	87	98	102	104	103	103	103	106	108	110	108		
May19110	113	114	120	127	134	138	135	127	115	101	91	82	79	85	90	95	98	103	101	102	100	98	106	107	107		
May20101	113	108	129	137	139	134	130	119	115	98	75	80	83	76	88	102	118	137	109	109	113	117	115	110	110		
May21124	129	127	127	129	133	132	127	117	107	101	92	86	85	86	95	100	104	106	108	108	108	109	112	111	111		
May22109	113	116	119	128	137	145	141	134	119	100	88	83	87	95	99	106	108	108	111	122	113	111	113	113	113		
May23113	113	115	122	130	135	135	134	124	107	91	75	69	73	81	94	104	107	107	107	110	111	112	113	108	108		
May24117	113	109	116	126	137	139	135	125	110	92	80	75	80	89	102	113	114	109	108	108	108	108	108	109	109		
May25108	108	108	113	124	135	139	135	125	109	90	79	79	85	96	103	109	108	104	104	108	111	114	112	109	109		
May26112	114	115	120	130	140	139	135	125	109	95	79	70	68	74	80	84	91	105	106	103	104	104	102	104	104		
May27113	118	116	130	137	147	151	133	107	91	81	79	82	88	95	96	99	106	108	107	109	106	108	110	109	109		
May28110	112	113	118	127	129	130	124	113	99	86	84	82	86	92	99	104	107	109	109	108	108	108	109	110	107		
May29111	113	115	119	125	129	131	133	132	122	108	95	92	87	93	95	100	104	110	106	100	103	109	111	110	110		
May30112	114	116	123	132	135	134	130	119	105	92	85	82	84	89	95	98	101	103	105	107	110	112	117	108	108		
May31118	117	118	121	121	124	125	124	120	110	98	88	86	88	88	91	100	106	105	104	106	108	109	110	110	109		
2021, Field component: Z, Base: 43900.0, Unit: nT																											
May0189	89	90	92	94	91	91	87	84	83	79	74	73	77	81	87	89	90	90	91	91	92	91	92	91	89	87	
May0290	90	90	85	87	84	81	82	78	77	77	71	71	77	83	87	88	88	88	89	89	89	89	89	89	88	84	
May0388	88	88	90	91	90	89	86	84	81	79	76	79	82	84	88	91	90	90	91	91	91	91	91	90	90	87	
May0490	90	90	91	92	90	91	89	88	87	85	80	77	80	83	87	88	89	91	91	91	91	91	91	90	90	88	
May0590	90	90	92	94	90	88	86	84	84	82	80	79	82	...	86	88	88	89	90	90	90	90	90	90	90	...	
May0690	90	90	91	93	90	86	83	83	84	83	79	81	85	86	89	90	90	90	90	90	90	90	90	90	90	88	
May0790	90	91	93	94	90	90	89	84	78	74	76	80	79	81	85	88	88	88	89	89	88	89	89	89	89	86	

Table 8.7 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
May0889	89	90	91	92	89	89	89	88	80	75	75	79	82	83	86	89	89	87	88	89	89	89	89	90	87
May0990	90	90	92	94	93	86	81	73	66	63	63	67	72	77	82	84	86	87	87	88	88	88	88	88	83
May1088	88	88	89	91	90	89	83	77	74	75	75	75	80	84	85	91	94	94	93	93	93	93	92	92	87
May1192	91	92	93	94	92	91	90	83	79	74	79	76	74	79	85	88	89	89	89	90	90	90	91	91	88
May1291	90	90	92	95	95	93	88	81	79	74	72	81	93	118	139	124	112	104	102	102	102	103	99	99	97
May1399	100	100	99	98	98	...	...	...	...	87	83	80	80	84	89	96	99	99	98	98	97	97	97	95	...
May1495	96	96	97	95	96	97	97	92	85	82	84	85	88	91	94	94	94	94	95	96	96	96	97	96	93
May1596	91	93	95	97	98	98	98	96	90	82	78	77	81	84	86	92	95	96	97	97	96	95	95	92	92
May1695	95	95	98	99	99	99	98	92	81	75	69	70	76	80	86	92	95	96	99	99	99	99	99	91	91
May1796	96	96	97	97	96	97	93	86	79	77	79	79	80	86	93	94	96	96	97	98	97	97	97	96	92
May1895	95	94	90	89	90	87	84	78	77	79	77	77	83	87	92	96	96	96	95	96	95	95	95	95	89
May1995	94	94	95	95	95	93	92	85	82	78	74	74	77	83	88	91	94	94	94	95	94	94	93	92	89
May2090	89	89	89	91	90	88	86	84	83	79	80	80	80	85	96	104	107	111	107	103	102	97	97	94	93
May2191	92	94	96	95	93	90	88	82	76	76	74	78	74	83	91	95	97	98	97	97	97	97	97	97	90
May2296	94	95	97	98	98	99	95	89	86	82	81	85	90	94	98	98	98	98	98	99	96	96	97	97	94
May2397	96	97	98	97	98	97	89	87	86	85	84	81	75	77	86	92	96	99	99	98	98	98	97	92	92
May2496	97	97	98	99	95	92	90	85	85	82	82	82	83	87	91	98	97	93	93	94	95	95	95	95	92
May2595	95	96	98	100	96	93	90	86	81	79	80	80	83	87	90	95	94	92	93	95	94	93	92	93	91
May2693	95	96	97	98	92	90	87	85	83	80	80	80	78	83	89	90	89	94	97	96	95	94	94	90	90
May2785	88	89	90	94	98	98	95	89	85	81	81	81	84	92	97	100	104	104	102	100	99	98	98	94	94
May2898	98	100	101	100	100	98	97	91	85	81	75	77	83	89	94	96	97	98	98	97	96	96	96	96	93
May2996	97	97	98	98	97	96	92	88	82	78	80	82	89	96	98	99	100	100	100	97	97	96	96	96	94
May3096	95	96	98	98	97	96	94	88	85	81	83	83	85	91	96	96	96	96	95	96	95	95	95	93	93
May3194	95	95	97	98	95	93	90	87	84	84	81	81	81	81	83	87	89	91	93	94	95	95	96	95	91

2021, Field component: F, Base: 48700.0, Unit: nT

May0184	82	84	86	84	82	77	71	70	68	67	68	67	68	73	76	81	82	83	83	84	84	83	83	84	79
May0280	80	83	82	78	73	67	71	69	67	67	62	62	66	66	72	76	78	81	81	83	84	85	84	87	76
May0386	83	84	85	87	85	79	73	69	67	67	65	65	68	69	72	77	78	80	80	81	80	81	81	81	78
May0481	82	81	83	84	80	81	79	77	75	73	72	70	72	74	77	79	81	80	82	82	82	82	82	82	79
May0582	81	82	84	86	81	76	73	70	70	71	73	74	76	76	76	77	79	80	81	83	84	83	83	83	79
May0683	83	83	85	86	81	78	73	72	70	72	74	78	77	75	78	79	79	81	83	83	83	83	82	82	79
May0782	82	82	86	87	81	78	75	70	68	69	75	78	73	72	77	78	80	80	80	82	83	82	82	82	79
May0882	82	83	84	84	79	78	76	69	67	70	76	76	78	78	81	80	79	80	81	82	82	82	82	82	79
May0982	82	83	85	87	82	74	69	62	58	59	64	68	73	75	76	78	78	81	84	84	84	86	86	84	77
May1085	85	87	89	90	84	80	72	68	67	70	70	75	77	76	81	78	79	81	84	83	81	82	83	79	79
May1183	83	83	86	86	82	80	75	71	66	68	69	68	72	76	79	81	81	82	82	83	83	83	83	83	79

Table 8.7 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
May1284	84	84	84	87	90	88	83	82	78	74	76	76	81	62	88	94	93	85	82	83	81	80	84	78	82
May1378	79	82	84	84	84	82	79	73	68	67	64	65	66	69	74	79	82	81	83	83	83	82	84	83	77
May1481	82	82	84	83	82	82	79	77	71	65	67	72	74	76	79	82	83	84	86	86	85	83	83	85	80
May1587	83	83	85	87	88	86	86	75	66	59	59	62	67	70	71	78	82	84	84	85	85	85	83	82	78
May1682	82	82	86	88	86	83	78	69	61	59	55	58	68	73	78	83	83	84	84	83	83	82	82	82	77
May1782	83	84	85	85	84	82	75	68	63	61	65	67	73	82	82	87	81	84	85	84	85	86	86	80	78
May1886	84	87	83	82	80	72	68	65	64	64	63	66	72	75	81	84	85	84	85	84	85	86	86	85	78
May1986	85	87	88	88	88	85	84	79	76	73	68	68	70	76	82	84	87	87	87	87	85	86	89	86	82
May2089	84	82	84	84	81	76	72	71	68	64	63	64	63	54	71	79	81	87	88	99	86	85	82	84	79
May2182	78	80	84	81	78	74	67	64	57	59	62	66	71	79	84	85	85	85	86	85	84	83	84	84	77
May2284	83	83	86	86	86	83	79	73	69	66	70	76	83	86	86	85	87	87	87	87	90	85	84	84	82
May2384	84	85	87	87	79	76	72	69	68	67	62	64	72	78	83	87	87	87	86	86	85	84	84	86	79
May2485	84	85	87	87	80	76	73	70	72	72	74	76	79	81	87	87	87	83	85	85	85	84	84	85	81
May2586	86	88	90	90	83	79	75	73	69	67	69	72	76	80	86	86	86	86	87	89	88	86	86	84	82
May2685	86	87	90	91	83	75	70	67	67	65	65	66	72	79	89	94	91	91	99	87	90	90	94	93	82
May27100	85	89	93	89	90	84	69	57	59	60	61	65	76	81	82	88	85	87	88	87	87	87	87	81	81
May2887	88	89	91	91	88	83	78	71	67	66	64	67	70	75	80	84	86	86	86	88	87	86	86	85	81
May2985	85	86	88	90	90	88	81	77	71	66	68	72	82	82	83	85	86	86	90	89	92	91	85	85	83
May3086	86	86	89	90	88	84	80	72	68	63	68	69	72	77	84	85	88	88	88	89	90	87	87	88	82
May3184	85	86	86	89	90	85	77	72	70	71	74	71	71	70	71	73	76	80	84	86	86	86	86	86	79

Table 8.8. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
2021, Field component: X, Base: 20900.0, Unit: nT																										
Jun01	111	109	109	112	113	112	109	107	105	102	107	114	118	119	121	118	115	115	117	118	118	117	117	115	113	
Jun02	114	115	115	117	118	112	107	105	103	102	106	114	122	135	128	115	121	126	129	125	124	125	127	125	118	
Jun03	131	137	133	133	134	133	124	113	97	95	104	112	118	116	109	113	111	112	117	121	119	117	117	116	118	
Jun04	119	119	120	125	127	124	120	114	109	109	111	115	120	123	121	116	116	112	116	115	115	113	114	113	117	
Jun05	111	111	114	118	120	114	105	101	96	99	104	110	114	115	115	...	...	117	119	120	123	123	122	125	...
Jun06	115	114	115	121	123	117	107	100	92	90	95	100	107	112	110	109	111	112	116	124	122	125	129	121	112	
Jun07	118	117	120	118	113	119	122	111	110	110	125	124	114	104	117	115	120	127	116	113	113	115	129	109	117	
Jun08	103	103	111	109	105	102	94	82	80	86	98	112	116	111	104	105	107	113	115	120	119	117	117	116	106	
Jun09	118	117	115	115	113	108	102	96	90	86	90	100	103	107	113	116	115	117	118	118	117	118	117	117	109	
Jun10	115	...	114	121	123	119	114	107	100	101	105	110	115	114	111	114	116	110	116	122	128	125	125	129	...	
Jun11	122	122	114	119	122	117	103	95	90	83	76	76	75	71	77	79	93	100	105	110	114	110	108	113	100	
Jun12	118	109	111	116	117	106	102	95	99	101	95	96	93	100	107	117	113	112	115	118	119	117	112	119	109	
Jun13	116	131	121	115	109	99	87	85	86	89	94	98	100	106	114	119	119	116	114	116	116	114	113	113	108	
Jun14	113	114	114	116	117	114	105	101	97	94	98	103	111	109	109	113	113	117	117	118	121	122	122	112		
Jun15	126	126	116	117	121	121	119	112	110	108	110	106	106	106	107	107	114	111	121	124	121	121	111	107	113	
Jun16	121	137	127	103	100	100	86	74	71	75	94	101	96	94	101	102	113	99	105	105	109	108	118	115	102	
Jun17	104	106	108	106	104	103	91	89	86	85	91	97	98	105	103	110	107	112	118	115	114	113	114	113	104	
Jun18	115	113	118	115	110	109	103	95	96	86	81	82	97	97	104	108	109	110	112	112	109	111	112	109	105	
Jun19	109	109	110	111	112	107	101	99	96	96	105	112	113	113	112	112	108	107	109	116	116	114	114	114	109	
Jun20	112	110	110	115	115	110	104	99	94	93	99	103	107	112	113	114	116	117	118	119	121	126	125	119	111	
Jun21	117	117	118	121	123	115	104	97	94	96	103	109	109	114	112	116	121	118	116	116	118	...
Jun22	122	119	120	124	118	108	103	99	97	98	103	110	111	114	110	110	111	111	114	119	119	117	119	116	112	
Jun23	116	117	113	115	114	110	106	103	100	104	107	108	113	115	114	115	114	114	115	117	118	116	117	117	112	
Jun24	116	117	118	122	122	116	112	107	95	94	100	111	116	116	115	123	124	125	125	127	127	125	128	118	117	
Jun25	125	120	126	118	118	111	101	92	85	86	87	95	104	108	111	112	111	106	109	113	115	114	112	113	108	
Jun26	114	114	116	123	125	121	110	95	88	88	97	110	122	123	119	109	105	110	112	115	117	117	116	117	112	
Jun27	118	120	121	121	121	115	110	105	102	103	103	99	102	107	106	107	112	117	117	123	119	119	120	124	113	
Jun28	123	121	122	124	127	125	118	110	102	95	95	98	105	112	117	117	115	113	116	118	119	120	117	118	114	
Jun29	117	118	120	122	123	122	115	101	94	99	106	110	108	112	115	112	115	112	119	117	125	123	118	119	115	
Jun30	119	120	122	130	135	126	119	107	88	85	92	107	110	105	106	...	...	...	110	127	106	100	102	99	...
2021, Field component: Y, Base: 1600.0, Unit: nT																										
Jun01	112	114	115	118	125	131	131	131	126	116	102	93	88	89	96	102	104	104	105	105	107	108	109	110	110	
Jun02	109	110	113	116	120	127	127	130	127	114	92	78	75	72	69	73	79	86	91	97	100	103	106	109	101	
Jun03	110	114	117	120	127	134	139	136	121	105	99	87	80	80	85	94	100	105	104	103	105	106	107	108	108	
Jun04	107	108	107	110	120	128	128	128	122	104	94	86	90	95	97	105	111	110	110	109	109	108	106	106	108	

Table 8.8 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean		
Jun05	109	110	112	117	122	128	129	124	117	108	94	78	74	76	82	105	105	106	106	106	106	107	106	...	
Jun06	111	107	106	111	123	132	135	134	123	107	98	89	80	78	89	99	105	107	109	109	111	108	107	110	108	108	
Jun07	112	111	114	119	130	138	138	137	131	113	98	85	76	75	78	82	92	97	113	127	118	119	118	116	110		
Jun08	124	127	119	122	127	134	136	131	117	102	89	82	81	84	90	98	106	109	109	110	108	107	108	110	110		
Jun09	106	107	111	122	133	144	141	136	123	105	89	78	75	77	82	91	100	109	109	107	107	108	109	110	107		
Jun10	112	...	111	118	130	142	143	140	126	108	97	83	75	77	87	96	104	106	106	104	106	108	108	105	...		
Jun11	107	110	109	110	122	132	131	129	128	111	93	70	58	57	72	87	104	114	114	115	112	114	113	112	105		
Jun12	121	130	123	123	145	142	148	145	138	123	113	100	86	87	88	93	103	107	111	111	111	110	111	109	116		
Jun13	109	116	120	127	124	133	143	141	128	109	92	74	73	78	84	97	106	107	107	109	110	112	113	109	109		
Jun14	114	114	116	121	127	134	138	139	131	120	99	87	80	80	86	97	106	111	112	111	109	107	109	110	111		
Jun15	113	115	119	122	130	142	144	144	141	127	106	82	64	66	62	73	90	96	105	114	129	134	131	129	112		
Jun16	117	112	126	129	131	138	139	139	133	120	111	95	91	90	91	93	110	111	112	114	111	108	106	114	114		
Jun17	117	116	119	120	128	133	138	135	131	125	114	91	77	76	79	90	103	108	106	107	109	111	113	114	109		
Jun18	111	119	120	128	133	138	135	133	130	119	105	94	93	89	90	94	103	107	108	109	109	108	110	113	112		
Jun19	115	115	119	123	127	134	134	136	133	126	111	100	95	93	97	100	106	111	112	110	110	112	111	110	114		
Jun20	113	115	115	121	132	142	143	141	132	116	101	90	85	86	92	98	103	106	104	104	106	112	118	118	112		
Jun21	117	120	124	129	134	142	141	140	131	115	99	...	83	87	96	106	108	104	103	...	110	109	109	110	...		
Jun22	112	116	120	128	143	152	142	141	130	109	96	89	83	75	84	98	103	105	108	111	113	113	113	119	113		
Jun23	120	113	120	123	133	140	140	135	125	114	101	98	92	88	92	98	104	107	110	110	110	109	109	112	110		
Jun24	110	112	112	119	129	140	142	137	127	112	97	83	79	78	80	92	101	105	104	104	107	109	123	126	110		
Jun25	119	122	134	135	133	139	143	145	132	107	89	72	66	64	74	91	106	113	112	110	111	111	111	112	111		
Jun26	112	113	116	124	135	142	143	148	141	119	92	71	70	82	90	100	107	114	112	109	110	111	112	111	112		
Jun27	110	109	112	122	131	141	147	149	138	123	108	87	79	77	79	90	103	107	110	109	111	111	110	111	111		
Jun28	113	112	117	125	129	134	141	139	136	129	122	105	92	85	85	90	99	105	109	110	110	109	111	111	113		
Jun29	111	114	115	118	123	131	137	136	127	111	99	88	83	82	86	93	102	104	107	109	112	108	108	111	109		
Jun30	113	114	117	120	129	137	139	142	136	116	99	93	86	82	84	...	...	...	110	132	127	147	148	128	...
2021, Field component: Z, Base: 43900.0, Unit: nT																											
Jun01	94	94	96	97	97	96	95	94	91	86	80	77	77	79	84	87	90	92	93	94	94	94	94	94	94	90	
Jun02	94	94	94	95	95	93	95	98	93	83	72	70	74	77	84	90	93	94	95	95	96	96	95	95	90	90	
Jun03	94	93	93	95	95	89	88	88	89	86	76	76	76	80	90	95	94	96	95	94	94	94	95	95	90	90	
Jun04	95	95	97	98	98	97	99	102	97	92	84	86	81	79	87	94	96	96	97	96	97	96	96	95	94	94	
Jun05	95	96	97	98	98	97	96	94	88	83	83	83	82	86	93	...	...	94	95	96	96	95	94	92	...
Jun06	92	93	97	97	97	97	98	98	98	92	83	80	83	89	98	100	98	98	97	96	94	94	93	93	94	94	
Jun07	94	94	96	98	99	95	93	89	80	74	76	77	82	81	84	91	94	99	99	102	101	99	96	95	91	91	
Jun08	95	96	97	97	96	96	98	98	96	87	76	72	79	86	94	98	99	98	96	96	96	95	96	96	93	93	
Jun09	96	95	96	99	99	95	93	92	93	86	80	80	84	85	92	99	102	102	97	94	95	95	95	96	96	96	

Table 8.8 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean		
Jun10 96	...	97	98	99	99	100	100	99	87	85	86	87	91	94	97	98	98	98	98	97	95	94	95	94	...		
Jun11 94	94	98	99	100	100	99	99	96	92	84	81	86	94	104	110	110	108	104	102	100	100	99	99	99	98		
Jun12 96	96	97	96	93	94	97	98	94	91	80	79	78	83	91	97	100	103	101	98	97	97	97	97	97	94		
Jun13 97	93	91	92	95	97	96	93	84	78	79	80	85	90	95	98	101	100	98	98	97	97	97	97	97	93		
Jun14 97	97	98	99	99	99	98	98	95	92	86	83	86	87	90	95	98	101	100	100	98	97	97	97	97	95		
Jun15 95	95	96	97	98	100	100	99	93	83	78	75	76	79	88	96	105	108	107	105	104	99	98	99	95	95		
Jun16 99	92	88	93	99	102	106	110	107	98	95	92	91	94	100	107	110	107	106	105	102	102	100	100	100	100		
Jun17 98	99	101	102	102	103	99	95	90	90	89	89	88	91	97	101	99	100	102	100	97	97	97	98	98	97		
Jun18 98	97	97	98	99	94	92	91	91	90	88	85	89	92	96	99	103	104	102	102	101	101	100	98	96	96		
Jun19 100	100	100	100	102	102	101	99	102	103	101	97	93	90	90	93	97	98	98	100	99	99	99	99	99	98		
Jun20 98	98	100	102	100	98	98	101	100	94	89	87	86	87	93	99	98	98	97	97	97	97	98	97	96	96		
Jun21 97	97	98	100	99	98	99	100	96	96	98	...	95	97	98	101	104	102	99	...	99	99	99	99	99	...		
Jun22 97	97	97	99	102	101	103	102	99	96	93	89	83	85	89	96	100	99	97	98	98	98	98	98	98	96		
Jun23 98	98	98	101	100	98	94	93	89	78	74	72	73	74	81	92	96	98	98	97	97	97	97	97	97	91		
Jun24 98	98	99	101	103	101	99	95	91	83	80	84	85	95	102	104	102	100	97	97	97	97	98	97	98	96		
Jun25 97	96	93	97	98	98	99	96	95	93	90	89	93	96	100	104	100	100	101	101	99	99	99	99	97	97		
Jun26 100	101	101	102	102	98	99	101	98	94	95	91	85	86	97	103	104	104	101	98	99	98	98	98	98	98		
Jun27 99	100	101	104	107	104	100	98	101	100	93	86	85	87	94	99	100	102	101	100	100	100	100	99	99	98		
Jun28 98	98	100	102	101	101	103	105	104	104	100	97	94	94	97	106	104	103	101	99	99	99	99	99	99	100		
Jun29 98	98	99	100	102	105	104	105	96	88	85	87	83	86	89	92	99	101	102	101	98	99	99	99	99	96		
Jun30 98	98	98	100	99	97	98	99	99	102	95	88	88	95	101	...	...	...	...	109	108	107	103	100	102	...
2021, Field component: F, Base: 48700.0, Unit: nT																											
Jun01 84	83	84	87	88	87	85	83	79	73	69	69	70	73	78	81	82	84	85	85	87	87	86	86	85	81		
Jun02 85	85	85	87	88	84	83	86	80	70	61	62	70	78	81	80	87	89	91	91	91	91	91	91	90	83		
Jun03 93	94	93	95	95	90	85	80	74	69	64	67	70	72	78	85	83	86	87	88	87	86	87	86	87	83		
Jun04 88	88	90	94	95	93	93	93	87	81	75	77	75	75	82	86	88	86	88	88	88	88	87	86	85	86		
Jun05 85	85	87	91	92	88	84	80	72	68	70	72	73	77	83	89	88	87	88	89	90	90	90	88	88	83		
Jun06 83	84	88	91	93	90	86	83	80	73	66	66	71	78	86	88	87	88	88	91	88	89	91	87	84	84		
Jun07 86	87	88	91	92	87	87	85	72	65	73	74	73	67	77	82	87	95	91	92	91	91	91	94	84	84		
Jun08 82	83	87	86	83	82	82	76	72	67	61	63	71	75	80	85	86	88	87	89	89	89	87	88	87	81		
Jun09 88	87	87	90	90	85	80	77	74	66	62	65	70	73	82	89	92	94	90	86	87	88	87	88	82	82		
Jun10 87	86	88	92	95	93	92	88	81	73	73	75	78	81	83	87	90	87	89	91	92	90	91	92	86	86		
Jun11 88	89	89	92	94	93	85	83	77	70	59	56	60	65	77	84	90	92	91	90	91	90	91	88	87	82		
Jun12 89	86	87	88	87	83	84	82	80	77	64	64	61	68	78	88	90	92	92	91	90	89	87	89	80	83		
Jun13 89	92	86	84	85	82	76	73	65	60	63	64	70	77	85	90	93	92	89	90	90	89	88	87	88	81		
Jun14 88	88	89	91	92	91	86	85	79	75	70	69	76	76	79	85	88	92	92	92	92	92	91	91	91	85		

Table 8.8 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Jun15 91	91	88	90	92	95	94	90	83	73	69	63	64	60	75	83	94	96	100	99	94	94	88	87	86	86	
Jun16 93	93	86	80	84	87	85	83	79	72	77	77	74	76	84	91	99	91	92	91	90	90	89	92	86	86	86
Jun17 84	87	89	89	88	89	80	76	70	69	71	72	72	78	82	89	86	90	94	91	88	88	88	89	89	83	
Jun18 89	88	90	90	88	84	79	75	75	69	64	62	72	75	82	86	91	92	91	92	89	90	90	89	87	83	
Jun19 88	88	89	91	92	89	85	86	86	84	84	82	81	80	83	86	86	86	88	88	90	90	90	90	89	87	
Jun20 88	87	89	93	92	88	86	86	83	76	73	73	74	77	83	89	89	89	90	90	90	91	93	92	89	86	
Jun21 89	89	91	94	94	90	87	84	78	79	84	83	83	85	88	91	95	93	92	93	91	90	90	90	91	88	
Jun22 91	90	91	94	95	90	89	87	83	80	79	78	73	76	78	85	89	88	88	91	91	91	90	91	90	87	
Jun23 90	90	88	92	91	88	83	80	75	67	63	62	65	66	73	83	87	88	89	89	89	89	89	89	89	82	
Jun24 89	90	92	95	97	94	90	83	75	67	66	74	77	86	92	97	97	95	93	93	94	93	94	91	88	88	
Jun25 92	90	90	90	91	88	85	79	74	72	69	71	78	83	88	93	89	87	89	91	90	90	90	89	90	85	
Jun26 90	91	93	97	98	93	89	85	79	74	78	79	79	80	89	91	90	93	90	89	91	90	90	90	90	88	
Jun27 91	92	95	97	100	96	90	86	87	86	79	70	70	75	80	86	90	93	93	94	93	94	92	92	93	88	
Jun28 93	92	94	97	97	97	97	96	95	89	87	83	80	81	83	88	97	94	92	92	91	92	92	91	91	91	
Jun29 90	90	92	94	96	99	95	90	78	73	73	76	72	76	80	82	92	93	93	96	93	91	92	91	88	88	
Jun30 91	92	93	98	99	94	92	87	79	80	76	76	77	81	87	88	94	97	97	104	94	89	89	86	87	89	

Table 8.9. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
2021, Field component: X, Base: 20900.0, Unit: nT																										
Jul01	104	123	115	114	106	108	104	91	87	88	95	102	103	102	101	103	103	107	108	110	110	110	110	110	110	105
Jul02	112	114	112	114	114	111	109	102	93	94	101	105	104	108	114	122	119	107	112	114	112	112	111	109	109	109
Jul03	108	109	113	114	116	110	97	86	86	88	93	102	110	109	109	114	110	107	112	115	115	113	112	113	107	107
Jul04	113	114	116	118	123	119	110	99	90	94	100	112	118	116	112	110	113	114	118	118	118	116	115	113	112	112
Jul05	114	118	123	125	130	126	115	105	99	95	102	114	120	123	119	115	117	110	109	100	99	98	103	103	112	112
Jul06	107	116	116	113	108	100	85	80	84	93	102	107	110	106	93	101	107	109	115	115	113	113	111	111	105	105
Jul07	113	114	115	113	113	107	95	93	97	102	113	116	109	108	98	98	111	115	120	121	122	122	120	120	111	111
Jul08	117	117	118	122	124	119	109	106	96	90	96	108	114	113	112	108	112	115	119	117	118	117	117	117	112	112
Jul09	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jul10	129	122	128	125	122	121	112	105	97	95	93	95	101	106	105	107	107	113	119	127	122	122	122	128	133	...
Jul11	115	115	116	119	122	120	110	98	94	98	105	114	117	119	119	115	115	118	123	122	123	120	119	117	115	115
Jul12	123	119	120	125	128	123	108	93	87	94	102	112	117	118	119	123	125	113	119	118	122	119	125	125	116	116
Jul13	116	106	108	110	112	111	109	106	95	89	83	94	103	109	108	111	111	110	113	116	117	115	113	113	107	107
Jul14	114	112	113	116	117	117	110	102	101	104	113	101	106	114	120	115	123	115	88	89	95	108	99	100	108	108
Jul15	97	102	102	99	99	98	92	100	90	81	85	96	99	93	101	106	107	114	101	110	110	105	112	121	101	101
Jul16	108	106	106	106	106	108	107	100	91	89	90	90	97	103	105	107	108	114	121	125	115	114	114	115	106	106
Jul17	113	113	115	113	...	...	...	103	96	87	87	93	99	104	110	117	116	109	117	121	125	120	119	119	116	...
Jul18	115	115	115	117	120	115	109	106	102	99	103	108	103	108	108	103	103	112	118	120	121	120	123	124	112	112
Jul19	117	123	125	121	120	118	119	115	109	103	99	101	102	100	99	101	113	107	108	117	118	116	113	116	112	112
Jul20	115	111	110	114	116	118	112	97	86	98	112	117	118	118	112	109	117	116	111	109	115	121	117	102	111	111
Jul21	107	106	105	107	117	107	101	96	91	93	98	109	111	104	100	106	104	97	106	108	109	106	105	106	104	104
Jul22	108	105	105	110	118	117	105	90	80	85	89	95	92	101	98	94	93	89	91	97	101	101	100	100	99	99
Jul23	102	102	103	104	104	100	91	83	81	87	92	101	113	116	110	108	103	104	108	110	112	111	112	110	103	103
Jul24	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jul25	...	112	112	115	118	116	108	97	90	91	104	115	118	115	111	113	113	...	...	...	...	...	...	...	...	...
Jul26	115	114	111	112	120	117	106	95	87	91	93	96	101	106	106	109	110	111	117	120	119	121	121	121	109	109
Jul27	120	119	119	122	123	118	108	99	92	94	103	113	119	121	115	113	116	123	126	129	135	138	137	131	118	118
Jul28	140	150	135	129	135	135	124	106	94	95	107	114	121	...	...	116	108	96	104	115	110	108	108	109	...	...
Jul29	116	111	107	103	114	111	104	96	82	87	93	89	92	93	94	94	105	105	108	113	109	114	112	110	103	103
Jul30	110	109	110	110	110	106	98	88	88	92	96	107	109	107	116	120	123	123	125	130	123	122	119	124	111	111
Jul31	114	114	119	119	119	113	109	103	93	91	96	108	115	115	111	112	110	114	118	119	120	115	112	113	111	111
2021, Field component: Y, Base: 1600.0, Unit: nT																										
Jul01	122	113	124	134	146	151	151	145	139	124	111	103	98	95	97	102	108	111	110	109	110	112	113	112	118	118
Jul02	111	111	116	118	123	131	135	134	132	122	111	96	89	86	91	100	104	113	111	109	111	114	113	114	112	112
Jul03	117	115	111	122	130	139	140	138	128	117	108	93	86	85	88	100	109	114	113	110	110	110	109	110	110	113

Table 8.9 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Jul04	112	114	114	119	125	133	132	136	136	128	114	98	90	86	89	98	106	108	109	111	110	109	111	113	113
Jul05	114	114	116	121	128	132	128	125	123	119	107	87	80	78	86	97	100	107	113	117	122	119	126	126	112
Jul06	130	133	131	130	136	140	141	143	139	126	105	91	81	79	87	96	104	107	109	114	113	112	112	115	116
Jul07	117	115	117	125	136	148	146	140	128	115	106	94	88	84	90	95	98	106	110	110	107	108	110	114	113
Jul08	114	117	121	124	135	141	136	137	134	122	109	100	95	95	93	96	108	113	111	110	109	109	111	113	115
Jul09	...	...	115	119	124	127	134	137	128	108	92	85	79	82	88	100	109	113	112	113	112	111	110	110	...
Jul10	110	109	114	132	132	139	146	147	141	124	108	93	84	83	88	94	108	113	113	110	107	109	116	114	114
Jul11	117	119	121	125	132	138	135	131	125	114	100	91	88	91	95	103	108	112	113	115	114	115	115	114	114
Jul12	115	118	121	125	131	138	135	132	121	105	87	81	80	83	86	91	96	106	106	107	108	111	112	119	109
Jul13	127	134	130	131	132	141	150	154	144	124	104	88	78	77	88	101	111	115	116	114	117	116	117	115	118
Jul14	114	115	116	117	121	132	142	149	147	134	111	91	80	77	81	75	89	105	113	118	132	118	124	122	113
Jul15	123	125	128	131	138	148	151	154	146	130	115	91	81	81	83	87	95	99	109	115	119	118	120	116	117
Jul16	123	122	125	124	129	138	148	148	138	126	113	100	91	86	88	95	103	106	110	117	112	112	115	117	116
Jul17	118	122	124	126	...	...	153	154	142	122	103	91	86	89	94	97	101	106	105	111	108	109	111	115	...
Jul18	118	120	121	124	132	139	139	140	134	122	106	93	89	86	85	95	104	108	110	112	112	111	110	117	114
Jul19	118	115	121	127	130	137	134	133	124	116	105	98	95	91	90	100	113	116	121	116	113	110	109	114	114
Jul20	117	115	120	126	137	147	146	137	126	116	108	95	81	83	94	102	113	128	136	126	118	121	132	128	119
Jul21	119	123	127	125	131	138	134	138	133	122	105	90	79	82	90	108	116	114	115	117	114	111	111	112	115
Jul22	114	121	122	124	130	131	128	134	131	122	108	97	92	99	107	118	123	120	118	111	111	111	113	116	117
Jul23	117	119	120	126	136	142	142	138	129	115	100	95	94	98	104	111	115	116	113	113	114	116	117	119	117
Jul24	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jul25	...	119	120	127	142	151	149	145	133	120	112	108	100	101	106	109	115	...	...	...	115	113	114	115	...
Jul26	114	117	118	124	132	141	145	142	134	123	105	89	87	91	96	100	107	110	109	109	113	115	116	116	115
Jul27	118	119	121	124	133	138	145	144	133	113	92	83	83	85	87	94	104	112	110	110	107	109	112	112	112
Jul28	118	140	135	130	138	136	135	129	115	99	84	77	71	...	...	91	108	117	131	122	114	114	115	115	...
Jul29	119	123	122	113	111	128	142	141	136	125	114	102	93	89	95	104	112	119	125	117	116	126	116	114	117
Jul30	116	119	121	123	130	136	134	134	127	117	107	100	93	93	95	98	100	104	108	115	114	114	115	120	114
Jul31	121	121	120	127	138	146	142	138	127	117	108	96	92	95	103	108	113	115	112	119	120	116	116	116	118

2021, Field component: Z, Base: 43900.0, Unit: nT

Jul01	103	101	98	100	101	98	98	101	97	95	89	91	93	95	97	101	102	103	103	103	102	102	102	102	99
Jul02	102	101	101	103	105	106	103	101	104	102	91	85	87	88	92	96	100	104	104	103	103	102	102	101	100
Jul03	101	101	102	103	106	103	98	96	94	94	89	87	92	92	99	105	105	103	101	100	100	101	101	101	99
Jul04	100	99	101	102	102	101	98	96	96	91	86	84	85	92	98	99	100	102	100	100	99	99	99	98	97
Jul05	98	99	99	100	100	97	100	101	99	92	84	84	90	94	99	106	108	109	110	110	109	108	106	105	100
Jul06	104	102	103	105	107	105	99	93	91	93	92	84	83	91	96	98	101	101	101	103	103	102	102	102	98
Jul07	102	101	102	102	103	103	106	103	99	101	98	92	88	90	97	101	102	102	104	103	102	102	102	103	100

Table 8.9 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Jul08	103	103	104	105	106	103	100	97	98	97	94	91	92	92	94	102	104	104	103	101	101	101	102	102	100
Jul09	...	...	102	103	105	105	104	103	101	99	93	93	95	99	101	105	105	104	102	101	100	100	99	99	...
Jul10	99	100	99	99	105	103	98	96	92	89	85	82	82	87	95	101	103	104	102	101	101	101	101	100	97
Jul11	100	101	102	103	102	102	102	100	94	90	89	89	94	93	96	98	101	102	103	101	100	100	100	101	99
Jul12	100	99	100	103	103	102	100	98	90	83	80	83	88	91	92	97	102	105	104	103	101	100	100	99	97
Jul13	98	99	101	103	103	97	97	96	98	94	91	84	83	92	98	104	108	104	101	101	100	101	101	101	98
Jul14	101	101	101	101	102	105	105	105	99	94	89	85	85	83	90	99	109	120	122	119	116	111	108	107	102
Jul15	106	106	106	107	108	104	104	103	101	101	93	92	92	92	94	98	102	106	107	108	108	108	107	102	102
Jul16	102	103	104	105	107	107	106	109	104	97	99	103	99	96	99	107	108	108	107	105	104	104	103	103	104
Jul17	102	102	101	101	...	...	97	97	95	86	79	79	84	89	93	98	99	101	104	103	103	102	102	102	...
Jul18	102	102	103	104	106	103	104	100	100	98	91	87	90	92	96	102	104	102	102	103	103	101	101	100	100
Jul19	100	100	99	102	103	100	98	98	99	99	97	89	87	89	97	101	103	105	105	105	103	102	102	102	99
Jul20	101	101	102	105	105	105	104	102	98	90	82	86	90	91	98	102	106	109	110	109	107	102	101	102	100
Jul21	102	103	104	106	104	102	99	98	93	90	89	88	93	98	106	113	114	111	109	107	105	105	105	105	102
Jul22	105	105	106	107	109	108	102	100	97	96	95	101	106	114	118	119	114	112	110	110	109	108	108	107	107
Jul23	108	108	109	110	113	114	112	107	99	99	99	94	93	94	98	108	110	107	105	106	106	105	105	104	105
Jul24	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jul25	...	105	106	109	110	106	107	109	110	108	102	105	104	104	103	104	105	...	...	...	105	104	104	103	...
Jul26	103	103	104	107	109	109	108	101	94	92	94	99	102	104	106	109	109	107	106	105	105	104	104	103	104
Jul27	103	103	103	105	108	108	105	104	97	92	93	92	94	98	99	100	104	104	102	102	101	101	100	101	101
Jul28	100	95	98	104	103	102	105	105	102	98	95	92	97	...	...	107	116	118	117	112	108	107	107	106	...
Jul29	104	103	105	109	107	106	108	105	102	100	99	97	93	95	103	106	108	108	107	107	107	105	105	104	104
Jul30	104	105	105	107	108	105	104	101	99	96	93	92	94	90	92	99	102	103	103	103	104	103	104	102	101
Jul31	102	103	104	106	107	105	103	100	97	96	93	91	95	94	96	103	106	105	104	104	104	104	104	104	101

2021, Field component: F, Base: 48700.0, Unit: nT

Jul01	89	96	90	91	90	88	86	83	78	75	73	76	78	80	81	86	87	90	91	91	90	90	90	90	86
Jul02	91	91	91	93	96	96	92	87	85	84	77	73	73	76	82	91	93	91	94	93	92	92	91	89	88
Jul03	89	89	92	94	97	92	82	75	73	74	71	73	80	80	86	95	93	90	91	90	90	91	91	91	86
Jul04	90	90	92	94	96	95	88	81	77	74	72	75	78	83	87	88	90	93	92	92	91	90	90	89	87
Jul05	88	91	93	95	98	94	92	88	83	76	71	76	83	88	91	96	99	97	97	94	92	91	92	91	90
Jul06	92	94	95	95	95	90	78	71	71	76	78	72	78	78	77	83	88	89	92	94	93	91	91	91	85
Jul07	92	92	93	92	93	91	89	85	83	86	88	83	77	78	80	84	90	93	97	96	96	97	96	96	89
Jul08	94	95	96	99	101	96	89	85	82	78	77	79	83	83	83	89	93	95	95	93	93	93	93	94	90
Jul09	92	94	95	98	99	97	89	82	78	76	79	86	90	95	96	98	94	92	93	94	94	96	96	97	92
Jul10	96	94	95	95	99	97	89	85	77	73	68	65	68	75	82	88	90	94	95	97	95	95	93	87	87
Jul11	91	92	93	96	97	96	92	86	82	79	77	80	85	86	88	89	92	94	97	95	94	93	93	93	90

Table 8.9 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Jul12	94	92	94	99	100	97	89	80	70	66	66	73	80	83	85	91	97	94	96	94	95	93	95	94	88
Jul13	90	88	89	93	93	88	87	85	82	74	69	67	69	80	85	93	96	92	91	92	92	92	92	91	86
Jul14	91	91	91	93	94	97	95	91	85	81	80	70	73	74	84	89	101	109	100	97	97	98	92	91	90
Jul15	89	91	91	91	92	89	86	88	82	78	72	75	75	73	79	84	89	96	91	97	96	94	96	96	87
Jul16	90	90	91	92	94	95	95	93	85	78	79	83	82	81	85	93	95	97	99	100	95	94	94	93	91
Jul17	92	92	92	92	95	93	85	82	75	66	63	64	71	78	85	89	87	92	97	98	96	95	94	93	86
Jul18	93	93	94	96	100	95	93	88	86	82	78	75	76	80	83	87	89	92	94	96	96	94	95	95	90
Jul19	92	94	95	95	97	94	92	90	87	85	81	74	73	74	81	86	93	92	93	96	95	93	92	93	89
Jul20	92	90	91	95	97	98	94	86	77	75	74	79	82	83	87	90	97	100	99	97	97	96	94	88	90
Jul21	89	90	91	93	97	90	85	81	76	73	73	76	82	83	89	98	99	93	95	94	93	92	91	92	88
Jul22	93	91	92	96	101	100	89	81	74	75	76	82	86	97	100	99	95	91	90	92	93	92	92	92	90
Jul23	93	93	94	96	99	98	92	85	76	78	79	79	83	85	87	95	94	93	92	94	95	94	94	93	90
Jul24	93	94	96	100	100	95	91	87	82	79	82	86	86	89	92	93	92	92	93	94	94	95	94	94	91
Jul25	94	94	95	100	102	98	96	93	90	89	88	95	95	95	92	93	94	94	95	95	95	95	94	96	95
Jul26	93	94	94	96	102	101	96	84	75	74	76	82	86	90	92	96	97	95	97	97	97	98	97	96	92
Jul27	96	95	96	99	102	101	94	88	79	74	79	82	86	91	89	89	95	98	98	98	101	101	101	99	93
Jul28	102	103	99	102	104	102	100	92	84	80	82	82	90	92	90	97	103	99	102	102	96	94	94	94	95
Jul29	95	93	92	94	97	95	95	88	79	79	81	77	74	77	84	87	94	94	95	96	95	96	94	93	89
Jul30	93	93	94	95	97	93	88	81	79	77	76	80	83	78	84	92	96	97	98	100	98	97	96	97	90
Jul31	92	94	96	98	100	96	92	87	80	77	76	79	85	85	85	93	94	95	96	96	97	95	93	94	91

Table 8.10. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
2021, Field component: X, Base: 20900.0, Unit: nT																										
Aug01	111	110	108	110	108	107	102	96	99	105	108	112	115	108	105	109	112	118	120	121	116	112	114	113	110	
Aug02	114	116	110	111	113	115	112	104	102	111	123	135	132	119	114	106	111	102	92	96	107	103	121	116	112	
Aug03	116	105	108	107	103	99	97	101	96	89	99	98	102	97	91	87	89	89	91	90	96	100	97	98	98	
Aug04	102	103	101	106	108	103	97	95	90	86	84	95	103	104	104	102	109	111	112	114	115	115	114	112	104	
Aug05	112	109	109	110	110	105	96	86	88	96	101	109	111	113	114	113	113	110	115	118	118	117	117	118	109	
Aug06	116	115	114	119	124	115	107	99	97	103	110	117	120	121	113	104	102	103	95	94	98	93	93	95	107	
Aug07	105	110	109	116	125	112	86	76	83	87	92	95	89	92	84	84	104	104	107	103	104	105	106	107	99	
Aug08	107	108	103	105	106	101	94	88	85	89	96	104	108	106	105	103	107	111	115	115	117	110	111	112	104	
Aug09	114	115	121	117	117	113	103	95	96	97	107	114	114	114	112	113	117	119	122	122	124	122	119	120	114	
Aug10	123	130	125	119	115	116	104	99	94	102	116	124	119	109	105	107	109	113	115	116	117	117	118	116	114	
Aug11	117	114	118	114	113	110	93	95	97	97	95	102	105	108	109	110	112	115	115	116	113	111	111	112	108	
Aug12	111	112	113	114	113	111	102	92	88	90	97	104	110	110	107	109	102	103	110	118	125	126	120	119	109	
Aug13	118	120	117	114	118	121	118	111	99	88	100	120	116	111	111	112	105	104	109	114	116	115	113	116	112	
Aug14	110	111	113	114	114	110	104	95	86	87	93	102	111	120	118	113	107	109	114	117	114	115	115	115	109	
Aug15	119	128	117	116	118	111	102	91	81	86	84	92	99	97	100	99	105	108	108	113	110	111	115	120	105	
Aug16	109	102	105	108	110	109	104	96	87	91	96	99	99	98	96	91	105	104	103	107	109	117	111	109	103	
Aug17	109	110	110	110	113	108	103	94	88	93	93	104	106	103	101	101	98	104	110	112	115	114	113	112	105	
Aug18	108	112	119	109	112	102	98	87	82	91	100	103	107	107	100	96	101	104	107	109	110	109	109	110	104	
Aug19	110	110	109	109	109	103	92	83	79	90	108	111	108	104	100	99	91	89	95	106	108	110	110	110	102	
Aug20	110	110	110	112	113	108	98	91	80	83	90	97	101	98	90	83	87	94	101	105	106	107	107	106	99	
Aug21	107	108	107	108	108	103	95	86	86	91	100	108	115	122	114	108	107	110	115	117	115	114	115	115	107	
Aug22	114	113	112	113	113	106	94	86	90	100	107	114	118	123	121	117	115	115	119	122	123	124	123	122	113	
Aug23	121	118	117	117	116	111	102	89	81	83	91	109	121	123	120	119	118	121	123	123	124	122	118	122	113	
Aug24	121	118	118	120	121	118	110	102	91	81	88	102	113	116	117	118	118	121	124	123	117	121	121	122	114	
Aug25	120	118	118	117	126	112	96	91	87	79	79	82	78	79	88	96	99	98	108	109	108	109	110	109	101	
Aug26	113	113	107	111	109	106	99	90	79	82	89	105	112	109	103	104	107	107	107	107	110	109	108	108	104	
Aug27	109	118	119	118	119	117	107	97	89	95	107	101	129	122	96	87	69	56	49	44	46	58	86	86	93	
Aug28	92	95	96	110	100	93	70	67	70	76	81	96	102	99	98	93	94	90	92	102	104	104	104	105	93	
Aug29	108	108	107	109	106	107	102	93	92	95	102	107	112	114	112	109	103	92	90	99	117	120	116	115	106	
Aug30	111	112	112	111	109	104	111	105	95	92	97	107	107	109	104	110	110	110	111	109	107	107	117	119	108	
Aug31	108	109	105	109	107	101	93	90	87	93	97	95	93	95	98	98	99	106	110	112	111	113	111	112	102	
2021, Field component: Y, Base: 1600.0, Unit: nT																										
Aug01	120	123	123	126	131	135	135	131	121	108	98	87	84	94	100	104	108	115	115	112	116	115	115	117	114	
Aug02	116	117	120	122	129	133	132	130	125	109	97	97	88	77	75	76	81	105	113	135	133	121	115	123	111	
Aug03	125	129	116	128	132	132	132	130	130	118	117	107	99	103	105	108	113	117	119	122	120	121	126	129	119	

Table 8.10 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Aug04125	130	126	126	134	136	136	137	134	124	124	115	105	99	94	93	102	107	109	111	111	113	115	117	117	117	
Aug05117	118	120	123	130	138	143	140	124	102	88	84	85	85	89	97	109	116	113	111	112	112	113	116	117	113	
Aug06118	117	121	124	135	141	138	136	126	108	97	91	93	94	94	94	99	103	103	114	119	122	122	128	136	116	
Aug07143	157	163	162	165	155	143	144	134	113	96	85	75	78	78	85	102	108	112	124	126	120	121	117	120	123	
Aug08115	122	128	131	139	145	143	137	126	112	100	95	93	95	95	102	107	113	113	110	114	121	122	116	117	117	
Aug09118	118	114	125	137	144	146	138	125	109	95	85	85	90	90	96	99	103	105	106	110	114	116	117	119	113	
Aug10117	123	129	131	140	139	142	141	126	110	100	94	90	89	89	98	107	113	111	112	113	113	114	117	128	117	
Aug11120	121	127	130	130	130	134	135	134	125	107	96	89	83	88	94	103	114	118	115	119	118	116	117	120	115	
Aug12122	122	122	124	130	134	136	137	133	122	108	94	84	81	81	90	100	109	114	114	114	124	119	121	122	116	
Aug13121	119	120	124	129	134	139	139	131	115	101	86	78	78	78	87	97	114	121	115	115	115	118	120	121	114	
Aug14122	122	124	125	131	135	142	140	131	119	106	94	88	84	84	90	99	110	115	114	117	118	117	118	118	116	
Aug15113	112	118	121	128	139	140	147	127	116	107	97	86	88	86	96	103	112	117	120	121	122	119	130	123	117	
Aug16130	127	117	119	131	135	143	146	138	125	111	101	94	99	103	109	119	117	113	115	115	117	119	118	119	119	
Aug17118	119	120	123	127	133	141	143	136	121	106	96	93	97	103	108	117	115	114	114	114	115	117	123	122	118	
Aug18120	108	120	126	132	136	142	144	133	117	99	86	85	93	93	106	117	125	126	122	125	122	116	116	118	118	
Aug19118	119	120	124	135	143	146	146	134	116	95	83	84	84	94	98	103	113	120	117	117	114	114	116	118	116	
Aug20118	120	121	124	132	136	137	136	126	110	98	90	86	84	84	98	108	118	121	118	122	120	116	117	119	116	
Aug21120	120	122	127	139	147	151	149	137	117	101	92	91	95	106	114	119	118	113	113	117	116	117	117	119	119	
Aug22119	122	124	127	137	143	146	142	128	111	96	84	83	93	93	103	109	113	114	112	112	113	115	117	119	116	
Aug23119	122	125	129	135	140	145	143	131	107	87	78	81	92	104	112	117	113	109	111	113	116	118	119	115	115	
Aug24121	123	124	127	137	143	148	151	143	123	97	80	78	86	97	107	111	110	110	112	112	113	113	115	119	116	
Aug25121	121	125	121	124	121	128	151	153	136	112	92	84	88	88	98	109	119	128	122	122	119	119	120	120	119	
Aug26121	121	121	126	137	140	139	137	129	114	101	87	79	81	94	105	114	118	119	122	122	123	126	122	123	117	
Aug27123	124	130	133	138	142	145	139	122	105	86	81	72	79	92	105	131	150	161	159	168	179	184	165	130	130	
Aug28166	137	107	131	126	123	129	134	137	122	107	103	101	104	111	119	124	124	119	115	115	115	117	119	120	121	
Aug29121	125	127	131	139	146	149	148	139	125	114	103	96	99	104	109	115	118	123	113	111	113	120	130	122	122	
Aug30131	130	131	131	135	137	144	148	145	131	115	99	96	100	109	116	119	116	119	116	120	121	118	118	122	123	
Aug31124	125	121	127	129	130	131	138	133	124	111	96	90	92	97	110	119	120	116	116	116	118	122	124	121	118	
2021, Field component: Z, Base: 43900.0, Unit: nT																										
Aug01104	104	105	105	108	107	106	103	93	85	79	79	79	85	91	94	101	103	103	102	102	104	105	104	104	99	99
Aug02103	103	102	104	106	103	105	105	102	100	96	91	90	93	98	98	107	111	120	120	116	112	112	110	108	105	105
Aug03106	106	106	104	109	110	112	107	110	109	105	104	102	102	103	108	112	113	112	113	112	113	112	111	110	109	109
Aug04109	107	108	110	111	107	105	104	99	97	97	93	89	93	89	100	107	109	106	105	105	105	105	105	106	103	103
Aug05106	106	106	107	109	108	107	106	96	93	93	94	98	100	103	107	108	105	102	103	104	104	104	104	105	103	103
Aug06105	105	105	107	107	103	103	100	94	93	92	91	89	90	97	104	107	111	113	111	113	114	114	114	112	103	103
Aug07109	105	103	105	105	105	107	108	105	99	96	91	90	93	98	104	111	114	111	111	111	112	111	110	110	108	105

Table 8.10 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Aug08108	106	107	110	112	110	107	104	100	96	93	91	91	93	101	105	106	106	106	106	107	107	108	107	107	104	
Aug09107	107	107	107	109	105	102	100	95	93	91	87	90	92	96	101	104	103	104	104	106	104	104	104	104	105	101
Aug10105	103	103	105	107	107	108	106	98	95	88	84	87	97	103	105	105	104	103	104	104	104	105	105	105	101	
Aug11105	105	103	104	106	108	107	105	100	95	95	99	101	102	103	105	107	106	104	105	106	106	106	106	106	104	
Aug12106	105	106	106	108	107	108	108	104	97	87	79	81	87	96	104	108	108	106	106	106	105	105	105	106	102	
Aug13104	103	104	105	107	108	110	111	108	98	90	89	90	91	94	102	109	110	108	108	107	107	107	107	105	103	
Aug14105	105	105	106	107	107	107	105	102	101	94	91	94	97	102	108	110	108	106	106	106	106	106	105	105	104	
Aug15105	102	103	104	108	109	110	109	104	101	102	99	97	98	101	107	110	108	108	108	108	108	108	106	101	105	
Aug16101	104	106	106	108	106	107	109	108	105	103	105	105	108	112	112	112	111	109	110	109	108	107	107	107	107	
Aug17107	107	107	108	109	110	111	111	107	102	94	96	98	101	105	108	108	108	108	107	108	108	108	108	106	106	
Aug18107	105	103	105	108	109	112	111	109	104	96	97	100	106	109	111	110	109	109	108	107	107	107	107	107	107	
Aug19107	107	108	110	111	109	108	107	104	98	92	91	97	101	104	107	113	114	114	114	112	111	110	110	109	106	
Aug20109	109	110	111	111	111	113	113	110	104	100	101	106	112	114	117	116	115	114	114	112	111	110	110	110	111	
Aug21110	111	111	112	114	114	112	110	105	100	93	90	96	102	108	110	109	108	107	107	107	107	107	108	108	107	
Aug22108	108	109	110	111	111	112	106	101	99	98	98	101	104	105	106	108	105	106	106	106	106	106	106	106	106	
Aug23106	106	106	106	107	106	107	106	107	108	105	101	100	99	101	102	103	104	105	104	105	105	105	106	107	105	
Aug24106	106	106	106	107	109	109	108	104	103	102	99	95	96	99	101	103	103	103	103	105	107	108	108	107	104	
Aug25107	107	106	106	105	106	107	106	106	101	97	97	97	99	103	107	113	116	114	112	110	110	109	109	109	107	
Aug26109	108	109	108	109	109	109	106	105	102	95	92	96	100	103	106	108	109	109	109	110	110	108	109	109	106	
Aug27108	108	107	108	109	109	107	108	106	103	102	96	100	103	113	122	132	137	137	133	130	126	121	112	105	113	
Aug28101	103	104	102	108	115	118	115	113	113	106	100	106	110	112	111	116	119	117	116	114	114	114	113	113	111	
Aug29113	112	112	113	113	111	107	104	103	100	97	98	99	103	105	108	112	115	118	117	114	114	112	113	112	109	
Aug30112	112	111	111	110	111	109	109	108	104	95	97	100	109	112	110	109	109	109	111	111	111	112	111	107	108	
Aug31109	109	109	108	111	114	116	116	113	109	102	100	101	103	106	108	111	113	112	111	111	111	111	111	111	109	

2021, Field component: F, Base: 48700.0, Unit: nT

Aug01193	93	93	94	96	95	92	86	78	73	69	70	77	80	81	88	93	95	95	96	95	94	94	93	88
Aug02194	94	91	93	96	94	95	91	87	90	90	91	88	85	88	92	98	103	99	98	99	97	102	99	94
Aug03197	93	93	92	94	94	94	92	92	88	89	87	86	85	88	90	91	91	92	93	95	95	94	94	92
Aug04194	93	92	97	99	93	89	87	80	76	75	76	76	79	85	91	96	95	94	95	96	96	95	95	89
Aug05195	94	94	96	98	94	90	85	76	76	78	82	87	89	92	96	97	94	93	95	95	96	96	96	91
Aug06196	96	96	99	102	95	91	85	78	80	81	83	83	84	87	89	91	95	94	95	97	95	94	94	91
Aug07196	95	93	97	102	98	87	80	78	75	73	73	73	78	81	87	99	96	98	97	97	96	96	95	89
Aug08195	94	93	96	99	95	89	84	79	77	76	77	79	80	87	90	93	94	96	97	98	96	96	96	90
Aug09197	98	100	99	101	96	89	83	79	77	79	78	80	83	85	91	95	95	97	99	99	97	97	97	91
Aug10199	100	99	98	98	98	95	90	81	81	81	80	80	85	89	92	93	93	94	95	96	96	96	97	92
Aug11196	95	96	95	96	97	89	87	84	78	78	83	87	89	91	94	97	96	95	96	96	95	95	95	95

Table 8.10 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Aug1295	95	95	97	98	96	93	89	84	78	71	67	71	76	83	91	93	93	93	94	98	101	100	98	98	90
Aug1396	96	96	95	99	102	102	100	92	77	76	82	81	80	83	90	94	95	95	96	98	98	97	97	96	92
Aug1494	94	95	97	98	96	93	88	81	80	76	76	83	89	93	97	96	95	95	96	98	98	96	96	96	92
Aug1597	98	94	96	100	99	95	90	80	80	79	80	81	80	85	90	96	96	96	96	98	98	96	96	95	91
Aug1690	90	92	94	97	94	94	92	87	86	86	88	88	90	93	91	98	96	96	94	96	97	99	99	95	93
Aug1795	95	95	96	99	98	97	93	87	83	76	82	85	86	89	92	91	93	95	97	98	98	98	98	96	92
Aug1894	94	95	94	97	95	95	90	86	84	81	82	87	92	92	93	95	95	95	96	96	96	95	95	95	92
Aug1996	96	96	98	100	95	90	85	80	78	80	80	84	87	87	90	93	93	93	95	98	98	98	98	97	91
Aug2098	97	98	100	101	99	96	94	85	81	79	84	89	93	92	92	94	95	95	98	100	98	98	97	97	94
Aug2197	98	98	99	102	100	94	89	84	81	78	79	87	95	97	97	96	96	96	97	99	99	98	97	98	94
Aug2298	98	98	99	101	98	94	85	81	83	85	87	92	97	98	97	98	96	96	98	99	99	100	100	100	95
Aug2399	98	98	98	98	96	93	88	81	78	80	86	93	96	96	96	96	97	97	99	99	100	99	98	100	94
Aug2499	98	98	100	102	101	97	90	85	79	78	79	86	90	92	95	96	96	98	99	98	101	101	101	100	94
Aug25100	99	98	98	101	96	90	87	85	77	72	73	73	78	86	94	99	97	97	99	98	97	97	97	97	91
Aug2698	98	96	97	97	96	90	86	81	78	75	79	85	88	88	91	95	95	95	96	97	98	96	96	96	91
Aug2796	100	100	100	102	101	95	91	85	85	88	80	96	96	94	98	101	101	101	94	89	87	88	92	85	94
Aug2884	86	86	91	93	95	89	85	84	86	81	83	91	93	94	92	97	97	97	96	100	99	99	99	99	92
Aug29100	100	99	100	100	98	93	86	84	83	83	85	89	92	94	95	97	95	97	97	100	105	104	103	102	95
Aug30101	101	100	100	99	97	99	96	90	85	78	84	87	96	97	98	97	97	97	98	98	98	98	102	99	96
Aug3196	96	95	96	98	98	97	93	88	83	83	83	84	87	87	90	93	96	99	99	100	100	100	100	100	94

Table 8.11. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean		
2021, Field component: X, Base: 20900.0, Unit: nT																											
Sep01	109	107	111	110	108	100	96	99	95	100	98	105	117	113	105	99	100	106	109	109	109	114	111	108	106		
Sep02	106	108	111	110	106	100	91	88	96	105	110	112	117	112	106	107	104	105	111	110	110	113	112	113	107		
Sep03	112	113	118	117	115	108	102	92	90	92	92	93	104	98	108	107	103	104	100	101	103	107	120	104			
Sep04	114	110	105	104	105	102	99	91	80	84	89	104	117	118	112	106	106	110	113	112	111	111	112	123	106		
Sep05	117	118	108	106	109	98	93	81	74	81	91	103	114	108	113	114	112	109	112	113	115	112	112	114	105		
Sep06	114	109	108	106	114	107	102	91	84	82	91	106	116	116	114	107	98	95	104	110	109	110	113	110	105		
Sep07	108	107	107	108	109	106	97	85	74	75	94	113	126	127	132	128	117	111	105	114	122	120	113	108	109		
Sep08	133	111	113	109	107	108	103	94	83	64	81	88	103	108	101	99	98	105	105	106	104	103	100	101			
Sep09	101	100	101	102	101	95	87	77	72	79	87	91	98	105	106	103	101	101	104	105	109	106	109	118	98		
Sep10	113	112	115	119	123	118	102	86	79	83	94	109	121	128	126	122	119	117	117	117	121	117	111	112			
Sep11	92	93	94	102	108	110	104	94	84	90	103	108	115	118	113	108	110	113	115	114	115	107	108	112	105		
Sep12	113	109	108	109	112	111	103	98	91	99	101	97	100	103	102	97	95	100	108	116	122	123	116	117	106		
Sep13	114	111	110	112	115	113	111	96	98	97	98	95	103	102	92	101	97	96	104	106	109	123	116	108	105		
Sep14	103	101	103	105	105	105	99	93	81	85	91	104	107	96	101	99	97	98	93	102	109	111	109	109	100		
Sep15	113	111	109	108	109	113	105	97	89	91	94	99	108	109	111	105	105	105	107	109	110	111	115	108	106		
Sep16	109	110	109	109	109	109	107	100	96	101	106	111	115	119	115	111	108	108	107	111	112	110	110	111	109		
Sep17	112	110	113	111	108	108	102	94	89	98	111	93	90	102	110	104	97	90	97	82	77	63	67	87	97		
Sep18	96	94	97	89	86	79	79	85	92	89	91	93	99	98	99	99	99	100	101	101	101	101	100	102	95		
Sep19	99	98	98	98	96	95	96	94	97	101	103	107	111	109	104	102	102	102	100	101	103	104	105	101			
Sep20	104	106	105	106	105	103	96	91	90	101	115	123	124	123	116	111	109	110	112	111	113	113	109	108	109		
Sep21	105	114	109	110	112	115	115	112	113	116	122	123	119	117	112	107	103	91	99	104	103	99	97	109	109		
Sep22	107	120	125	119	112	109	103	84	58	73	92	103	104	96	90	85	87	92	97	106	99	112	106	106	99		
Sep23	107	110	104	105	117	112	109	97	80	94	106	111	125	118	121	120	116	116	113	118	114	113	114	113	111		
Sep24	113	111	111	112	112	111	107	100	99	103	110	117	123	121	116	107	83	82	98	106	107	107	107	104	107		
Sep25	103	106	107	108	107	104	100	96	91	89	95	102	104	103	103	102	105	106	108	108	106	106	106	109	103		
Sep26	107	106	106	107	107	106	102	98	93	93	97	104	111	114	111	107	107	110	112	113	113	114	115	115	107		
Sep27	118	113	116	126	122	119	124	116	114	102	98	101	108	115	119	119	119	117	125	129	134	126	122	121	118		
Sep28	116	116	117	118	119	116	115	110	103	100	90	86	92	97	95	93	101	106	115	130	106	108	116	121	108		
Sep29	107	109	108	107	107	103	99	95	95	97	96	93	88	96	97	100	104	111	109	113	118	113	116	104			
Sep30	119	115	114	115	114	114	109	105	101	102	103	100	101	106	108	112	111	103	117	108	89	88	105	107	107		
2021, Field component: Y, Base: 16000.0, Unit: nT																											
Sep01	128	127	126	135	141	144	144	141	133	123	114	107	106	108	113	117	115	115	117	118	122	123	121	122	123		
Sep02	125	125	129	132	134	138	137	132	121	106	97	96	101	104	111	112	113	117	124	118	119	120	120	119			
Sep03	121	123	126	130	132	133	135	135	128	116	103	100	102	104	112	118	119	117	117	120	122	122	123	124	120		
Sep04	124	127	130	128	133	137	139	138	128	114	102	98	96	98	105	113	118	116	117	121	122	121	120	117	119		

Table 8.11 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean		
Sep05	117	119	124	123	132	137	141	143	134	117	100	88	84	94	103	115	120	121	120	121	121	120	122	119	118		
Sep06	121	120	123	120	132	140	149	152	144	129	113	96	90	96	104	109	116	114	117	120	123	131	127	127	121		
Sep07	122	122	124	126	131	138	144	142	129	115	96	83	85	97	103	104	110	116	128	121	114	118	131	135	118		
Sep08	114	126	130	142	148	160	163	153	128	108	88	84	83	97	115	125	126	133	133	126	125	127	125	120	124		
Sep09	120	123	126	130	135	145	152	145	124	103	92	86	87	101	113	126	125	122	128	123	121	123	121	114	120		
Sep10	118	123	124	128	131	137	145	145	137	123	105	94	95	105	114	119	115	111	112	132	144	144	140	149	124		
Sep11	144	135	129	132	134	138	143	141	130	119	101	93	93	102	113	120	116	112	113	117	118	121	122	123	121		
Sep12	124	125	126	127	129	134	140	143	137	122	103	88	83	92	105	110	118	127	118	116	116	118	121	123	119		
Sep13	123	123	127	129	133	137	129	128	120	105	96	94	98	108	111	117	124	124	124	122	123	137	129	130	121		
Sep14	131	125	124	130	132	136	143	142	135	122	112	98	90	100	107	113	119	122	130	125	124	125	125	122	122		
Sep15	121	126	125	125	125	135	142	143	135	123	109	98	95	99	106	113	114	117	120	121	122	125	133	128	121		
Sep16	123	124	126	128	129	129	129	136	139	134	123	107	97	102	110	118	121	120	120	122	121	121	121	123	120		
Sep17	122	123	126	129	122	124	132	138	137	127	106	98	96	106	113	117	124	117	115	142	186	181	139	128	127		
Sep18	125	128	133	138	141	149	148	140	134	123	111	103	99	103	110	116	118	120	122	124	125	126	130	132	125		
Sep19	132	128	127	127	130	136	141	136	129	120	115	110	110	110	114	118	119	120	122	126	126	125	124	124	124		
Sep20	126	125	127	129	126	125	129	132	129	120	109	99	101	107	114	117	116	116	119	121	123	128	127	127	120		
Sep21	126	126	130	128	128	126	130	134	131	122	110	105	103	101	106	107	111	134	118	117	123	146	143	134	122		
Sep22	134	121	128	138	137	138	143	140	129	110	104	92	91	97	105	114	120	121	126	128	130	130	132	124	122		
Sep23	125	121	128	126	129	133	138	140	136	123	113	104	95	102	106	110	111	112	119	119	120	121	121	123	120		
Sep24	124	128	128	131	129	130	135	135	132	123	110	102	102	106	110	112	127	118	121	122	123	127	130	129	122		
Sep25	129	127	135	129	131	131	133	139	137	130	117	106	97	99	102	111	113	116	123	124	124	125	127	117	122		
Sep26	125	127	128	130	129	132	138	142	137	126	113	103	101	104	108	113	116	117	119	121	121	122	122	123	121		
Sep27	122	128	123	131	133	131	137	144	142	132	115	97	88	86	94	102	105	105	108	110	111	118	120	121	117		
Sep28	125	125	125	125	127	127	131	137	142	135	123	109	101	97	101	111	113	116	136	135	127	129	136	130	124		
Sep29	128	127	126	126	126	131	138	147	148	136	120	107	105	106	109	113	116	118	128	122	122	122	124	124	124		
Sep30	124	126	125	126	127	129	135	139	135	124	113	108	105	106	107	109	113	126	107	123	144	134	126	130	123		
2021, Field component: Z, Base: 43900.0, Unit: nT																											
Sep01	110	111	110	110	112	112	111	110	109	106	99	96	99	101	104	106	109	110	110	111	111	110	109	110	108		
Sep02	110	111	110	110	111	111	110	110	112	108	101	101	103	105	108	108	108	110	111	111	111	111	111	111	109		
Sep03	111	111	110	109	110	110	110	103	97	98	103	106	110	110	107	106	109	110	113	115	115	115	114	111	109		
Sep04	109	109	110	111	111	111	109	110	109	105	104	105	106	104	105	107	108	109	109	110	111	111	111	109	108		
Sep05	108	107	108	110	112	115	118	118	116	112	108	108	110	112	113	112	111	109	110	110	110	110	110	110	111		
Sep06	109	110	111	112	112	115	117	115	115	114	111	106	104	107	109	110	113	113	113	113	112	111	110	111	111		
Sep07	111	111	111	112	113	115	115	112	111	105	95	97	105	107	104	101	103	107	111	111	110	110	111	111	108		
Sep08	100	104	106	108	112	116	117	114	110	110	111	110	115	112	112	115	114	113	114	113	113	113	113	113	112		
Sep09	113	113	114	115	117	118	116	115	113	112	112	112	114	114	113	113	114	113	114	114	114	114	113	113	111		

Table 8.11 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Sep10	110	110	111	111	111	112	113	112	107	100	96	95	98	105	110	109	108	108	111	110	111	109	108	107	108
Sep11	110	112	114	114	115	117	119	120	118	112	106	106	109	112	111	110	109	109	110	111	111	111	111	112	112
Sep12	111	111	112	112	112	114	115	113	111	107	104	107	108	105	106	109	112	114	114	113	112	112	111	111	111
Sep13	111	111	112	112	112	113	114	113	111	106	103	104	105	110	111	111	113	114	115	114	113	110	110	110	111
Sep14	111	112	112	112	113	116	117	114	112	110	105	103	104	104	107	111	113	114	117	115	114	113	113	113	111
Sep15	113	111	112	112	113	114	115	114	111	107	102	101	103	106	109	109	109	111	113	113	113	113	111	112	110
Sep16	112	112	112	112	111	113	114	115	112	106	99	99	102	104	108	108	108	110	112	111	111	111	112	112	109
Sep17	111	111	111	111	111	110	110	108	106	102	101	104	107	107	109	112	112	119	118	120	123	122	128	122	112
Sep18	120	119	118	117	117	115	113	112	108	104	104	104	104	103	106	110	112	114	115	115	116	116	116	116	112
Sep19	116	116	116	116	115	115	115	113	111	109	102	102	103	102	106	109	111	113	114	114	115	115	115	115	112
Sep20	115	115	114	114	113	113	114	114	113	111	107	101	100	102	103	106	109	111	112	112	113	113	113	114	110
Sep21	115	112	113	113	112	111	115	116	113	110	106	103	105	108	108	111	116	120	119	118	118	118	121	118	113
Sep22	117	115	109	107	108	110	112	115	117	111	107	107	113	118	120	118	118	118	119	117	117	115	113	115	114
Sep23	115	114	114	114	115	113	113	113	114	112	109	106	105	104	106	108	107	109	110	112	112	112	113	113	111
Sep24	113	113	113	112	112	114	115	116	115	109	101	98	103	107	109	111	117	120	118	117	116	115	115	115	112
Sep25	115	115	115	115	113	114	117	115	112	107	103	99	100	104	108	109	112	114	115	114	114	114	115	114	111
Sep26	113	114	114	114	114	115	117	115	112	105	101	99	100	104	108	110	111	112	113	113	113	113	113	113	111
Sep27	112	112	112	109	107	109	111	111	111	109	103	99	102	106	109	110	110	111	111	111	110	110	111	112	109
Sep28	111	111	111	111	111	112	113	116	116	109	108	111	109	107	111	115	115	115	114	111	111	111	113	112	110
Sep29	111	112	113	113	113	113	116	117	113	106	100	102	110	112	113	114	115	115	115	114	111	114	114	113	112
Sep30	113	112	112	112	112	112	114	114	111	107	104	106	109	108	109	111	112	114	116	116	120	122	119	116	113

2021, Field component: F, Base: 48700.0, Unit: nT

Sep01	98	98	99	98	99	96	94	94	91	90	82	83	91	91	90	90	93	96	98	99	99	100	98	97	94
Sep02	97	98	99	100	97	94	90	91	90	88	88	89	91	96	96	94	94	95	97	99	99	100	100	100	96
Sep03	100	100	101	101	100	98	95	85	78	79	83	87	95	92	94	93	95	95	98	98	99	99	100	103	95
Sep04	99	97	96	97	98	96	94	91	84	82	83	91	97	96	94	93	95	97	98	99	99	99	99	102	95
Sep05	99	98	96	97	100	98	99	94	89	88	87	92	98	97	101	101	99	97	99	99	100	99	99	100	97
Sep06	99	98	98	98	102	102	102	95	92	90	90	92	94	98	98	96	96	93	98	101	100	100	100	98	97
Sep07	98	98	98	99	100	101	98	90	84	78	77	86	100	102	101	97	95	95	97	101	103	102	100	98	96
Sep08	99	93	96	97	100	104	103	96	87	78	85	87	92	96	99	99	97	96	100	99	99	98	98	96	96
Sep09	97	98	99	101	99	95	89	85	86	89	91	95	99	99	98	98	97	99	101	99	101	99	100	102	96
Sep10	99	99	101	103	105	104	99	91	83	77	78	83	91	101	105	103	100	99	101	102	103	102	100	97	97
Sep11	91	93	95	98	102	105	104	101	94	91	91	93	99	103	100	97	97	98	100	100	101	98	99	101	98
Sep12	100	99	99	100	101	103	100	97	92	90	88	88	91	90	91	91	94	97	101	103	105	105	102	102	97
Sep13	101	99	100	101	102	103	102	95	94	88	86	85	90	94	90	94	95	96	100	100	101	105	100	97	97
Sep14	96	97	97	98	99	102	101	95	88	87	85	88	91	86	91	94	96	97	97	100	102	102	101	100	95

Table 8.11 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Sep15	102	100	100	100	101	103	101	97	90	87	83	85	90	93	96	97	95	97	99	100	101	101	102	99	97
Sep16	100	100	100	99	99	100	101	98	94	91	86	88	92	96	98	97	95	97	98	100	100	99	99	100	97
Sep17	100	99	100	99	99	97	95	90	86	86	90	84	86	92	97	97	95	97	99	96	98	92	97	100	95
Sep18	101	100	100	96	95	91	89	89	83	84	85	87	86	87	86	90	93	95	97	99	99	100	100	101	94
Sep19	99	99	98	98	97	96	97	95	93	92	87	88	90	91	94	95	95	97	98	98	99	100	100	100	96
Sep20	100	101	100	100	99	98	96	94	92	95	97	94	94	96	95	95	97	99	101	101	102	102	101	100	98
Sep21	100	102	100	101	101	102	105	105	103	100	100	97	97	99	96	97	100	99	101	103	102	102	103	106	101
Sep22	103	107	104	100	97	99	98	92	82	83	87	91	98	99	98	95	95	98	101	103	100	104	100	101	97
Sep23	101	102	99	100	104	102	103	97	88	90	92	94	98	97	100	99	99	101	101	103	102	102	103	102	99
Sep24	102	101	102	101	101	102	102	100	98	95	90	90	97	100	99	97	92	95	100	102	102	102	102	101	99
Sep25	100	101	102	102	100	100	100	97	92	86	85	84	85	89	92	94	98	100	101	101	101	101	101	101	96
Sep26	100	100	100	101	100	101	101	98	93	87	84	85	89	94	96	97	98	100	101	102	102	102	103	103	97
Sep27	103	101	102	104	101	101	105	102	101	94	87	83	88	96	100	101	101	101	105	107	108	105	104	104	100
Sep28	102	102	102	102	103	103	104	104	101	94	88	88	89	89	92	95	99	100	104	108	98	100	103	103	99
Sep29	98	99	100	100	100	100	101	100	96	89	83	84	91	90	94	96	98	100	103	102	103	105	103	104	97
Sep30	104	103	102	102	102	102	102	100	96	92	89	89	92	94	96	99	100	99	105	103	99	100	104	102	99

Table 8.12. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
2021, Field component: X, Base: 20900.0, Unit: nT																										
Oct01	102	104	103	102	106	104	104	99	78	80	82	72	77	74	82	94	92	100	105	103	106	106	106	105	105	95
Oct02	105	106	106	106	107	108	104	98	88	78	61	72	78	83	78	85	92	94	99	98	100	102	103	103	103	94
Oct03	103	104	104	106	103	105	100	94	88	82	90	97	97	101	100	102	101	107	107	101	99	98	100	108	100	100
Oct04	103	97	102	106	107	104	102	102	95	93	94	101	104	105	102	97	98	105	104	105	106	118	113	112	103	103
Oct05	106	105	106	110	109	109	101	91	85	88	99	107	111	108	103	99	102	107	108	109	108	109	110	112	104	104
Oct06	112	111	116	120	122	121	118	112	106	106	104	98	92	97	92	76	65	56	70	87	102	106	105	105	100	100
Oct07	106	108	106	103	103	104	103	97	90	89	92	99	101	101	91	81	84	87	93	102	103	103	104	105	98	98
Oct08	106	109	110	112	111	111	112	107	100	97	96	98	101	103	102	103	106	108	108	109	111	110	110	110	110	106
Oct09	108	108	111	108	111	110	109	103	91	81	86	93	94	98	100	101	103	105	107	108	109	107	106	107	103	103
Oct10	106	108	112	118	116	111	111	108	104	100	101	101	92	87	83	72	74	89	105	99	100	94	124	106	101	101
Oct11	106	105	108	111	117	116	113	102	87	79	79	82	84	104	99	91	85	81	85	94	122	94	90	107	98	98
Oct12	120	100	132	146	116	98	90	83	72	70	55	28	58	59	36	24	53	74	60	68	85	82	94	88	79	79
Oct13	88	88	87	91	90	85	81	81	77	73	75	82	89	95	93	90	92	93	94	95	93	94	96	95	88	88
Oct14	99	98	98	105	107	108	103	100	93	83	83	81	83	86	81	73	70	65	70	81	96	109	106	105	91	91
Oct15	103	101	101	101	104	106	105	98	88	80	86	97	101	101	102	104	106	108	109	110	109	107	115	106	102	102
Oct16	97	106	111	109	107	108	107	102	100	99	102	108	113	115	113	113	119	118	111	113	111	109	110	110	109	109
Oct17	111	112	112	114	116	119	119	113	101	95	78	72	72	73	68	69	60	64	62	75	64	73	77	80	87	87
Oct18	97	105	96	95	96	92	88	84	83	87	94	100	104	109	107	104	102	91	95	99	89	81	95	87	95	95
Oct19	89	90	92	100	115	111	111	106	101	93	85	91	97	100	100	101	96	67	72	80	92	97	104	101	95	95
Oct20	101	101	99	100	102	104	108	106	104	97	96	102	103	106	104	99	104	108	107	111	112	102	106	107	104	104
Oct21	104	107	109	111	111	111	108	104	97	94	97	102	107	107	107	108	102	100	103	101	102	103	121	114	105	105
Oct22	106	103	106	108	109	109	105	99	95	92	96	106	111	111	111	109	110	111	111	112	113	109	108	112	107	107
Oct23	112	111	110	112	114	115	115	110	100	87	89	101	111	116	118	114	112	112	110	112	114	115	113	115	110	110
Oct24	113	114	115	117	117	115	111	104	97	94	100	104	112	115	116	111	102	104	100	97	98	105	105	106	107	107
Oct25	107	110	108	112	111	112	110	109	104	95	91	96	101	107	111	111	113	107	108	112	109	109	113	110	107	107
Oct26	107	111	109	111	119	118	113	108	99	92	93	101	111	116	116	115	114	115	115	115	115	115	112	111	115	111
Oct27	113	111	111	113	113	113	111	106	98	95	98	109	116	119	119	114	113	113	113	112	112	112	113	112	111	111
Oct28	110	112	112	111	111	112	111	109	104	101	100	107	115	117	118	117	116	117	117	117	117	119	119	118	117	113
Oct29	117	117	117	117	118	118	115	111	106	101	99	102	107	111	116	117	115	115	118	116	113	113	109	112	113	113
Oct30	109	112	107	112	116	117	117	122	117	115	114	116	119	120	119	116	114	117	122	121	113	107	106	95	114	114
Oct31	94	99	99	102	101	99	97	94	93	104	104	108	92	52	67	80	79	84	90	87	91	104	95	91	91	91
2021, Field component: Y, Base: 1600.0, Unit: nT																										
Oct01	129	117	126	128	132	133	134	137	138	131	110	101	92	99	100	116	113	120	125	124	123	124	126	126	126	121
Oct02	127	127	127	127	128	128	130	136	137	128	119	97	86	85	106	122	125	135	131	126	125	125	125	125	125	122
Oct03	126	125	125	126	128	128	125	130	135	137	129	114	100	101	100	105	114	120	124	124	125	131	132	138	135	123

Table 8.12 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Oct04	136	129	129	129	127	129	136	141	139	132	120	105	102	105	115	121	122	124	124	122	123	124	122	123	124	
Oct05	128	129	129	124	128	130	135	139	138	129	115	105	104	107	116	117	117	120	122	122	125	125	123	125	123	
Oct06	127	124	123	126	129	129	133	135	130	121	112	97	86	88	96	107	111	129	140	133	128	125	126	126	120	
Oct07	126	126	127	128	129	131	132	139	138	128	116	102	97	101	111	115	125	123	125	125	125	126	127	126	123	
Oct08	125	124	121	128	128	127	131	139	142	136	123	109	104	103	108	113	117	120	122	125	129	126	127	126	123	
Oct09	126	124	129	127	127	127	131	138	141	136	121	103	95	96	106	113	116	119	122	122	124	127	129	132	122	
Oct10	129	128	125	124	127	132	134	140	141	134	116	97	89	85	92	97	113	119	121	131	132	142	181	135	124	
Oct11	129	129	116	122	122	130	134	141	141	137	126	109	95	101	106	113	115	120	124	133	146	143	152	146	126	
Oct12	139	148	146	118	150	139	132	136	133	97	81	85	78	63	62	110	123	136	150	149	147	134	140	122	122	
Oct13	146	129	129	130	132	134	139	141	141	134	122	113	110	115	122	123	123	126	128	131	134	133	130	129	129	
Oct14	125	128	128	126	129	131	136	139	140	133	118	107	103	107	116	117	120	124	135	143	141	140	144	143	128	
Oct15	131	130	130	125	125	132	137	141	141	132	120	109	103	105	112	118	119	121	122	124	125	132	136	141	125	
Oct16	134	120	131	136	129	130	133	137	138	133	120	110	107	110	117	121	117	118	123	123	125	126	126	126	125	
Oct17	126	126	126	124	124	126	128	136	141	130	111	94	98	96	105	121	120	125	140	177	152	156	172	165	130	
Oct18	163	154	133	122	118	121	128	137	136	126	112	106	108	111	114	117	118	120	130	133	141	149	155	154	129	
Oct19	136	136	140	130	123	130	131	137	139	133	126	116	110	110	104	103	105	117	147	132	132	134	134	130	126	
Oct20	130	131	131	128	128	127	131	137	139	133	118	107	103	104	110	114	117	118	124	124	126	133	139	132	124	
Oct21	134	128	127	128	128	129	132	138	141	136	123	112	105	107	113	115	118	124	127	127	134	131	130	133	126	
Oct22	130	129	125	124	125	127	133	138	141	134	113	96	93	100	111	116	119	122	124	125	126	127	129	130	122	
Oct23	125	127	126	125	124	126	132	143	147	139	120	105	105	111	119	122	122	124	127	127	130	131	127	126	125	
Oct24	126	125	124	126	127	126	134	141	141	128	108	100	98	105	113	116	120	120	126	131	137	135	131	128	124	
Oct25	128	127	126	125	129	132	139	148	153	143	124	105	96	95	102	108	113	118	125	127	130	130	131	133	124	
Oct26	131	126	129	124	123	128	132	145	150	139	113	97	98	105	113	120	119	122	124	125	126	128	139	133	124	
Oct27	126	127	127	127	129	131	136	142	144	136	116	99	96	106	115	120	121	123	123	124	126	126	126	127	126	124
Oct28	127	127	127	129	130	132	137	143	143	133	116	101	97	104	112	117	117	120	121	122	122	123	124	125	123	
Oct29	125	125	126	126	127	129	135	143	147	141	124	111	105	109	115	117	117	119	122	124	125	125	131	128	125	
Oct30	130	131	130	124	128	129	126	134	136	129	116	107	108	111	115	114	113	117	115	117	124	133	149	172	125	
Oct31	150	139	137	137	134	131	136	141	141	131	110	97	96	101	110	117	118	128	132	143	147	167	159	141	131	

2021, Field component: Z, Base: 43900.0, Unit: nT

Oct01	115	113	114	114	113	114	113	111	109	104	103	109	110	114	117	120	119	118	118	117	117	117	116	114	114
Oct02	116	116	115	115	115	118	121	120	114	107	108	112	111	114	118	120	120	119	118	118	117	117	117	116	116
Oct03	117	117	116	116	115	119	122	120	112	104	104	107	109	112	115	116	117	116	117	117	118	118	118	115	115
Oct04	113	115	116	116	116	117	119	120	115	108	103	102	106	108	113	115	116	117	117	117	116	115	113	113	114
Oct05	114	115	115	115	114	116	119	119	117	112	108	110	111	112	114	115	115	116	115	115	115	115	115	115	115
Oct06	115	115	114	113	112	114	116	117	116	109	103	104	110	111	113	119	126	130	129	127	123	121	119	118	116
Oct07	118	117	117	117	118	117	120	121	116	109	104	105	108	113	117	119	121	122	121	120	119	118	118	118	116

Table 8.12 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Oct08	118	117	116	115	116	116	120	121	117	110	106	104	103	107	112	116	117	117	116	117	116	116	116	116	116	114
Oct09	116	116	115	115	116	118	121	121	117	111	107	108	112	114	117	117	118	119	118	118	118	118	117	118	117	116
Oct10	117	116	116	115	115	116	118	115	109	101	96	97	105	110	117	122	124	125	122	121	121	121	121	114	116	115
Oct11	116	116	117	113	114	117	118	118	112	106	104	106	106	108	114	118	120	123	125	124	116	118	118	116	115	
Oct12	107	110	108	96	96	104	112	117	118	116	112	115	124	128	137	141	138	134	133	133	129	128	123	123	120	
Oct13	122	122	121	121	122	124	124	124	123	118	114	112	114	114	117	120	122	122	122	122	122	122	122	121	121	121
Oct14	121	120	120	119	118	120	122	123	121	118	114	112	115	118	122	126	128	131	131	130	128	125	122	121	122	
Oct15	121	121	121	121	120	121	122	122	121	116	113	113	115	118	120	119	119	119	119	119	119	120	118	117	119	
Oct16	119	119	115	115	117	118	118	116	108	103	106	111	114	114	115	115	115	115	116	117	118	118	118	118	115	
Oct17	118	117	117	117	117	117	117	118	118	115	113	118	122	126	130	130	133	134	134	132	131	129	128	124	123	
Oct18	120	116	117	118	120	123	125	124	120	116	116	117	114	117	119	120	121	124	125	125	125	125	121	120	120	
Oct19	123	123	122	122	122	118	117	120	121	119	117	116	116	115	118	122	121	123	129	134	132	129	126	123	122	
Oct20	123	122	122	122	122	122	123	123	120	113	109	109	114	117	120	120	121	121	121	121	120	121	122	121	120	
Oct21	121	121	120	119	118	119	120	120	118	114	111	112	115	117	119	119	120	121	121	121	121	121	121	118	118	
Oct22	117	118	119	119	119	119	121	121	118	111	107	107	110	115	117	118	118	119	118	118	118	118	118	119	118	
Oct23	118	117	117	117	117	118	119	118	117	114	112	112	114	118	119	117	118	118	118	119	118	118	117	117	117	
Oct24	117	116	116	116	116	118	121	122	118	112	108	109	110	113	116	117	119	120	120	122	122	122	121	120	117	
Oct25	119	119	119	118	118	118	121	122	121	115	109	110	114	116	117	117	119	119	120	120	120	120	118	118	118	
Oct26	118	118	117	117	116	117	119	119	115	107	99	104	108	111	115	117	118	118	117	117	117	117	117	117	115	
Oct27	117	116	116	116	117	117	118	117	114	109	101	98	100	107	111	113	116	116	116	117	117	117	117	117	113	
Oct28	117	117	117	117	117	117	117	116	114	109	104	105	109	112	114	115	116	116	116	116	116	116	116	116	114	
Oct29	115	115	115	115	115	115	118	119	116	111	106	108	109	114	117	116	117	117	116	116	117	117	117	118	115	
Oct30	118	117	118	117	116	116	119	119	118	110	103	105	111	114	113	113	116	117	117	117	118	119	118	117	115	
Oct31	118	119	118	118	118	119	121	124	122	110	104	108	116	127	129	127	128	128	127	126	125	121	121	122	121	

2021, Field component: F, Base: 48700.0, Unit: nT

Oct01	100	100	98	98	100	99	100	96	86	85	80	75	82	82	88	97	99	102	103	102	103	102	102	102	95
Oct02	102	102	102	101	101	102	104	103	98	88	74	79	86	86	87	95	99	100	102	101	101	101	102	102	97
Oct03	102	102	102	102	101	101	102	103	98	88	84	87	89	92	95	99	99	103	103	101	101	101	101	102	98
Oct04	98	98	100	102	102	102	103	104	97	90	85	87	91	94	97	97	98	102	102	102	102	106	103	102	99
Oct05	100	101	101	102	102	102	104	103	99	94	91	91	96	99	99	99	100	102	102	103	102	103	103	104	100
Oct06	103	103	104	105	105	107	107	106	102	96	89	87	89	92	92	91	93	93	99	103	107	106	104	104	100
Oct07	104	104	103	102	102	102	104	103	96	88	85	88	87	92	96	94	97	100	101	104	103	103	103	103	99
Oct08	103	104	104	104	104	105	108	107	101	93	88	87	92	96	100	100	102	103	103	104	105	104	104	103	100
Oct09	103	103	103	102	104	106	108	106	97	87	84	89	92	96	99	101	102	104	104	105	105	104	104	104	100
Oct10	103	103	104	106	105	105	106	103	96	86	82	82	85	87	92	92	95	102	107	104	104	102	109	103	98
Oct11	102	102	104	101	104	105	106	103	96	87	81	80	83	93	96	97	97	98	101	105	110	99	98	103	98

Table 8.12 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Oct12	100	95	106	101	89	88	92	93	90	87	76	66	88	90	89	88	99	104	98	102	106	103	104	101	94	
Oct13	100	100	99	100	101	100	99	99	96	90	86	87	92	98	100	100	101	102	102	103	102	103	102	103	102	99
Oct14	104	103	103	104	105	106	107	107	101	94	90	87	90	94	97	97	97	98	100	105	109	112	108	107	101	
Oct15	106	104	104	104	105	106	108	105	99	91	91	95	98	100	104	103	104	106	106	106	106	106	108	104	103	
Oct16	101	104	103	103	103	105	104	103	100	92	88	93	100	104	103	104	107	106	103	105	105	105	105	105	102	
Oct17	106	106	106	106	107	108	109	107	102	96	87	88	91	96	97	98	97	100	100	100	105	98	100	102	99	101
Oct18	103	103	99	99	101	102	102	100	96	94	96	99	98	103	105	104	104	103	105	108	104	100	100	102	98	101
Oct19	101	101	102	104	107	105	108	107	103	97	93	95	96	101	105	104	103	96	105	105	108	108	106	106	103	
Oct20	106	106	105	105	106	107	110	109	105	96	91	93	98	102	104	102	105	107	107	108	108	105	108	108	104	
Oct21	106	107	107	107	106	107	107	106	100	95	94	96	101	103	104	105	104	104	105	104	105	104	105	110	105	104
Oct22	103	103	105	105	106	106	106	106	104	99	89	93	98	102	104	105	105	106	106	107	107	107	105	105	107	103
Oct23	106	105	105	106	107	107	109	106	101	93	91	96	102	108	110	107	106	107	106	107	107	107	107	106	107	105
Oct24	106	106	106	107	107	107	109	107	101	93	92	94	98	102	106	104	103	104	104	104	104	105	107	106	106	103
Oct25	105	106	105	106	106	107	109	109	107	97	89	91	97	102	105	105	106	105	106	108	107	106	107	106	106	104
Oct26	104	106	105	106	108	108	108	106	99	89	81	88	96	101	105	106	107	107	107	107	107	107	106	106	107	103
Oct27	106	105	104	105	106	106	106	106	104	97	91	84	86	91	99	103	103	105	105	105	105	105	106	105	105	101
Oct28	105	105	105	105	105	106	106	104	100	94	88	92	98	103	105	106	106	106	107	107	107	107	107	107	106	103
Oct29	106	106	106	106	106	107	108	107	103	96	90	92	95	102	106	106	106	106	106	107	107	106	106	105	106	104
Oct30	105	106	104	105	106	106	106	109	111	109	100	94	95	102	105	104	104	107	109	109	107	106	105	100	105	
Oct31	100	100	101	101	103	103	103	104	106	102	91	90	95	88	97	100	101	103	105	104	105	107	103	101	100	

Table 8.13. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
2021, Field component: X, Base: 20900.0, Unit: nT																										
Nov01	97	92	94	91	93	103	110	104	97	88	79	94	103	107	110	111	109	110	110	107	116	119	110	105	102	102
Nov02	109	116	121	114	99	116	115	103	89	80	76	61	78	97	100	101	93	84	81	91	105	112	105	102	98	98
Nov03	103	107	108	102	103	107	104	98	93	87	83	85	90	86	91	95	97	97	99	107	131	122	96	78	99	99
Nov04	92	136	110	98	95	105	51	41	4	2	27	2	3	6	9	41	52	58	62	68	71	75	80	79	57	
Nov05	76	78	78	78	79	99	101	90	80	79	75	75	82	87	85	66	70	67	71	82	85	108	92	96	82	
Nov06	102	93	91	89	100	103	98	96	93	83	87	88	86	85	81	59	66	79	85	61	71	97	77	94	86	
Nov07	102	105	87	87	87	88	89	85	79	73	72	79	86	88	86	86	88	90	92	94	94	94	93	93	88	
Nov08	93	93	94	94	97	98	98	95	93	89	86	96	98	98	96	96	96	99	96	96	94	100	109	94	96	
Nov09	90	95	94	94	98	101	100	104	97	93	87	87	92	94	94	92	96	98	97	100	91	90	93	90	94	
Nov10	93	103	93	93	101	103	104	97	93	92	89	92	95	91	93	94	94	94	94	96	94	94	94	94	94	95
Nov11	94	94	100	100	101	103	103	104	99	91	86	86	88	92	97	106	108	104	101	103	104	102	100	100	99	
Nov12	100	100	97	100	102	107	107	108	103	93	82	83	92	97	99	100	100	100	99	99	100	101	98	100	99	
Nov13	98	98	99	103	104	103	97	90	82	77	84	93	97	103	104	103	103	103	103	104	101	97	99	101	98	
Nov14	102	106	106	104	105	106	107	106	103	95	88	88	92	95	98	100	98	96	96	96	97	102	99	97	99	
Nov15	97	99	101	105	108	110	111	108	104	99	92	92	98	100	99	91	86	97	101	95	89	84	98	98	98	
Nov16	102	93	102	100	97	109	105	99	93	89	78	77	83	86	88	85	84	95	102	101	98	99	104	103	95	
Nov17	96	103	108	106	104	104	104	99	105	94	83	83	89	91	93	97	101	98	98	100	99	100	101	104	98	
Nov18	103	99	99	103	105	104	104	103	99	91	84	83	89	94	98	97	97	99	100	101	102	101	106	98	98	
Nov19	97	99	101	103	104	108	112	111	105	99	94	94	94	99	96	97	104	102	102	108	107	105	103	104	102	
Nov20	112	102	102	105	108	108	112	108	105	97	95	94	93	98	98	90	91	96	100	99	101	97	105	105	101	
Nov21	100	103	114	110	102	106	112	115	106	92	87	84	86	94	91	95	93	107	96	101	99	104	104	116	101	
Nov22	116	100	96	98	99	104	102	99	93	88	84	90	95	101	99	93	95	94	110	102	100	98	101	108	99	
Nov23	103	99	99	102	105	109	110	108	100	82	70	89	96	95	95	86	90	84	94	102	99	103	105	99	97	
Nov24	100	97	97	99	105	105	104	102	...	84	80	88	97	104	108	107	105	102	107	106	105	104	102	103	...	
Nov25	103	98	102	109	107	109	110	106	97	87	84	91	98	102	104	102	101	99	102	101	100	102	101	101	101	
Nov26	100	99	100	101	102	105	108	106	100	97	98	102	103	106	110	112	110	110	109	110	109	109	108	108	105	
Nov27	107	108	107	105	106	105	105	101	95	92	91	93	92	90	94	96	96	97	98	97	100	104	107	125	100	
Nov28	113	107	103	108	110	112	119	116	111	105	102	99	103	107	109	111	113	112	109	109	108	102	95	94	107	
Nov29	90	88	102	118	107	100	101	93	87	79	76	78	83	89	95	93	94	95	96	101	107	102	99	99	95	
Nov30	98	99	101	103	106	108	108	105	98	92	92	97	102	104	108	110	114	115	116	119	113	99	89	96	104	
2021, Field component: Y, Base: 1600.0, Unit: nT																										
Nov01	131	127	127	127	125	127	129	135	141	138	128	113	111	115	120	122	124	125	130	131	125	126	126	125	126	
Nov02	123	124	117	134	125	109	125	136	148	142	119	106	110	108	115	123	124	136	136	134	132	132	127	130	126	
Nov03	128	124	123	129	130	131	136	142	144	140	129	120	114	120	125	126	128	131	131	129	129	183	173	142	134	
Nov04	140	138	118	116	94	78	92	123	130	124	144	134	131	146	176	156	143	147	144	143	141	138	138	138	132	

Table 8.13 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Nov05	136	138	139	140	140	137	135	137	139	137	128	119	116	118	119	130	142	138	141	151	141	138	136	132	134
Nov06	128	130	127	125	124	127	133	140	140	138	125	117	121	124	126	130	130	140	149	144	143	156	148	140	133
Nov07	139	140	136	134	134	135	136	140	143	141	130	118	115	117	121	124	128	130	131	132	133	133	133	134	131
Nov08	134	134	133	133	133	133	135	140	144	126	114	113	118	122	124	125	128	128	130	137	135	135	144	147	131
Nov09	144	134	132	131	131	132	131	135	140	136	124	115	115	119	122	125	127	128	128	140	144	139	147	136	131
Nov10	142	133	139	133	132	130	132	131	133	131	124	118	116	120	126	126	127	130	131	132	136	134	133	132	130
Nov11	131	131	130	129	129	131	133	137	140	138	126	114	111	118	125	123	126	127	130	130	130	131	133	132	129
Nov12	131	133	133	136	134	132	133	140	146	144	134	119	114	120	126	127	128	130	130	131	131	132	132	132	131
Nov13	131	131	131	130	131	131	136	141	145	140	126	113	113	118	124	126	128	128	129	130	134	133	131	131	130
Nov14	128	127	127	129	129	129	134	141	144	142	132	119	113	114	119	122	124	125	129	132	134	139	141	137	130
Nov15	133	131	129	126	125	127	132	139	143	142	133	122	113	115	119	122	119	125	126	132	157	176	138	132	132
Nov16	133	129	122	135	130	128	132	144	150	142	131	119	112	113	122	122	127	132	133	131	134	135	136	143	131
Nov17	136	140	125	128	130	131	133	137	141	135	127	119	116	118	122	127	125	127	138	144	133	136	139	133	131
Nov18	131	128	128	125	129	128	131	137	145	143	132	120	116	119	124	126	129	133	133	134	134	136	138	137	131
Nov19	133	130	132	130	129	129	132	139	145	143	132	117	115	120	124	129	127	128	132	137	134	136	138	137	131
Nov20	136	130	126	126	127	127	131	137	142	141	124	114	113	118	118	137	132	129	133	138	142	138	131	135	130
Nov21	140	130	130	137	131	130	132	138	143	140	130	110	112	122	120	125	129	152	132	131	139	137	139	137	132
Nov22	127	137	131	131	123	130	134	140	143	140	128	114	111	117	122	129	134	131	142	140	138	137	139	134	131
Nov23	131	132	129	128	128	130	134	142	146	138	120	110	109	117	125	123	138	130	132	143	140	137	142	138	131
Nov24	134	135	132	132	132	133	136	145	...	140	129	118	115	121	126	127	128	131	131	132	133	134	135	133	...
Nov25	138	134	130	132	131	133	133	139	140	129	122	114	114	120	125	128	131	135	133	133	136	137	134	132	131
Nov26	132	131	131	132	133	133	135	138	137	131	125	115	111	115	118	122	127	129	130	130	131	130	130	130	128
Nov27	129	128	128	129	130	132	135	140	141	130	119	109	108	112	119	124	125	128	132	134	135	134	132	135	128
Nov28	144	138	139	137	132	132	138	139	134	123	120	115	118	124	126	124	127	129	130	131	161	154	156	133	133
Nov29	148	144	134	141	134	131	137	144	143	137	121	112	111	111	120	125	129	130	131	142	142	136	135	135	132
Nov30	134	133	131	129	131	132	134	138	142	137	123	115	115	119	125	128	125	124	127	126	128	168	144	186	133

2021, Field component: Z, Base: 44000.0, Unit: nT

Nov01	20	21	21	21	21	19	16	10	8	12	17	19	19	20	19	20	20	20	19	20	18	19	19	18	18
Nov02	20	17	14	12	17	17	17	18	16	13	16	19	22	22	21	23	24	24	26	26	23	20	20	20	19
Nov03	21	19	18	19	20	21	22	24	22	18	16	19	21	25	27	25	24	23	23	22	19	11	9	18	20
Nov04	19	4	2	9	13	11	16	23	30	29	34	47	57	54	52	49	42	39	37	35	34	32	32	30	30
Nov05	32	31	31	31	31	27	25	24	24	21	17	18	22	25	27	29	31	35	33	32	31	25	25	25	27
Nov06	24	25	26	26	25	24	25	28	26	21	15	17	22	25	26	30	34	33	30	33	34	29	31	29	27
Nov07	27	24	26	27	28	28	30	32	30	26	22	21	23	26	27	28	29	29	28	28	27	27	27	27	27
Nov08	27	27	27	27	27	26	26	26	26	24	19	17	20	24	26	26	27	27	27	27	28	27	23	24	25
Nov09	25	25	26	26	27	26	27	27	26	21	15	16	20	25	27	27	27	27	26	26	28	27	27	27	25

Table 8.13 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Nov10	25	23	24	26	26	25	25	23	21	18	15	20	23	26	27	27	27	27	27	28	28	28	27	27	25
Nov11	27	27	26	26	26	26	25	25	26	17	12	14	20	25	26	25	25	25	26	25	25	25	26	25	24
Nov12	25	25	24	25	25	25	25	25	25	22	18	16	20	26	27	26	26	26	26	26	26	26	26	26	24
Nov13	26	25	25	25	25	26	28	27	21	17	17	21	25	28	28	26	25	25	25	25	26	27	26	25	24
Nov14	26	24	23	23	24	24	26	26	22	16	17	20	22	24	26	26	27	27	27	28	28	27	27	27	24
Nov15	26	26	25	25	24	24	23	21	18	15	14	14	17	22	24	26	28	28	28	28	28	32	29	27	24
Nov16	25	25	24	22	24	23	24	27	22	16	14	17	22	27	30	30	30	30	30	29	28	27	27	26	25
Nov17	27	25	25	23	23	24	24	26	24	20	19	21	23	27	29	28	28	27	27	27	27	26	26	25	25
Nov18	24	25	25	25	25	25	26	27	26	24	22	24	28	30	29	28	28	28	27	27	27	26	25	26	26
Nov19	26	26	26	26	26	25	25	25	27	26	21	19	22	26	30	29	28	27	27	26	26	26	26	26	26
Nov20	24	24	24	24	24	24	24	25	26	23	20	18	21	25	28	29	30	29	28	29	28	28	27	24	25
Nov21	25	25	22	21	23	23	23	24	21	20	17	18	24	28	30	29	29	29	29	28	28	27	27	24	25
Nov22	20	21	24	25	25	25	26	27	27	23	19	19	23	27	28	28	28	29	27	27	27	27	26	24	25
Nov23	24	24	25	25	25	25	25	28	25	22	24	24	28	29	29	30	31	32	31	29	29	29	26	27	27
Nov24	27	27	27	27	27	27	27	28	...	21	18	19	25	29	29	27	27	27	27	26	26	26	26	26	...
Nov25	25	26	26	25	25	25	26	27	26	26	25	26	29	31	29	28	28	28	28	28	28	27	27	26	27
Nov26	26	26	26	26	27	27	27	28	28	26	24	23	25	29	28	26	26	26	26	26	26	25	25	25	26
Nov27	25	25	25	25	26	26	26	26	25	21	20	23	28	32	32	30	30	29	29	29	29	28	27	23	27
Nov28	22	23	23	24	24	24	23	22	20	20	21	22	25	27	28	27	26	26	26	26	26	27	27	28	25
Nov29	28	28	28	22	23	25	27	26	22	17	17	19	25	29	30	30	30	30	30	29	28	28	28	26	26
Nov30	27	27	27	27	26	26	25	26	25	20	18	22	26	28	29	27	26	25	25	25	25	24	30	19	25

2021, Field component: F, Base: 48700.0, Unit: nT

Nov01	102	100	101	100	101	105	108	106	101	95	85	89	97	102	106	106	106	107	107	107	110	110	106	105	103
Nov02	107	107	106	102	99	106	107	104	98	91	86	82	92	103	105	104	102	100	101	105	108	108	105	104	101
Nov03	105	106	105	103	105	107	107	106	103	96	93	96	99	102	105	106	105	105	105	108	116	107	93	92	103
Nov04	99	105	91	92	93	95	77	80	71	69	85	85	95	94	95	105	103	103	102	104	103	104	105	105	94
Nov05	104	104	104	104	104	109	108	103	98	95	90	90	97	101	103	97	101	102	103	107	107	111	104	106	102
Nov06	108	105	104	103	107	108	107	109	106	97	93	95	98	101	100	95	101	106	107	99	104	111	104	109	103
Nov07	110	109	103	104	105	106	108	108	104	98	93	95	99	103	103	104	106	107	107	108	108	107	107	107	104
Nov08	106	107	107	107	108	108	108	107	106	102	96	98	102	105	106	107	108	109	108	108	108	110	110	105	106
Nov09	104	106	106	107	108	109	109	111	107	102	93	93	99	104	106	106	108	108	107	109	107	106	107	105	105
Nov10	105	108	104	105	109	109	109	105	101	98	94	99	103	104	107	106	107	107	108	107	108	108	107	107	105
Nov11	107	107	108	108	109	109	109	110	108	97	89	91	98	104	107	110	111	109	109	109	110	109	108	108	106
Nov12	108	107	106	107	109	111	111	112	109	103	93	92	99	107	109	108	108	108	108	108	109	109	108	108	107
Nov13	107	107	107	108	109	110	110	110	106	97	91	96	103	109	111	110	109	109	109	110	109	108	109	109	107
Nov14	109	109	108	108	108	108	109	112	112	107	98	96	101	104	107	109	108	108	108	109	109	111	109	108	107

Table 8.13 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Nov15	108	108	108	110	110	111	111	108	103	99	94	94	99	105	106	104	104	109	111	109	107	109	111	109	106
Nov16	109	105	107	105	110	109	109	109	103	95	89	90	97	103	107	106	106	110	112	111	109	110	111	110	105
Nov17	108	110	110	108	108	108	109	108	109	101	94	96	101	105	108	109	110	109	109	110	109	109	109	110	107
Nov18	108	107	107	109	110	109	110	111	108	104	98	99	105	109	110	109	109	109	109	110	110	110	111	108	108
Nov19	107	108	109	110	110	111	113	115	112	104	100	102	105	111	109	109	111	110	110	112	111	110	110	110	109
Nov20	112	108	108	109	110	110	111	111	111	105	100	98	100	106	109	107	108	109	110	110	111	110	112	109	108
Nov21	108	109	111	108	106	109	111	113	107	100	94	93	100	108	108	109	109	115	110	111	110	112	111	114	108
Nov22	110	105	105	107	107	109	110	110	107	101	95	98	103	109	110	108	109	109	114	110	110	109	110	111	107
Nov23	108	107	108	109	110	111	112	114	109	97	94	102	108	109	110	106	109	107	111	113	111	113	111	109	108
Nov24	109	108	108	109	112	112	112	112	105	...	93	97	105	113	115	112	112	111	112	111	112	111	110	110	...
Nov25	109	108	109	112	111	112	113	112	108	103	101	104	110	114	113	111	111	110	111	111	110	111	110	109	110
Nov26	109	109	109	109	110	111	112	113	110	108	105	106	109	113	115	114	112	113	112	113	112	112	111	111	111
Nov27	111	111	110	110	111	111	111	111	110	106	101	99	102	106	109	111	110	110	110	110	111	112	112	117	109
Nov28	111	109	108	110	111	112	114	112	108	105	105	105	108	112	114	114	114	113	112	112	113	112	110	109	111
Nov29	107	106	111	113	109	108	110	106	100	92	90	92	100	106	110	109	110	110	111	112	114	111	110	110	106
Nov30	109	109	110	111	111	112	112	111	107	100	97	103	109	112	114	114	115	114	115	115	113	108	108	102	110

Table 8.14. Hourly and daily means of field components X, Y, Z and independently measured F from the Conrad Observatory. Please note: if data is missing within one hour/day, then means are not calculated.

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
2021, Field component: X, Base: 20900.0, Unit: nT																										
Dec01	76	81	87	90	98	106	97	91	79	76	74	69	68	66	63	69	77	76	62	66	71	92	84	84	84	79
Dec02	91	86	88	92	94	94	88	98	94	89	88	90	91	85	76	63	60	79	77	76	90	95	89	92	86	86
Dec03	93	94	96	100	101	102	104	101	97	93	88	87	87	91	77	66	77	78	72	75	99	95	92	94	90	90
Dec04	97	100	104	100	100	101	101	90	91	84	86	90	93	98	95	91	89	92	95	99	102	99	96	98	96	96
Dec05	98	101	101	102	106	102	101	102	98	91	90	89	90	94	94	95	86	93	92	87	94	93	94	100	96	96
Dec06	100	96	97	99	101	105	108	105	98	90	84	89	98	100	96	90	76	84	91	96	109	101	97	96	96	96
Dec07	108	110	105	105	103	104	...	...	103	102	103	102	103	99	98	100	102	102	101	97	99	101	101	104	...	...
Dec08	104	102	105	108	108	111	114	114	104	94	93	99	103	103	102	99	97	100	103	102	101	105	106	101	103	103
Dec09	101	101	99	100	102	109	112	111	106	97	93	97	102	102	102	100	102	106	108	109	108	108	106	105	104	104
Dec10	105	105	107	110	112	112	114	115	110	105	107	112	112	111	110	111	114	117	115	111	113	110	108	108	111	111
Dec11	107	103	106	105	108	121	117	112	106	99	95	97	103	107	110	109	109	109	106	105	102	101	98	100	106	106
Dec12	100	99	99	102	105	108	110	111	108	103	102	102	105	108	108	104	104	104	103	99	103	107	108	109	105	105
Dec13	109	108	109	110	107	117	117	110	102	101	102	102	105	107	109	112	111	110	111	112	112	109	109	108	109	109
Dec14	109	107	102	109	113	114	115	112	99	94	92	96	100	102	100	97	99	99	95	96	99	104	101	97	102	102
Dec15	97	98	101	108	109	111	118	120	112	97	98	104	106	101	98	95	86	97	104	105	102	97	99	99	103	103
Dec16	98	102	100	99	105	109	110	106	103	97	93	95	101	106	106	104	103	99	90	94	96	99	102	101	101	101
Dec17	105	103	102	102	103	104	107	107	103	95	92	96	101	102	104	103	105	106	107	107	108	106	104	103	103	103
Dec18	102	102	102	103	106	108	111	114	107	96	94	97	101	103	102	103	106	106	107	106	103	103	105	106	104	104
Dec19	105	104	106	107	109	110	112	115	109	99	97	99	100	108	118	126	123	94	57	38	57	68	92	89	98	98
Dec20	86	85	81	91	91	92	95	95	88	72	85	92	96	93	88	66	77	79	87	97	89	87	88	94	87	87
Dec21	93	93	91	92	93	94	94	92	85	84	84	87	85	79	77	88	97	94	86	99	93	98	98	99	91	91
Dec22	97	100	104	101	99	100	103	98	86	83	85	89	91	86	72	84	81	86	93	95	87	86	93	100	92	92
Dec23	96	91	99	93	95	95	97	98	91	88	91	92	92	98	103	105	104	103	104	100	97	101	100	100	97	97
Dec24	99	101	101	99	102	103	106	108	103	94	91	87	94	102	106	103	101	100	97	96	95	103	112	102	100	100
Dec25	96	98	98	99	105	107	110	108	99	86	91	91	91	88	87	79	77	79	92	86	89	92	96	96	93	93
Dec26	96	98	95	96	98	100	102	106	103	97	92	93	98	99	103	104	105	103	102	100	105	99	100	98	100	100
Dec27	98	100	99	104	106	109	112	108	108	106	110	109	90	81	104	102	90	87	80	88	96	98	98	98	99	99
Dec28	99	110	103	104	100	99	100	96	87	81	81	83	81	76	79	83	75	77	95	96	95	96	98	98	91	91
Dec29	102	99	98	101	100	104	109	106	101	92	91	91	89	90	92	91	92	98	101	99	102	107	115	114	99	99
Dec30	114	111	105	114	119	121	118	115	112	101	94	103	100	94	94	93	96	98	101	107	105	105	104	104	105	105
Dec31	104	104	106	107	108	111	110	109	101	92	89	93	99	104	102	94	100	106	111	111	111	111	109	107	104	104
2021, Field component: Y, Base: 1700.0, Unit: nT																										
Dec01	47	35	26	24	25	31	31	39	40	31	23	16	11	15	26	30	57	44	51	75	62	71	50	48	38	38
Dec02	40	34	33	32	33	36	35	35	35	30	26	19	19	26	34	43	35	35	42	43	46	43	39	34	34	34
Dec03	32	31	31	32	34	35	38	43	40	31	19	16	22	21	21	18	37	39	70	43	43	42	36	33	34	34

Table 8.14 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Dec04 26	19	25	29	31	34	37	38	35	29	24	21	22	25	27	32	33	34	35	42	40	35	35	34	31		
Dec05 31	30	30	25	28	31	34	38	42	38	30	22	20	22	26	27	28	45	52	45	44	43	46	43	34		
Dec06 35	34	34	33	33	34	36	40	45	39	30	24	19	23	29	40	37	40	34	40	44	40	38	35	35		
Dec07 27	29	30	31	29	32	...	...	...	42	38	34	29	25	29	32	31	33	34	39	41	37	36	35	...
Dec08 32	32	27	26	28	31	32	36	37	33	30	25	23	26	30	31	34	35	33	34	37	39	38	37	32		
Dec09 34	33	31	30	31	33	35	38	40	36	31	26	23	24	27	30	31	32	33	33	33	33	33	33	32		
Dec10 32	31	30	29	29	30	32	35	37	32	23	18	18	22	27	27	28	28	30	31	32	36	46	44	30		
Dec11 39	33	31	35	33	38	35	39	43	36	28	21	20	22	27	31	32	33	34	32	34	37	39	37	33		
Dec12 35	33	32	31	33	33	35	37	38	34	25	19	20	24	26	28	26	30	33	34	37	37	35	33	31		
Dec13 30	29	27	27	28	27	34	36	42	36	25	21	20	22	27	30	31	32	33	34	34	33	32	30	30		
Dec14 28	30	30	24	30	33	36	39	39	31	23	20	20	21	26	28	34	31	32	37	40	37	39	41	31		
Dec15 39	38	34	31	31	30	33	33	38	29	28	22	16	21	22	23	29	38	33	34	35	40	37	33	31		
Dec16 31	31	33	34	32	38	37	36	38	26	23	17	23	25	28	29	31	30	43	40	40	39	40	35	32		
Dec17 31	31	31	31	33	33	36	40	43	37	30	25	22	24	26	30	31	31	33	34	35	37	37	36	32		
Dec18 34	34	32	30	30	32	36	41	43	40	34	26	20	22	26	24	29	30	32	37	43	38	36	35	33		
Dec19 35	31	30	29	30	31	34	37	39	35	30	22	18	13	18	17	12	4	40	46	58	55	98	50	34		
Dec20 45	36	42	41	38	37	38	41	43	36	37	31	28	29	27	36	25	31	36	43	43	48	48	49	38		
Dec21 50	45	25	33	35	37	40	46	42	38	33	27	23	27	36	29	29	32	35	45	38	38	40	39	36		
Dec22 40	40	36	36	35	36	34	45	45	39	31	23	21	21	37	31	33	30	42	42	52	43	39	45	37		
Dec23 44	39	39	37	37	39	41	43	41	33	25	21	22	25	29	33	35	35	34	42	42	37	36	38	35		
Dec24 36	36	37	34	34	34	37	42	46	42	35	30	19	21	28	32	33	33	35	31	39	39	42	48	35		
Dec25 39	35	37	33	31	32	37	40	38	32	23	18	21	25	33	36	32	34	45	40	42	42	42	42	35		
Dec26 42	42	39	38	38	38	38	41	43	37	33	29	24	23	26	31	32	32	35	36	44	39	40	40	36		
Dec27 38	36	32	33	35	38	39	39	39	33	17	13	17	16	21	27	33	36	47	41	38	37	36	35	32		
Dec28 34	32	39	35	35	31	37	49	50	43	33	27	26	30	32	35	40	41	37	37	38	37	37	36	36		
Dec29 36	35	34	36	33	37	40	44	46	47	37	21	17	22	27	33	30	33	34	36	40	42	31	30	34		
Dec30 27	24	27	27	28	30	35	37	36	40	34	24	21	29	32	34	35	36	37	42	39	36	34	33	32		
Dec31 32	31	31	32	33	36	38	42	42	41	36	26	21	24	28	33	32	33	33	34	35	34	34	33	33		
2021, Field component: Z, Base: 44000.0, Unit: nT																										
Dec01 27	27	27	26	27	27	27	27	27	24	26	28	32	35	38	37	36	37	38	37	35	30	30	29	31		
Dec02 28	29	30	30	30	30	30	27	27	24	25	28	32	34	36	38	38	36	36	37	35	33	32	31	31		
Dec03 31	30	30	30	30	30	29	28	25	22	22	25	31	33	36	38	37	37	38	38	34	32	31	31	31		
Dec04 31	29	26	27	28	29	29	29	27	24	25	25	29	33	33	32	32	32	31	31	31	30	30	29	29		
Dec05 29	29	29	29	28	28	28	27	26	23	21	23	24	31	31	31	31	32	32	33	32	31	31	30	29		
Dec06 28	29	30	30	30	30	29	29	29	26	26	28	29	29	31	32	34	35	34	33	30	29	29	30	30		
Dec07 28	25	26	27	28	28	28	25	24	25	23	24	26	29	30	30	30	30	30	30	29	29	29	...	

Table 8.14 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Dec08 28	28	28	28	28	28	28	27	28	27	28	25	26	29	27	29	30	30	30	30	30	30	30	29	28	28	28
Dec09 28	28	28	29	29	29	29	28	28	28	26	25	26	27	29	30	30	30	29	29	29	29	28	28	28	28	28
Dec10 28	28	27	27	27	27	27	26	26	24	23	22	24	26	26	27	27	27	27	26	27	26	27	27	27	26	26
Dec11 26	27	26	26	26	24	24	25	25	25	22	22	25	27	27	28	28	28	28	28	28	28	29	29	29	27	27
Dec12 28	28	28	28	27	27	27	27	27	26	25	27	28	30	32	31	30	30	30	30	31	31	31	30	29	28	29
Dec13 27	27	27	27	28	27	27	27	26	24	22	24	25	27	28	29	28	28	28	27	27	27	27	27	27	27	27
Dec14 26	26	27	27	26	27	26	27	26	25	25	28	31	32	33	31	31	30	30	31	32	32	30	30	30	29	29
Dec15 30	29	29	28	26	26	25	24	24	24	26	27	29	30	31	32	33	34	35	33	32	32	32	32	31	29	29
Dec16 30	29	28	28	28	27	27	27	26	25	23	24	28	30	30	30	30	30	31	32	33	32	31	30	30	29	29
Dec17 29	29	28	29	29	29	28	28	27	27	27	30	31	32	32	31	31	30	30	29	29	29	29	29	29	29	29
Dec18 29	28	28	28	28	28	28	28	27	27	24	21	25	29	31	31	31	30	30	30	30	29	30	29	29	28	28
Dec19 28	28	28	28	28	28	27	27	27	24	23	24	24	27	31	30	27	26	30	40	49	51	45	41	38	31	31
Dec20 35	35	35	34	33	33	33	32	30	27	31	31	29	31	32	36	37	39	38	36	36	36	37	36	35	34	34
Dec21 34	33	32	32	33	33	33	33	31	31	33	34	34	37	40	38	36	36	36	36	35	34	34	34	33	34	34
Dec22 33	33	32	32	32	32	33	32	32	31	31	31	31	33	38	40	39	39	38	37	37	37	37	36	33	34	34
Dec23 32	33	32	33	33	33	34	33	31	31	34	34	33	35	38	37	36	34	34	33	34	35	34	33	33	34	34
Dec24 32	32	32	32	32	32	32	31	32	33	33	32	28	32	35	36	34	34	34	34	35	35	34	30	30	30	33
Dec25 32	32	32	32	32	32	32	31	32	31	33	34	34	36	38	41	39	40	40	38	39	38	37	36	35	35	35
Dec26 34	34	34	34	34	34	34	33	34	33	31	32	30	29	30	34	34	33	33	33	33	34	33	33	33	33	33
Dec27 33	32	32	32	32	32	32	31	32	29	27	23	22	27	34	33	33	34	36	37	37	37	36	35	34	34	32
Dec28 33	31	31	32	32	32	33	34	35	35	36	35	36	40	43	42	40	39	40	38	37	36	36	35	35	36	36
Dec29 34	34	34	34	34	34	34	33	34	35	34	32	25	27	34	37	37	37	36	35	35	35	34	32	31	34	34
Dec30 30	29	30	30	30	30	29	28	27	29	35	35	34	37	39	38	37	36	35	35	34	33	33	33	33	33	33
Dec31 32	32	32	32	32	32	32	33	34	35	35	30	30	35	38	37	35	34	33	32	32	31	31	31	31	31	31

2021, Field component: F, Base: 48700.0, Unit: nT

Dec01 100	102	104	104	108	112	108	106	100	97	97	100	102	103	105	109	109	109	104	105	106	111	106	111	106	105	104
Dec02 106	105	107	109	110	110	107	109	107	105	102	103	106	108	106	102	102	102	109	108	108	113	113	109	110	107	107
Dec03 110	110	111	112	113	113	114	112	107	102	100	102	107	111	107	104	109	110	109	109	109	116	112	110	111	109	109
Dec04 111	111	110	109	111	112	112	107	105	101	102	104	109	113	113	110	110	111	112	113	114	112	110	111	110	110	
Dec05 111	112	112	112	113	111	110	109	105	101	102	102	106	110	110	111	108	111	111	111	110	112	111	111	112	109	109
Dec06 111	109	111	112	113	114	115	114	109	104	102	105	110	111	111	110	106	110	112	113	117	112	111	110	110	111	
Dec07 114	112	111	112	112	112	113	114	113	109	108	107	108	108	111	112	113	113	112	111	112	111	112	113	112	111	111
Dec08 112	111	113	114	114	114	115	116	116	110	106	108	110	110	111	112	111	113	114	113	114	113	114	113	111	112	112
Dec09 111	111	110	111	112	115	116	115	112	107	106	108	112	112	113	112	113	114	115	115	114	114	114	113	113	112	112
Dec10 112	112	113	114	114	114	115	115	115	111	108	108	111	113	114	114	114	115	116	115	114	115	114	113	113	113	113
Dec11 112	111	111	111	111	113	116	115	114	110	105	103	106	111	114	115	114	114	114	114	113	112	112	111	111	112	112

Table 8.14 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean	
Dec12	110	110	111	112	113	114	114	114	112	109	110	111	114	117	117	114	113	114	114	114	113	114	116	115	114	113
Dec13	113	113	113	113	113	117	117	116	111	106	107	108	111	113	115	116	115	114	115	114	115	115	115	113	113	113
Dec14	113	111	110	113	114	116	116	113	108	108	109	112	115	115	113	112	112	112	112	112	112	114	114	113	112	112
Dec15	111	111	112	114	113	113	115	115	113	107	108	112	115	113	113	112	109	116	116	116	115	113	113	113	113	
Dec16	111	112	111	110	112	114	114	112	110	106	103	104	110	115	115	114	113	112	111	112	113	113	113	114	113	111
Dec17	113	112	112	112	112	113	113	114	111	107	109	111	113	114	115	115	114	114	114	115	115	114	113	112	113	113
Dec18	112	112	112	112	113	114	115	117	113	109	104	103	108	112	113	114	115	115	115	114	114	113	113	114	114	112
Dec19	113	112	113	114	114	114	115	116	111	106	106	106	109	116	120	120	118	109	103	104	113	113	122	115	113	
Dec20	111	110	109	112	111	112	112	110	104	101	107	108	111	111	112	104	110	111	115	117	114	113	113	115	111	
Dec21	114	112	110	111	112	113	113	111	108	107	109	110	109	109	112	114	116	115	112	118	115	115	115	115	112	
Dec22	114	115	116	114	114	115	115	113	107	106	107	108	111	113	110	113	112	114	116	117	113	113	115	116	113	
Dec23	113	112	114	112	113	113	114	113	110	111	111	111	113	118	120	119	118	117	117	116	115	116	115	115	114	
Dec24	114	115	114	114	115	115	116	118	116	113	111	105	111	118	120	117	116	116	115	115	115	118	118	114	115	
Dec25	112	113	113	114	116	118	118	118	113	109	112	111	113	114	116	112	111	112	117	114	115	115	116	115	114	
Dec26	115	115	114	114	115	116	116	119	117	112	111	109	110	112	117	118	117	117	116	116	117	115	115	114	115	
Dec27	114	114	114	116	117	118	119	118	115	112	110	109	105	107	117	116	112	112	110	114	116	116	115	115	114	
Dec28	115	118	115	115	115	114	116	116	112	110	109	110	113	114	114	114	110	112	118	117	116	116	116	116	114	
Dec29	117	115	115	116	116	117	120	120	116	111	104	105	111	114	115	115	115	117	118	117	117	119	121	119	115	
Dec30	118	116	114	118	120	120	118	116	117	117	114	116	118	117	117	115	116	116	117	119	118	117	117	116	117	
Dec31	116	116	116	117	117	119	119	120	118	114	108	109	116	121	119	115	116	118	118	119	118	119	118	117	116	117

