ZAMG

Conrad Observatory Magnetic Results 2020

GMO Bulletin 7

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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.

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, 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 $\approx$ 2.5 km.

The following instruments are deployed at the Observatory for magnetic measurements: 7 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 2020 and their parameters.

Name	Type	Serial Number	Dynamic Range	Timestep Accuracy	Passband	Spectral Noise	Absolute Error	Orthogonality	Resolution	Setup	Operational
FGE	Fluxgate	S0252	3200nT	<10ms	1Hz	$60\mathrm{pT}/\sqrt{Hz}$		<2mrad	100 pT	HEZ	2012-09 - 2017-06
G823A	Cesium	C120	80000nT			$<4\mathrm{pT}/\sqrt{Hz}$					2015-07
G823A	Cesium	C228	80000nT			$<4\mathrm{pT}/\sqrt{Hz}$					2015-07
GP20S3NSS1	Potassium	012201									2015-07
GP20S3NSS2	Potassium	012201									2015-07
GP20S3NSS3	Potassium	012201									2015-07
GSM90	Overhauzer	14245	100000nT			$22\mathrm{pT}/\sqrt{Hz}$	0.2nT		10 pT		2014-12
GSM90	Overhauzer	31968									2015-04
GSM90	Overhauzer	6107631									
LEMI025	Fluxgate	22	3000nT	<10ms	3.5Hz	$<10\mathrm{pT}/\sqrt{Hz}$		<30min of arc	1 pT	HEZ	2017-12
LEMI036	Fluxgate	1	4000nT	<10ms	3.5Hz	$<10\mathrm{pT}/\sqrt{Hz}$		<30min of arc	1 pT	HEZ	2015-12
POS1	Overhauzer	N432	80000nT				0.5nT		1 pT		2013-06 - 2016-12

Note. — Spectral noise is determined at 0.3 Hz. Bold printed instruments are the primary source of high resolution data.
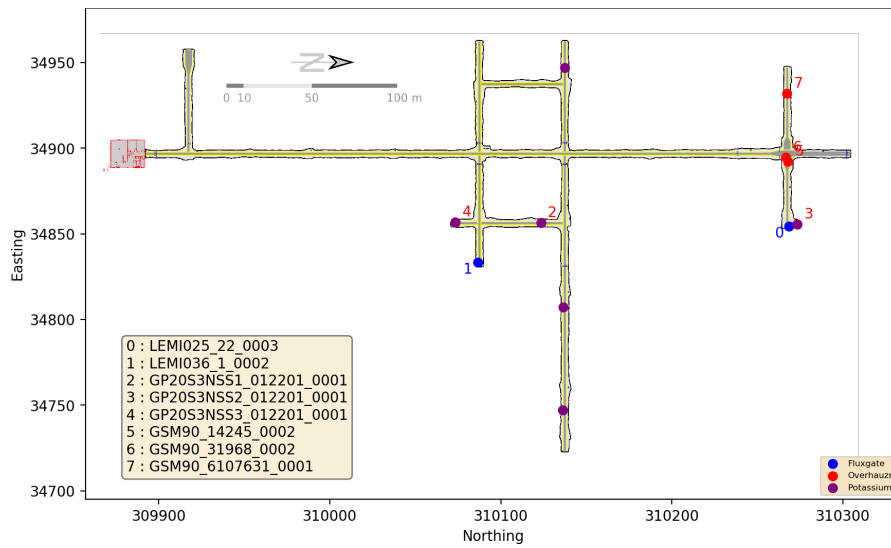
Figure 2.1 Location map of the Conrad Observatory with instrumentation

Chapter 3

Methods

3.1 Acquisition and data transmission

Variations in directional components of the Earth's magnetic field at the Conrad Observatory in 2020 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*, 2012]. 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) registers on ports of several MARTAS 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 FTP server 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 1.0.2 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
T010B 160391 07-2018	MAG01H 504-0911H 03-2016	117
T010B 160391 07-2018	MAG01H 562 1024H	11
T010B 154167 03-2019	MAG01H 378-0619H 03-2016	7
Hegy 6814-5255 04-2012	DTU DI0146 04-2012	4
T010A 811643 04-2012	DTU DI0146 04-2012	13

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 0.30 nT per year for 2020), 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 072018 equipped with a MAG01H 504-0911H 032016 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 0.12 nT/m (maximum: 0.39 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	-0.19	2020			
A10	4.38	-0.50	2020	-26.244	-0.684	2016
A11	7.38	-0.51	2020			
A12	7.47	-0.37	2020			
A13	2.38	-0.10	2020			
A14	2.65	0.26	2019			
A15	5.56	0.40	2020			
A16	5.73	0.83	2019	140.436	-14.328	2020
A3	2.20	-0.15	2020			
A4	3.96	0.79	2020	0.000	-8.388	2020
A5	2.41	-0.35	2020	0.000	0.000	2020
A6	1.75	-0.69	2020			
A7	2.69	-0.17	2020	0.000	-5.256	2020
A8	4.39	0.60	2020	33.912	0.000	2017
A9	4.22	-1.07	2020			
H1	353.89	1.08	2018	0.000	0.000	2020

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 extractes 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 obervatory 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 perfomed 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 Niemegk 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.

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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. 152 absolute measurements by the WIC observers on pier A2 were considered for the analysis of 2020 (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 0.27 nT for H, 0.14 nT for Z and 4.5 arcsec for D, which are well within INTERMAGNET requirements. Calculated baseline curves have a maximum amplitude of 0.85 nT in the X and Z components, and 10.8 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 2020. The resulting δF (see section 4.2) and and variometer differences after baseline correction are virtually zero.
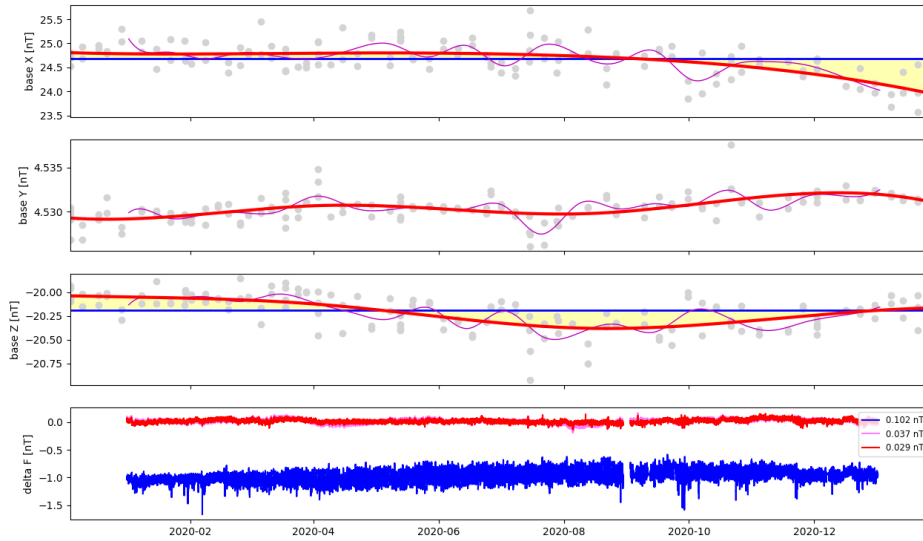
Figure 4.1 Basevalues for the primary vectorial system LEMI036 and iterative choice of optimal baseline. The first analysis step makes use of a constant baseline approximation (blue line). The resulting delta F values between baseline-corrected variometer and permanently recording F are depicted in the lower plot (also in blue) and show a considerable trend. According to this remaining trend a cubic spline fit (red) is choosen leading to a signifcantly 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 choosen 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 60 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 0.35 nT for H, 0.17 nT for Z and 8.6 arcsec for D. A maximum amplitude of 1.52 nT in the X and Z components, and 32.7 arcsec in the declination is obtained. In 2020 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 hour and are availbale throughout the year with maintainance breaks in September and November. 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. AutoDIF data is almost continuously available and agrees well to all other measurements. Please note, however, the large directional deltas, determined by the average deviation of AutoDIF measurements in comparison to A2 data. In summary all tests support the high quality of the baseline of the Conrad Observatory.
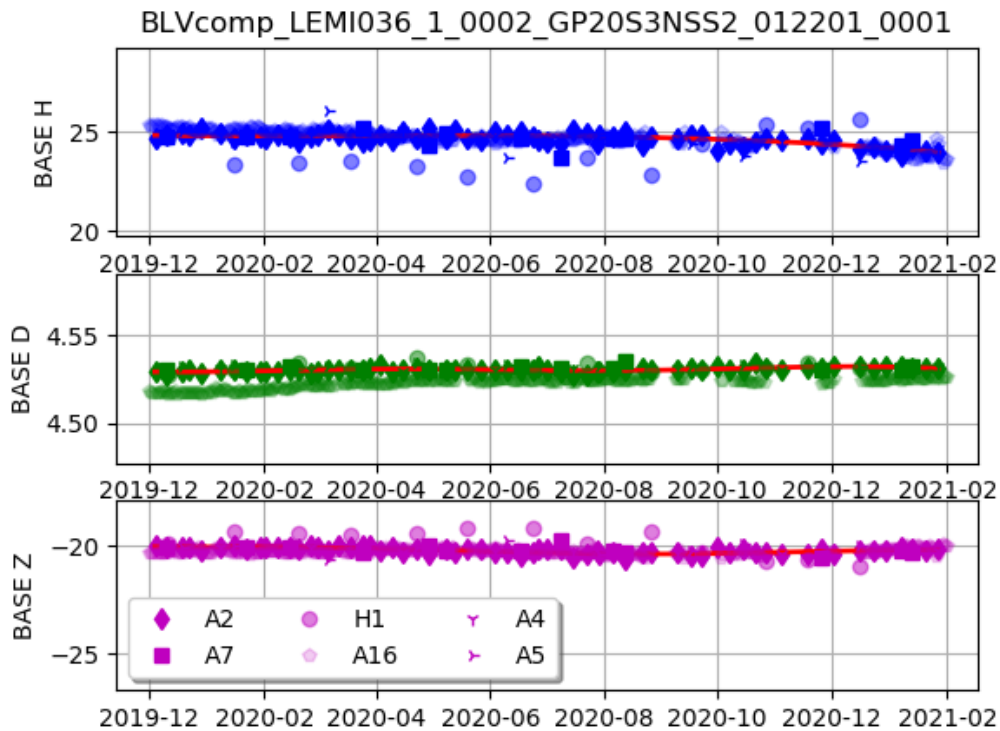
Figure 4.2 Combined plot of all basevalues for the LEMI036 variometer as determined on the piers given in the legend. Average pier differences as listed in Table 3.2 have been regarded for.

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 0.02 nT with a standard deviation of 0.03 nT. The maximum amplitude remains below 0.29 nT for the year 2020. Taking baseline and delta F uncertainty estimates into consideration by combining the scalar residual and statistical variation of absolute measurements results in a 2-σ uncertainty scenario with maximum values of $\pm$ 0.30 nT for all components in 2020. This is well within INTERMAGNET's requirement of a 5 nT accuracy for definitive data [*St-Louis*, 2012].

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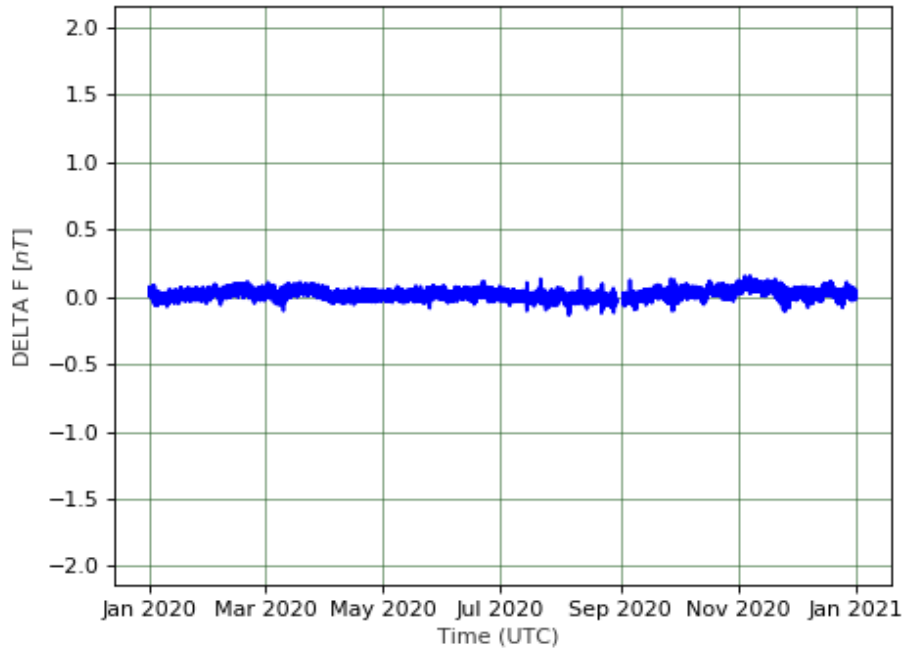
Figure 4.3 Delta F values between the scalar magnetometer and the field strength calculated from the baseline corrected vectorial data set. The scale of the figure is related to the INTERMAGNET 5 nT criteria.

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 2020, 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 -0.03±0.05 nT. For the Y and Z component values of 0.04±0.06 nT and 0.03±0.05 nT are obtained. Gaps are related to missing data from our secondary instrument. These gaps are related to a loss of the primary GPS time stamp end of April, which affects all older LEMI025 boards. As we record NTP time stamps of recorded data as well, and also continuously determine the time difference between NTP and GPS timing we could reconstruct reasonably accurate times for most periods, when NTP timing where available. Variation data of two instruments is available for 2020, 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

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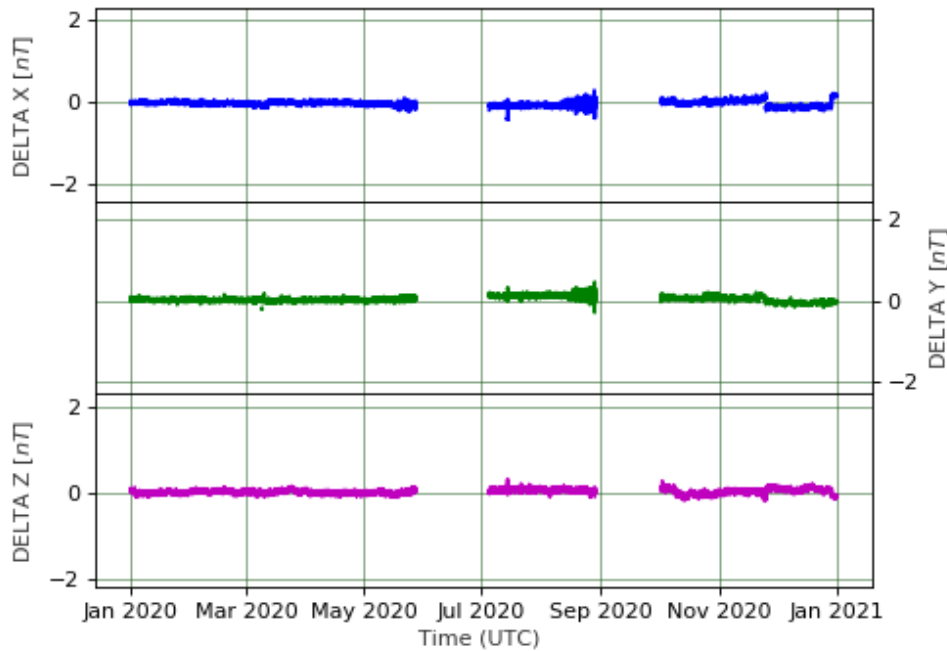
Figure 4.4 Delta values of vectorial components of baseline corrected variometer data.

determination and a detailed manuscript on significance and application is in preparation. 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 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 resiudal 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 definitve data here, requiring some interplolation. The average residuals are -0.013 nT for X, -0.004 nT for Y and 0.002 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 99.8 % of vectorial data in minute resolution was established for 2020. 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 98.1 % 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 2020 the composite minute data set consists of contributions from all instruments shown in figure 4.5. Yellow shaded regions indicates 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
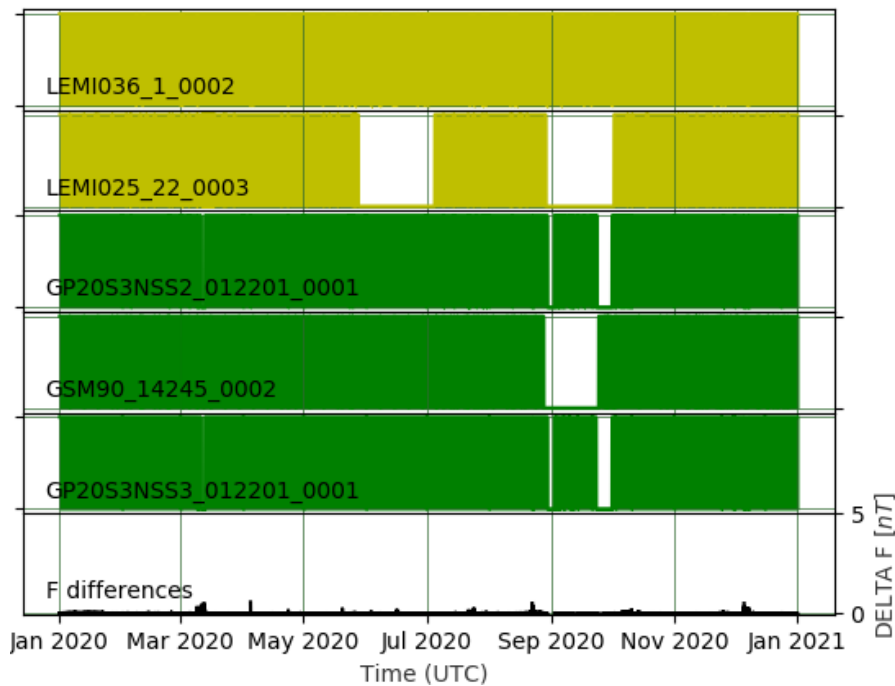
Figure 4.5 Contributions of each sensor for the analysis of 2020. Yellow shaded regions indicate time ranges of respective variometer data, green shaded regions mark scalar data which has been averaged for the composite one-minute record. The lowermost plot depicts the average difference between all scalar data.

for 2020. 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 occured 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 LEMI036. For minute values, the LEMI025 record was merged into LEMI036 data to fill gaps, a procedure which is abolutely valid looking at the similarity of both records after baseline correction. Scalar data was mainly recorded with three instruments in 2020. 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 $6.14 \pm 0.02 \, °C$. 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 -0.860 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 2020 (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 0.14 nT in x, less than 0.17 nT in y, less than 0.08 nT in z and less than 0.10 nT in F. Overall, the deviations from quasi-definitive data to definitive data is slightly smaller with average absolute differences of less than 0.18 nT in x, less than 0.02 nT in y, less than 0.02 nT in z and less than 0.14 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 recurring magnetic disturbances with a period T=900s along with higher harmonic frequencies for the year 2019 [*Leonhardt et al.*, 2020]. These spectral characteristics also occurred in 2020 and can be connected to small adjustments of the mains frequency in 15-minute intervals [*Arneitz et al.*, 2021]. Furthermore, a correlation between variations of magnetic disturbances with T=75s and power consumption is indicated, e.g., during the first lockdown due to the COVID19 pandemic in Austria (Fig. 5.2). The physical and/or technical sources of the observed characteristics are subject of ongoing investigations.

The average quiet day spectrum for our most sensitive scalar instrument, the GP20S3 potassium system, is shown in Figure 5.3 for the primary F component as obtained from the GP20S3NSS2 potassium sensor. The average noiselevel was calculated to 372 fT$/\sqrt{Hz}$. Spectral peaks can be seen at T = 900s, T = 300s, T≈140s, T≈130s, T≈120s, T≈100s, T≈75s, T=60, T=50s, T≈38s and T≈34s. Additonally for 90s > T > 50s and 50s > T > 2s a superposition with some spectral broadband distributions is visible. Another spectral broadband distribution is superimposed on all the other distributions between 3000s > T > 2s.
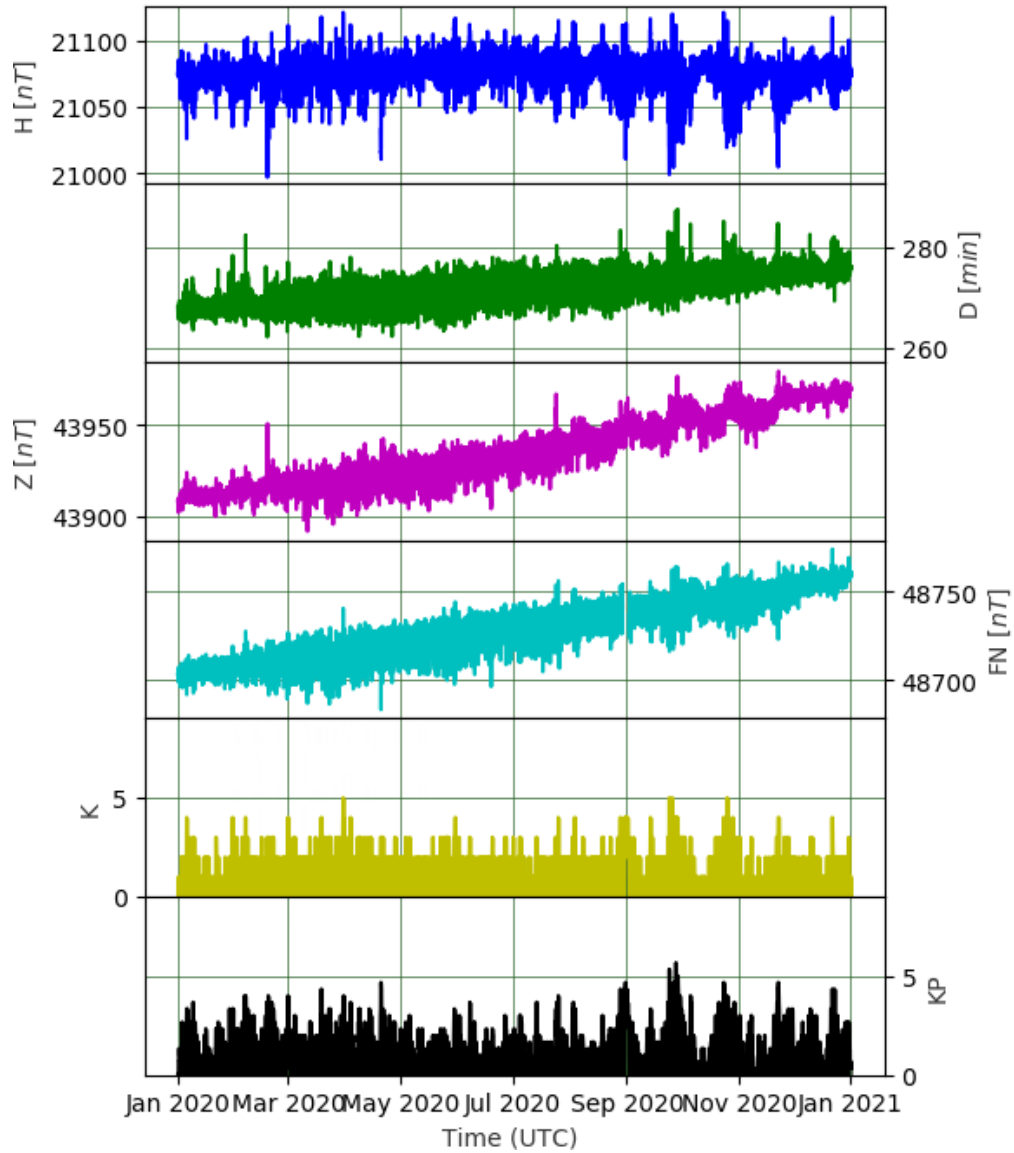
Figure 5.1 Definitive one-minute data of WIC. Shown are the three baseline corrected vectorial components, the independently determined F value and the temperature variation at the sensor position, as well as local K and global K_p indices.
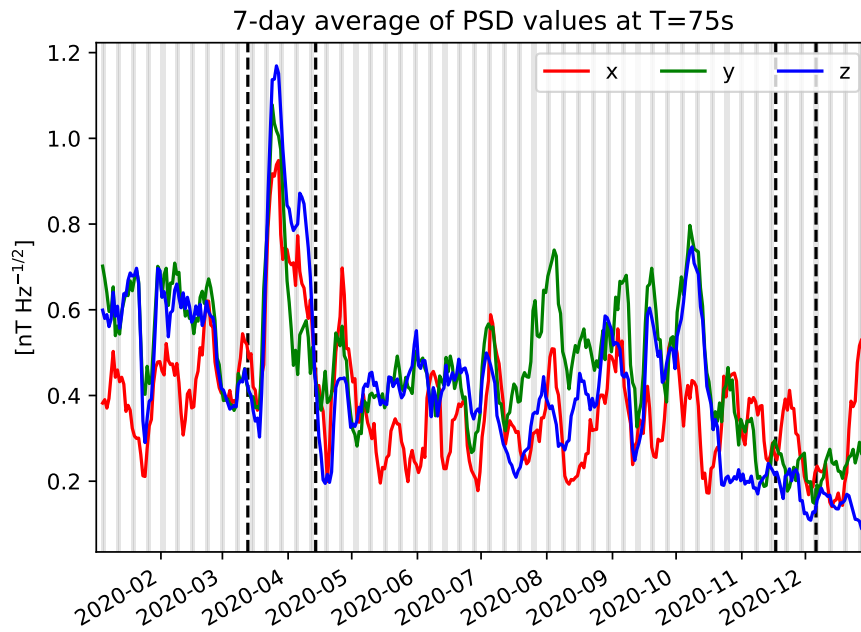
Figure 5.2 7-day running means of power spectral density (PSD) values at T=75s for field components x, y, and z recored with LEMI036 during the year 2020. Dashed vertical lines give the period of the first and second lockdown, respectively, while grey areas depict weekends.
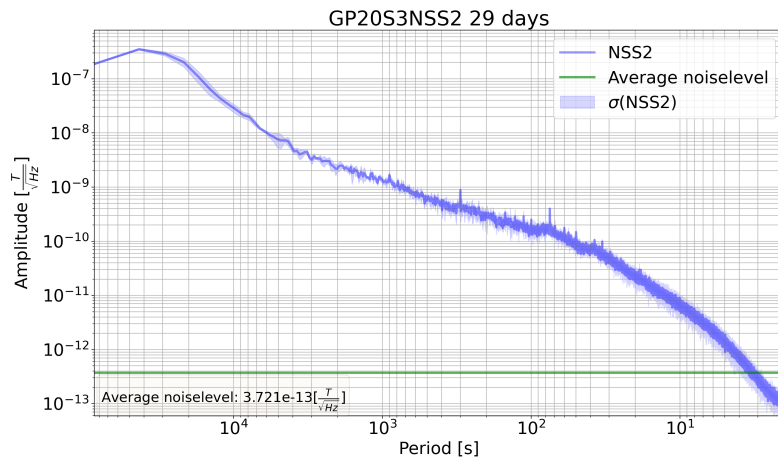
Figure 5.3 Average quiet day spectrum for F from the GP20S3NSS2 potassium sensor.

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 ($\approx$ 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 $\pm$ 2 nT, diff Y = -30 $\pm$ 1 nT, diff Z = -272 $\pm$ 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 = 0.0 nT/year, dY = 50.0 nT/year and dZ = 59.0 nT/year is obtained. Fitting and extrapolating an average annual derivative curve using cubic splines results in the following predicted average field values for 2021: H = 21076 nT, D = 4.66 deg, Z = 43998 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 then 90% of data is available then averages are not calculated.

Date	X [nT]	Y [nT]	Z [nT]	Fn [nT]
2020-01	21008.210	1642.850	43911.987	48706.323
2020-02	21006.537	1647.742	43917.526	48710.730
2020-03	21009.707	1651.557	43919.298	48713.921
2020-04	21009.281	1656.012	43925.448	48719.354
2020-05	21015.784	1658.524	43927.145	48723.757
2020-06	21015.888	1663.266	43932.386	48728.661
2020-07	21013.577	1667.204	43937.718	48732.668
2020-08	21011.908	1670.751	43943.845	48737.613
2020-09	21004.699	1676.092	43950.704	. . .
2020-10	21005.119	1679.787	43956.707	48746.540
2020-11	21004.364	1683.996	43962.028	48751.140
2020-12	21006.926	1687.512	43967.156	48757.018

Table 6.2. Yearly arithmetric 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
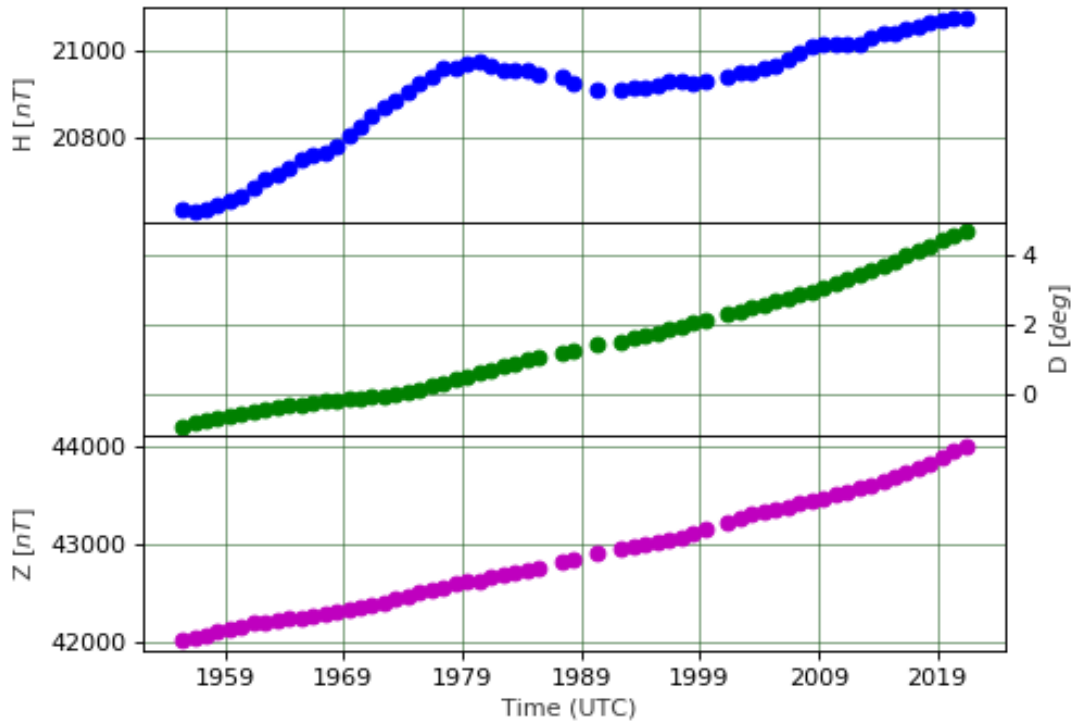
Figure 6.1 Yearly means since 1955. Data from 1955 until 2015 was obtained at the Cobenzl Observatory and corrected for the average offset of years 2014 and 2015 to the Conrad Observatory. Shown is also a predicted value for 2021.

ionospheric radio signal disturbances, and visible aurorae. The average local K for 2020 at Conrad Observatory corresponds to 1.2, which is in perfect agreement with the yearly average K_p of 1.2 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. Is 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
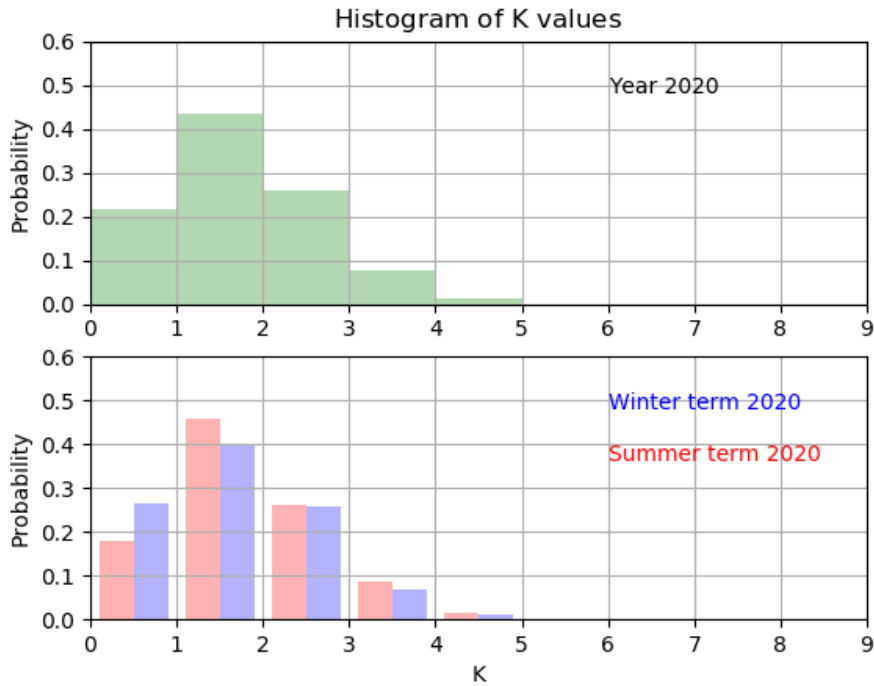
Figure 6.2 Distribution of K values.

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 4 days: 2020-08-31, 2020-09-26, 2020-09-28, 2020-11-22.

For quiet days the average daily K index needs to be below 0.5, and this was found for 29 days: 2020-01-13, 2020-01-14, 2020-01-19, 2020-01-20, 2020-01-25, 2020-01-27, 2020-02-03, 2020-02-14, 2020-02-16, 2020-07-11, 2020-07-12, 2020-09-09, 2020-09-10, 2020-09-11, 2020-10-09, 2020-10-10, 2020-10-11, 2020-10-14, 2020-11-09, 2020-11-10, 2020-11-14, 2020-11-16, 2020-11-18, 2020-12-04, 2020-12-07, 2020-12-15, 2020-12-16, 2020-12-17, 2020-12-18.

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, 9 storms were detected in the year 2020: 2020-03-31, 2020-04-20, 2020-08-03, 2020-09-28, 2020-09-29, 2020-10-19, 2020-10-23, 2020-10-28, 2020-12-10. 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.
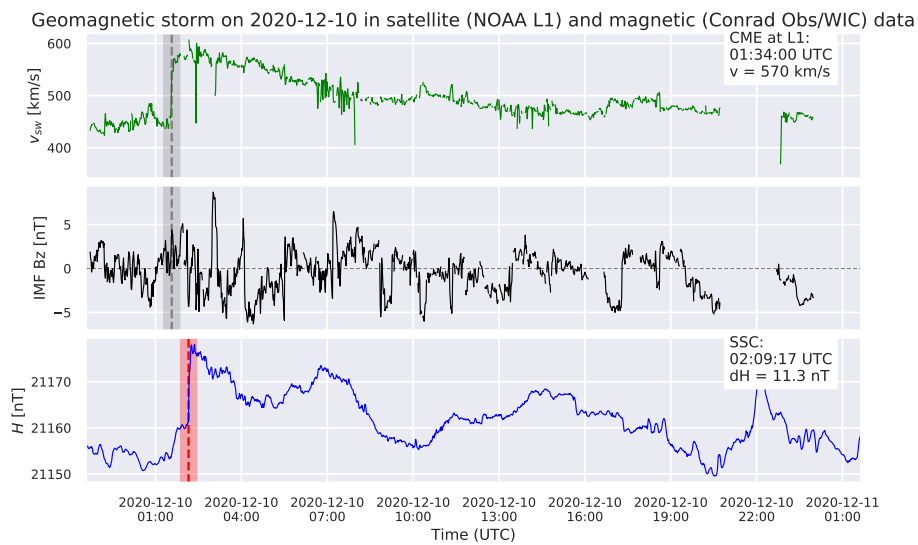
Figure 6.3 Most prominent geomagnetic storm in 2020. Shown are solar wind speed as determined at Lagrange point 1 (L1) by DSCOVR/ACE satellites and the horizontal component (H) of the geomagnetic field. Denoted are the times when shock front of the coronal mass ejection (CME) passed the satellite and initiated the sudden storm commencement (SSC) on earth.

Chapter 7

Publications and Presentations

In 2020 the geomagnetism group contributed to the following presentations and publications:

2020

Bailey, . L., C. Möstl, M. A. Reiss, A. J. Weiss, U. V. Amerstorfer, T. Amerstorfer, J. Hinter-reiter, W. Magnes, and R. Leonhardt, Prediction of Dst during solar minimum using in situ measurements at L5, *Space Weather*, *18*, 5, 2020.

Schnepp, E., D. Thallner, P. Arneitz, and R. Leonhardt, New archeomagnetic secular variation data from Central Europe, II: Intensities, *Physics of the Earth and Planetary Interiors*, *309*, 2020a.

Schnepp, E., D. Thallner, P. Arneitz, H. Mauritsch, R. Scholger, C. Rolf, and R. Leonhardt, New archaeomagnetic secular variation data from Central Europe, I: Directions, *Geophysical Journal International*, *220*, 1023–1044, 2020b.

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Bailey, R. and R. Leonhardt, Automated detection of geomagnetic storms with heightened risk of GIC, *Earth, Planets and Space*, *68:99*, 2016.

Jankowski, J. and C. Sucksdorff, *Guide for Magnetic Measurements and Observatory Practice*, 1996, ISBN 0965068625.

Lauridsen, K., Experiences with the DI Fluxgate magnetometer inclusive theory of the instrument and comparison with other methods, *Danish Meteorological Institute, Geophysical Papers*, *71*, 1–25, 1985.

Leonhardt, R., R. Bailey, M. Miklavec, and J. Matzka, GeomagPy, 2016.

Leonhardt, R., R. Egli, B. Leichter, I. Herzog, R. Kornfeld, R. Bailey, N. Kompein, P. Arneitz, R. Mandl, and R. Steiner, Conrad Observatory: Magnetic Results 2019, GMO Bulletin 6, Tech. rep., Zentralanstal für Meteorologie und Geodynamik, Vienna, 2020, iSBN: 978-3-903171-07-7.

Leonhardt, R., J. Matzka, and M. Wack, MagPy – A python based software for analyzing geomagnetic observatory measurements, in *Proceedings o f the XVth IAGA Workshop on Geomagnetic Observatory Instruments, Data Acquisition, and Processing 3/13*, edited by P. Hejda, A. Chulliat, and M. Catalán, pp. 169–172, San Fernando, Cadiz, 2013.

Menvielle, M., N. Papitashvili, L. Häkkinen, and C. Sucksdorff, Computer Production of K indices : Review and Comparison of Methods, *Geophysical Journal International*, *123*, 866–886, 1995, ISSN 0956540X.

Rasson, J. and A. Gonsette, The mark II automatic DIflux, *Data Science Journal*, *10*, 169–173, 2011.

St-Louis, B., *INTERMAGNET Technical Reference Manual*, INTERMAGNET, Edinburgh, 2012.

Sucksdorff, C., R. Pirjola, and L. Häkkinen, Computer production of K-values based on linear elimination, *Geophysical Transactions*, *36*, 333–345, 1991.

Wessely, G., *Geologie der österreichischen Bundesländer: Niederösterreich*, Geologische Bundesanstalt, Vienna, 2006, ISBN 3-85316-23-9.

Chapter 8

Appendix

Table 8.1.   K indicies: Daily K indicies 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
2020-01-01	0.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	
2020-01-02	0.0	0.0	1.0	1.0	0.0	1.0	1.0	2.0	
2020-01-03	0.0	1.0	2.0	2.0	0.0	1.0	1.0	2.0	
2020-01-04	1.0	1.0	1.0	2.0	1.0	1.0	2.0	2.0	
2020-01-05	1.0	0.0	1.0	0.0	1.0	2.0	4.0	2.0	
2020-01-06	2.0	2.0	1.0	0.0	1.0	1.0	3.0	2.0	
2020-01-07	0.0	1.0	1.0	0.0	1.0	1.0	2.0	2.0	
2020-01-08	0.0	1.0	1.0	1.0	1.0	2.0	2.0	3.0	
2020-01-09	2.0	2.0	2.0	1.0	2.0	3.0	3.0	1.0	
2020-01-10	1.0	0.0	1.0	2.0	1.0	2.0	1.0	0.0	
2020-01-11	1.0	1.0	2.0	1.0	0.0	2.0	0.0	1.0	
2020-01-12	1.0	1.0	2.0	2.0	1.0	0.0	0.0	1.0	
2020-01-13	0.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	Q
2020-01-14	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	Q
2020-01-15	1.0	0.0	1.0	2.0	2.0	1.0	1.0	2.0	
2020-01-16	0.0	1.0	2.0	1.0	1.0	1.0	1.0	0.0	
2020-01-17	1.0	0.0	2.0	1.0	1.0	2.0	1.0	0.0	
2020-01-18	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	
2020-01-19	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	Q
2020-01-20	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	Q
2020-01-21	0.0	0.0	1.0	1.0	1.0	3.0	3.0	2.0	
2020-01-22	1.0	1.0	0.0	1.0	1.0	1.0	2.0	2.0	
2020-01-23	2.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	
2020-01-24	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	
2020-01-25	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	Q
2020-01-26	1.0	0.0	1.0	1.0	1.0	2.0	0.0	1.0	
2020-01-27	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	Q
2020-01-28	0.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	
2020-01-29	2.0	2.0	1.0	2.0	1.0	1.0	2.0	2.0	
2020-01-30	1.0	1.0	1.0	0.0	3.0	3.0	4.0	3.0	
2020-01-31	2.0	3.0	1.0	2.0	0.0	1.0	0.0	2.0	
2020-02-01	1.0	0.0	1.0	1.0	2.0	2.0	2.0	3.0	
2020-02-02	2.0	0.0	1.0	1.0	0.0	2.0	2.0	1.0	
2020-02-03	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	Q
2020-02-04	1.0	1.0	1.0	1.0	1.0	1.0	2.0	3.0	
2020-02-05	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	
2020-02-06	1.0	1.0	3.0	2.0	2.0	2.0	4.0	2.0	
2020-02-07	2.0	2.0	2.0	0.0	3.0	2.0	3.0	3.0	
2020-02-08	1.0	0.0	0.0	0.0	2.0	2.0	1.0	1.0	
2020-02-09	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	
2020-02-10	2.0	1.0	1.0	1.0	0.0	1.0	1.0	2.0	
2020-02-11	2.0	2.0	1.0	0.0	0.0	0.0	1.0	2.0	
2020-02-12	1.0	1.0	2.0	2.0	2.0	1.0	0.0	1.0	
2020-02-13	1.0	0.0	1.0	1.0	0.0	0.0	1.0	2.0	
2020-02-14	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	Q
2020-02-15	1.0	0.0	1.0	2.0	3.0	1.0	1.0	1.0	
2020-02-16	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	Q
2020-02-17	1.0	1.0	0.0	1.0	1.0	1.0	2.0	2.0	
2020-02-18	0.0	2.0	2.0	1.0	3.0	3.0	3.0	2.0	
2020-02-19	1.0	3.0	3.0	3.0	2.0	2.0	1.0	2.0	
2020-02-20	2.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	
2020-02-21	3.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0	
2020-02-22	2.0	1.0	1.0	2.0	2.0	2.0	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
2020-02-23	0.0	0.0	1.0	1.0	0.0	1.0	2.0	2.0	
2020-02-24	2.0	1.0	0.0	0.0	0.0	1.0	1.0	2.0	
2020-02-25	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	Q
2020-02-26	1.0	1.0	1.0	0.0	1.0	0.0	2.0	2.0	
2020-02-27	2.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	
2020-02-28	2.0	2.0	2.0	2.0	1.0	1.0	1.0	2.0	
2020-02-29	1.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0	
2020-03-01	3.0	1.0	2.0	3.0	1.0	0.0	1.0	2.0	
2020-03-02	2.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	
2020-03-03	2.0	1.0	0.0	2.0	2.0	2.0	1.0	3.0	
2020-03-04	0.0	0.0	1.0	2.0	1.0	3.0	2.0	2.0	
2020-03-05	0.0	0.0	1.0	1.0	2.0	1.0	1.0	0.0	
2020-03-06	1.0	1.0	1.0	2.0	2.0	2.0	1.0	0.0	
2020-03-07	1.0	0.0	2.0	1.0	2.0	0.0	0.0	0.0	
2020-03-08	1.0	1.0	2.0	2.0	0.0	2.0	2.0	2.0	
2020-03-09	0.0	1.0	2.0	0.0	1.0	2.0	2.0	1.0	
2020-03-10	2.0	0.0	2.0	1.0	1.0	1.0	1.0	2.0	
2020-03-11	2.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	
2020-03-12	2.0	2.0	1.0	2.0	2.0	2.0	3.0	1.0	
2020-03-13	1.0	1.0	2.0	2.0	2.0	1.0	1.0	2.0	
2020-03-14	0.0	0.0	1.0	1.0	1.0	0.0	2.0	0.0	
2020-03-15	0.0	0.0	1.0	2.0	1.0	1.0	2.0	3.0	
2020-03-16	2.0	0.0	1.0	2.0	1.0	1.0	2.0	1.0	
2020-03-17	1.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	
2020-03-18	0.0	0.0	0.0	1.0	2.0	2.0	3.0	2.0	
2020-03-19	4.0	2.0	2.0	2.0	2.0	1.0	1.0	2.0	
2020-03-20	2.0	1.0	1.0	1.0	1.0	3.0	2.0	3.0	
2020-03-21	0.0	1.0	2.0	2.0	2.0	2.0	1.0	2.0	
2020-03-22	1.0	1.0	1.0	1.0	2.0	2.0	3.0	3.0	
2020-03-23	1.0	3.0	2.0	3.0	2.0	1.0	3.0	3.0	
2020-03-24	3.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	
2020-03-25	1.0	0.0	1.0	1.0	2.0	0.0	1.0	2.0	
2020-03-26	0.0	0.0	1.0	1.0	1.0	2.0	2.0	3.0	
2020-03-27	1.0	1.0	0.0	1.0	1.0	2.0	3.0	0.0	
2020-03-28	0.0	1.0	1.0	2.0	2.0	1.0	2.0	3.0	
2020-03-29	1.0	1.0	2.0	2.0	2.0	2.0	1.0	1.0	
2020-03-30	1.0	1.0	1.0	0.0	2.0	3.0	4.0	5.0	
2020-03-31	3.0	3.0	4.0	1.0	2.0	2.0	3.0	2.0	
2020-04-01	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	
2020-04-02	1.0	1.0	2.0	1.0	0.0	1.0	3.0	3.0	
2020-04-03	2.0	1.0	0.0	1.0	2.0	2.0	3.0	4.0	
2020-04-04	1.0	1.0	1.0	2.0	1.0	1.0	2.0	2.0	
2020-04-05	1.0	2.0	2.0	2.0	1.0	1.0	0.0	2.0	
2020-04-06	1.0	1.0	1.0	0.0	1.0	0.0	0.0	0.0	
2020-04-07	0.0	0.0	1.0	0.0	1.0	0.0	3.0	3.0	
2020-04-08	1.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0	
2020-04-09	1.0	1.0	0.0	1.0	1.0	0.0	3.0	2.0	
2020-04-10	0.0	1.0	0.0	2.0	1.0	2.0	0.0	0.0	
2020-04-11	0.0	1.0	2.0	1.0	2.0	2.0	3.0	3.0	
2020-04-12	1.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	
2020-04-13	0.0	1.0	0.0	1.0	1.0	1.0	2.0	3.0	
2020-04-14	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	
2020-04-15	3.0	2.0	1.0	1.0	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
2020-04-16	2.0	2.0	1.0	0.0	0.0	1.0	2.0	0.0	
2020-04-17	1.0	0.0	1.0	1.0	0.0	1.0	0.0	2.0	
2020-04-18	2.0	2.0	2.0	2.0	0.0	1.0	1.0	0.0	
2020-04-19	0.0	1.0	1.0	0.0	1.0	0.0	1.0	0.0	
2020-04-20	2.0	3.0	3.0	3.0	3.0	3.0	1.0	1.0	
2020-04-21	1.0	3.0	2.0	2.0	3.0	3.0	2.0	2.0	
2020-04-22	2.0	1.0	1.0	2.0	2.0	1.0	1.0	2.0	
2020-04-23	1.0	1.0	2.0	2.0	1.0	0.0	0.0	2.0	
2020-04-24	2.0	1.0	2.0	1.0	1.0	2.0	2.0	2.0	
2020-04-25	2.0	1.0	2.0	1.0	1.0	1.0	0.0	0.0	
2020-04-26	0.0	2.0	1.0	2.0	2.0	2.0	1.0	2.0	
2020-04-27	2.0	1.0	2.0	1.0	2.0	2.0	2.0	2.0	
2020-04-28	3.0	1.0	2.0	3.0	2.0	1.0	0.0	2.0	
2020-04-29	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	
2020-04-30	2.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	
2020-05-01	1.0	1.0	2.0	2.0	2.0	2.0	0.0	1.0	
2020-05-02	0.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0	
2020-05-03	0.0	1.0	1.0	1.0	1.0	0.0	2.0	3.0	
2020-05-04	2.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0	
2020-05-05	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	
2020-05-06	3.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	
2020-05-07	1.0	1.0	2.0	1.0	1.0	1.0	1.0	0.0	
2020-05-08	0.0	1.0	1.0	1.0	1.0	0.0	0.0	2.0	
2020-05-09	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	
2020-05-10	0.0	1.0	1.0	2.0	1.0	2.0	2.0	2.0	
2020-05-11	0.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0	
2020-05-12	1.0	1.0	1.0	1.0	1.0	1.0	0.0	2.0	
2020-05-13	2.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	
2020-05-14	1.0	2.0	1.0	0.0	0.0	1.0	1.0	1.0	
2020-05-15	0.0	0.0	2.0	2.0	1.0	1.0	0.0	0.0	
2020-05-16	1.0	0.0	1.0	1.0	2.0	2.0	1.0	1.0	
2020-05-17	0.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	
2020-05-18	1.0	1.0	1.0	1.0	2.0	3.0	2.0	1.0	
2020-05-19	2.0	1.0	2.0	2.0	1.0	1.0	1.0	2.0	
2020-05-20	0.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	
2020-05-21	1.0	2.0	1.0	2.0	1.0	1.0	2.0	2.0	
2020-05-22	2.0	2.0	2.0	2.0	2.0	2.0	3.0	1.0	
2020-05-23	1.0	2.0	2.0	2.0	1.0	1.0	1.0	0.0	
2020-05-24	0.0	1.0	1.0	1.0	2.0	3.0	2.0	1.0	
2020-05-25	1.0	2.0	1.0	1.0	3.0	2.0	2.0	3.0	
2020-05-26	1.0	0.0	1.0	3.0	3.0	1.0	1.0	3.0	
2020-05-27	2.0	2.0	3.0	2.0	2.0	0.0	2.0	0.0	
2020-05-28	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	
2020-05-29	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	
2020-05-30	2.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	
2020-05-31	1.0	2.0	1.0	2.0	2.0	2.0	1.0	1.0	
2020-06-01	1.0	1.0	1.0	1.0	1.0	2.0	2.0	3.0	
2020-06-02	2.0	2.0	1.0	1.0	1.0	1.0	2.0	1.0	
2020-06-03	0.0	1.0	0.0	1.0	1.0	2.0	0.0	0.0	
2020-06-04	1.0	1.0	1.0	1.0	0.0	1.0	2.0	1.0	
2020-06-05	0.0	1.0	1.0	0.0	1.0	0.0	1.0	0.0	
2020-06-06	1.0	1.0	2.0	1.0	1.0	1.0	1.0	0.0	
2020-06-07	1.0	1.0	1.0	2.0	2.0	3.0	3.0	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
2020-06-08	1.0	1.0	1.0	2.0	1.0	1.0	1.0	0.0	
2020-06-09	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	
2020-06-10	1.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0	
2020-06-11	0.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	
2020-06-12	1.0	1.0	2.0	2.0	1.0	1.0	0.0	0.0	
2020-06-13	0.0	1.0	0.0	1.0	2.0	1.0	0.0	0.0	
2020-06-14	1.0	1.0	1.0	2.0	2.0	1.0	1.0	0.0	
2020-06-15	0.0	2.0	1.0	2.0	1.0	1.0	1.0	0.0	
2020-06-16	0.0	1.0	1.0	2.0	1.0	2.0	2.0	2.0	
2020-06-17	2.0	1.0	2.0	2.0	2.0	2.0	1.0	0.0	
2020-06-18	0.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	
2020-06-19	1.0	2.0	1.0	2.0	1.0	2.0	2.0	2.0	
2020-06-20	3.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0	
2020-06-21	1.0	0.0	1.0	1.0	2.0	1.0	1.0	1.0	
2020-06-22	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	
2020-06-23	0.0	1.0	1.0	0.0	1.0	1.0	1.0	2.0	
2020-06-24	1.0	2.0	1.0	2.0	2.0	1.0	0.0	1.0	
2020-06-25	1.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0	
2020-06-26	1.0	0.0	1.0	0.0	1.0	2.0	2.0	3.0	
2020-06-27	2.0	2.0	1.0	3.0	3.0	1.0	1.0	1.0	
2020-06-28	0.0	1.0	1.0	0.0	1.0	0.0	0.0	2.0	
2020-06-29	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	
2020-06-30	2.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	
2020-07-01	1.0	1.0	2.0	3.0	1.0	2.0	2.0	2.0	
2020-07-02	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
2020-07-03	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
2020-07-04	1.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	
2020-07-05	2.0	1.0	3.0	3.0	1.0	1.0	2.0	2.0	
2020-07-06	1.0	1.0	2.0	0.0	1.0	2.0	2.0	1.0	
2020-07-07	1.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	
2020-07-08	0.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	
2020-07-09	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	
2020-07-10	1.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	
2020-07-11	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	
2020-07-12	0.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	Q
2020-07-13	1.0	1.0	2.0	2.0	2.0	2.0	2.0	3.0	
2020-07-14	3.0	3.0	2.0	1.0	2.0	2.0	1.0	1.0	
2020-07-15	0.0	1.0	2.0	2.0	2.0	1.0	1.0	0.0	
2020-07-16	1.0	1.0	0.0	2.0	2.0	2.0	1.0	1.0	
2020-07-17	0.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	
2020-07-18	2.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	
2020-07-19	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
2020-07-20	0.0	1.0	2.0	0.0	1.0	1.0	0.0	1.0	
2020-07-21	1.0	0.0	0.0	1.0	1.0	1.0	1.0	2.0	
2020-07-22	1.0	1.0	1.0	1.0	0.0	1.0	2.0	1.0	
2020-07-23	1.0	2.0	2.0	1.0	1.0	1.0	1.0	0.0	
2020-07-24	1.0	2.0	2.0	3.0	3.0	3.0	2.0	3.0	
2020-07-25	3.0	2.0	3.0	2.0	2.0	2.0	1.0	4.0	
2020-07-26	1.0	0.0	0.0	1.0	2.0	1.0	0.0	1.0	
2020-07-27	0.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	
2020-07-28	2.0	1.0	1.0	1.0	2.0	1.0	0.0	1.0	
2020-07-29	2.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	
2020-07-30	1.0	1.0	1.0	2.0	2.0	1.0	0.0	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
2020-07-31	1.0	2.0	1.0	2.0	2.0	1.0	1.0	0.0	
2020-08-01	0.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	
2020-08-02	1.0	1.0	2.0	2.0	3.0	3.0	3.0	2.0	
2020-08-03	3.0	3.0	3.0	3.0	2.0	3.0	3.0	4.0	
2020-08-04	2.0	2.0	2.0	2.0	1.0	1.0	1.0	2.0	
2020-08-05	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	
2020-08-06	0.0	1.0	1.0	1.0	2.0	2.0	1.0	2.0	
2020-08-07	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
2020-08-08	1.0	1.0	3.0	2.0	2.0	1.0	1.0	1.0	
2020-08-09	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	
2020-08-10	0.0	1.0	2.0	0.0	0.0	1.0	0.0	1.0	
2020-08-11	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	
2020-08-12	0.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	
2020-08-13	1.0	1.0	1.0	1.0	2.0	1.0	0.0	2.0	
2020-08-14	1.0	2.0	2.0	2.0	2.0	1.0	2.0	1.0	
2020-08-15	0.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	
2020-08-16	2.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	
2020-08-17	1.0	1.0	1.0	2.0	1.0	1.0	0.0	0.0	
2020-08-18	1.0	1.0	1.0	1.0	1.0	0.0	1.0	3.0	
2020-08-19	2.0	2.0	3.0	2.0	0.0	0.0	0.0	1.0	
2020-08-20	0.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	
2020-08-21	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	
2020-08-22	0.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	
2020-08-23	1.0	2.0	3.0	2.0	2.0	2.0	1.0	2.0	
2020-08-24	0.0	1.0	1.0	2.0	1.0	2.0	1.0	0.0	
2020-08-25	0.0	1.0	1.0	1.0	1.0	1.0	2.0	0.0	
2020-08-26	1.0	1.0	1.0	2.0	1.0	2.0	1.0	2.0	
2020-08-27	1.0	2.0	2.0	2.0	3.0	1.0	1.0	2.0	
2020-08-28	0.0	1.0	1.0	2.0	3.0	4.0	2.0	3.0	
2020-08-29	3.0	2.0	3.0	2.0	1.0	2.0	nan	nan	
2020-08-30	0.0	3.0	2.0	2.0	2.0	2.0	1.0	3.0	
2020-08-31	3.0	4.0	2.0	4.0	4.0	3.0	4.0	3.0	D
2020-09-01	2.0	3.0	2.0	3.0	3.0	4.0	3.0	3.0	
2020-09-02	2.0	2.0	2.0	2.0	3.0	2.0	1.0	2.0	
2020-09-03	0.0	0.0	1.0	1.0	1.0	1.0	0.0	2.0	
2020-09-04	2.0	1.0	1.0	2.0	2.0	2.0	3.0	1.0	
2020-09-05	2.0	1.0	2.0	2.0	2.0	0.0	1.0	nan	
2020-09-06	0.0	1.0	0.0	1.0	1.0	0.0	1.0	2.0	
2020-09-07	1.0	1.0	1.0	1.0	0.0	2.0	1.0	0.0	
2020-09-08	1.0	1.0	2.0	2.0	1.0	1.0	1.0	0.0	
2020-09-09	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	Q
2020-09-10	0.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	Q
2020-09-11	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	Q
2020-09-12	0.0	0.0	2.0	1.0	1.0	2.0	2.0	0.0	
2020-09-13	1.0	2.0	2.0	1.0	2.0	2.0	1.0	3.0	
2020-09-14	4.0	3.0	3.0	3.0	3.0	1.0	1.0	3.0	
2020-09-15	3.0	2.0	2.0	1.0	0.0	1.0	1.0	1.0	
2020-09-16	0.0	1.0	1.0	2.0	1.0	2.0	2.0	0.0	
2020-09-17	0.0	1.0	1.0	1.0	0.0	1.0	0.0	2.0	
2020-09-18	1.0	1.0	1.0	0.0	2.0	1.0	2.0	0.0	
2020-09-19	0.0	1.0	1.0	1.0	0.0	1.0	0.0	0.0	
2020-09-20	0.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	
2020-09-21	0.0	1.0	1.0	1.0	1.0	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
2020-09-22	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	
2020-09-23	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	
2020-09-24	2.0	3.0	5.0	3.0	3.0	3.0	2.0	2.0	
2020-09-25	2.0	1.0	3.0	3.0	2.0	4.0	4.0	5.0	
2020-09-26	4.0	3.0	3.0	3.0	4.0	2.0	2.0	4.0	D
2020-09-27	1.0	3.0	2.0	1.0	2.0	2.0	4.0	4.0	
2020-09-28	3.0	4.0	2.0	3.0	2.0	3.0	4.0	3.0	
2020-09-29	3.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	
2020-09-30	3.0	2.0	3.0	2.0	2.0	2.0	3.0	3.0	
2020-10-01	2.0	1.0	2.0	3.0	2.0	3.0	3.0	1.0	
2020-10-02	1.0	1.0	1.0	3.0	3.0	2.0	3.0	2.0	
2020-10-03	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
2020-10-04	0.0	1.0	1.0	2.0	2.0	0.0	0.0	1.0	
2020-10-05	0.0	0.0	1.0	2.0	2.0	3.0	3.0	3.0	
2020-10-06	1.0	2.0	1.0	1.0	2.0	1.0	1.0	1.0	
2020-10-07	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	
2020-10-08	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	
2020-10-09	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	Q
2020-10-10	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	Q
2020-10-11	0.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	
2020-10-12	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	
2020-10-13	1.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0	
2020-10-14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Q
2020-10-15	0.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	
2020-10-16	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	
2020-10-17	1.0	0.0	1.0	1.0	1.0	1.0	2.0	2.0	
2020-10-18	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	
2020-10-19	0.0	1.0	1.0	2.0	3.0	2.0	2.0	2.0	
2020-10-20	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	
2020-10-21	2.0	2.0	3.0	2.0	1.0	1.0	1.0	2.0	
2020-10-22	3.0	2.0	1.0	1.0	1.0	1.0	2.0	2.0	
2020-10-23	1.0	1.0	1.0	1.0	2.0	3.0	4.0	4.0	
2020-10-24	3.0	3.0	3.0	3.0	2.0	3.0	3.0	3.0	
2020-10-25	2.0	2.0	2.0	2.0	3.0	3.0	5.0	3.0	
2020-10-26	2.0	3.0	2.0	2.0	3.0	2.0	3.0	3.0	
2020-10-27	1.0	2.0	3.0	3.0	1.0	1.0	2.0	2.0	
2020-10-28	2.0	2.0	1.0	2.0	2.0	3.0	4.0	3.0	
2020-10-29	0.0	1.0	3.0	3.0	2.0	3.0	2.0	2.0	
2020-10-30	2.0	1.0	0.0	1.0	0.0	0.0	1.0	3.0	
2020-10-31	1.0	1.0	2.0	2.0	2.0	3.0	1.0	1.0	
2020-11-01	1.0	1.0	2.0	2.0	3.0	3.0	3.0	2.0	
2020-11-02	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	
2020-11-03	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	
2020-11-04	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	
2020-11-05	0.0	0.0	1.0	1.0	2.0	1.0	2.0	1.0	
2020-11-06	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	
2020-11-07	1.0	1.0	1.0	2.0	1.0	1.0	2.0	3.0	
2020-11-08	0.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	
2020-11-09	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	Q
2020-11-10	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	Q
2020-11-11	0.0	0.0	1.0	1.0	0.0	2.0	2.0	2.0	
2020-11-12	0.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0	Q
2020-11-13	0.0	1.0	1.0	1.0	0.0	0.0	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
2020-11-14	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	Q
2020-11-15	1.0	1.0	0.0	0.0	0.0	2.0	1.0	0.0	
2020-11-16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Q
2020-11-17	0.0	0.0	1.0	1.0	2.0	0.0	0.0	1.0	
2020-11-18	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Q
2020-11-19	0.0	0.0	1.0	2.0	0.0	0.0	0.0	2.0	
2020-11-20	2.0	1.0	2.0	2.0	1.0	1.0	2.0	1.0	
2020-11-21	1.0	0.0	1.0	2.0	3.0	3.0	3.0	3.0	
2020-11-22	2.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	D
2020-11-23	1.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	
2020-11-24	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	
2020-11-25	1.0	2.0	0.0	1.0	1.0	2.0	2.0	3.0	
2020-11-26	2.0	1.0	0.0	1.0	2.0	2.0	3.0	2.0	
2020-11-27	0.0	1.0	2.0	1.0	2.0	1.0	0.0	1.0	
2020-11-28	3.0	3.0	2.0	2.0	2.0	1.0	2.0	2.0	
2020-11-29	0.0	1.0	2.0	2.0	1.0	1.0	0.0	0.0	
2020-11-30	1.0	2.0	2.0	2.0	1.0	1.0	0.0	2.0	
2020-12-01	2.0	0.0	1.0	1.0	0.0	0.0	0.0	1.0	
2020-12-02	2.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	
2020-12-03	0.0	0.0	0.0	0.0	1.0	2.0	1.0	0.0	
2020-12-04	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	Q
2020-12-05	0.0	1.0	1.0	1.0	2.0	1.0	2.0	1.0	
2020-12-06	1.0	1.0	1.0	2.0	2.0	1.0	2.0	2.0	
2020-12-07	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	Q
2020-12-08	1.0	1.0	1.0	1.0	0.0	0.0	0.0	2.0	
2020-12-09	1.0	1.0	1.0	1.0	1.0	2.0	2.0	1.0	
2020-12-10	3.0	1.0	1.0	1.0	0.0	0.0	1.0	2.0	
2020-12-11	3.0	2.0	1.0	1.0	0.0	1.0	2.0	1.0	
2020-12-12	1.0	1.0	1.0	1.0	0.0	1.0	1.0	2.0	
2020-12-13	2.0	1.0	0.0	0.0	1.0	0.0	2.0	1.0	
2020-12-14	0.0	1.0	1.0	0.0	0.0	0.0	2.0	1.0	
2020-12-15	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	Q
2020-12-16	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	Q
2020-12-17	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	Q
2020-12-18	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	Q
2020-12-19	2.0	1.0	2.0	2.0	2.0	0.0	2.0	1.0	
2020-12-20	1.0	1.0	1.0	1.0	1.0	1.0	0.0	2.0	
2020-12-21	0.0	1.0	1.0	2.0	2.0	1.0	2.0	4.0	
2020-12-22	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
2020-12-23	1.0	2.0	1.0	1.0	1.0	1.0	2.0	2.0	
2020-12-24	1.0	1.0	1.0	2.0	2.0	2.0	1.0	2.0	
2020-12-25	2.0	0.0	1.0	2.0	2.0	1.0	0.0	0.0	
2020-12-26	0.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	
2020-12-27	2.0	1.0	0.0	2.0	2.0	1.0	1.0	2.0	
2020-12-28	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	
2020-12-29	1.0	1.0	1.0	2.0	1.0	1.0	2.0	2.0	
2020-12-30	2.0	2.0	2.0	2.0	1.0	1.0	1.0	3.0	

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
2020-05-23	182
2020-05-26	42
2020-06-03	88
2020-06-07	15
2020-06-14	24
2020-06-26	58
2020-07-01	221
2020-07-24	134
2020-07-28	353
2020-08-11	94
2020-08-13	68
2020-08-14	86
2020-08-29	114
2020-09-05	113

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
2020, Field component: X, Base: 20900.0, Unit: nT																									
Jan01	111	111	112	111	114	118	120	119	115	113	112	114	114	113	114	115	111	111	113	112	113	113	113	113	114
Jan02	113	114	114	116	118	119	121	121	115	106	100	95	96	100	106	109	109	109	113	114	113	113	113	121	111
Jan03	117	118	117	119	122	126	126	123	117	106	102	102	100	103	104	106	107	112	110	106	104	104	103	103	111
Jan04	104	104	106	108	108	108	109	110	112	109	101	94	98	104	103	100	92	86	88	92	92	91	92	94	100
Jan05	95	98	102	103	104	104	106	107	111	113	111	110	110	110	114	118	112	106	94	72	76	92	93	97	102
Jan06	90	103	100	102	103	103	108	106	106	103	101	99	99	104	108	110	111	108	97	101	114	101	104	106	104
Jan07	104	103	105	107	107	109	112	113	106	99	97	98	102	107	108	103	103	105	106	108	107	103	110	104	105
Jan08	105	105	107	110	111	117	118	115	107	97	93	94	96	101	103	106	106	100	92	97	96	89	86	96	102
Jan09	100	101	98	105	116	116	114	115	98	89	85	87	96	103	101	89	102	100	92	86	87	96	100	103	99
Jan10	103	101	100	103	105	106	108	103	106	103	97	93	99	103	104	103	95	101	92	105	102	103	104	103	102
Jan11	106	110	110	107	107	107	104	111	111	109	107	102	105	107	107	102	104	109	105	109	109	107	106	104	107
Jan12	105	104	104	106	111	111	115	108	108	101	102	107	108	108	108	110	109	110	110	109	109	107	106	110	108
Jan13	106	106	107	107	111	112	115	117	114	111	108	106	108	110	116	117	115	114	113	110	111	111	111	110	111
Jan14	109	110	111	112	115	118	120	122	114	104	103	102	103	104	107	110	108	110	107	108	110	109	109	109	110
Jan15	112	110	111	113	116	119	121	123	121	110	103	113	115	111	110	109	110	108	111	112	110	106	108	109	112
Jan16	109	110	110	112	116	120	121	128	121	110	99	99	103	104	106	109	109	107	109	111	107	109	109	110	111
Jan17	110	110	111	114	116	118	125	121	118	107	104	105	109	114	117	111	105	106	110	107	109	110	111	111	112
Jan18	113	114	112	115	120	118	121	120	118	104	104	108	110	112	116	115	117	119	118	116	115	113	110	110	114
Jan19	110	112	113	116	116	118	119	118	115	101	100	102	106	108	114	116	117	114	115	115	113	113	111	110	112
Jan20	110	110	110	110	112	116	116	116	113	105	106	109	110	112	115	114	114	114	113	114	114	111	110	109	111
Jan21	110	113	114	116	117	121	124	128	120	110	112	114	114	118	116	100	96	112	106	106	111	95	101	102	110
Jan22	101	103	101	103	108	108	114	113	110	107	100	101	105	104	107	108	110	107	108	108	103	103	102	102	106
Jan23	102	97	96	102	109	112	116	118	111	102	97	96	99	100	104	107	108	105	105	103	98	102	104	104	104
Jan24	105	107	105	106	107	110	113	115	113	112	109	110	110	108	112	114	115	113	112	112	113	111	111	113	111
Jan25	113	113	113	114	114	118	127	126	124	120	116	113	114	113	115	116	116	114	116	115	116	114	112	112	116
Jan26	111	110	115	118	120	122	123	124	120	114	109	105	109	111	114	115	110	111	114	115	116	114	110	111	114
Jan27	112	114	114	115	117	120	123	123	117	111	106	101	100	101	107	112	113	113	113	113	114	114	113	113	112
Jan28	111	110	108	111	111	114	119	125	123	116	117	119	118	117	118	116	114	112	113	113	107	107	110	103	114
Jan29	101	101	110	105	105	108	110	108	102	89	92	99	103	104	106	106	104	96	96	99	102	105	110	103	103
Jan30	109	108	106	109	113	112	112	116	110	110	109	110	109	101	109	108	85	79	79	89	96	98	92	99	103
Jan31	99	94	99	98	113	110	110	110	105	93	94	91	103	107	109	107	106	105	105	104	105	105	105	108	103
2020, Field component: Y, Base: 1600.0, Unit: nT																									
Jan01	41	39	37	37	37	38	40	43	43	38	35	32	29	33	38	37	39	39	38	41	47	45	44	41	39
Jan02	39	37	36	35	36	37	40	42	46	47	43	33	28	31	34	36	38	41	40	40	42	43	47	48	39
Jan03	41	37	36	35	34	36	37	38	41	45	41	31	27	33	32	32	34	39	41	43	45	47	55	54	39

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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	53	48	40	37	39	38	41	42	43	47	43	31	29	31	31	34	25	35	35	50	45	48	55	59	41
Jan05	59	56	53	46	46	43	45	48	46	45	40	30	26	33	30	36	33	41	37	61	61	60	56	54	45
Jan06	53	36	36	43	44	37	44	49	49	48	43	34	35	38	40	41	41	40	43	46	49	51	46	45	43
Jan07	42	41	39	41	38	39	43	49	54	52	45	31	28	32	34	36	38	41	46	50	49	49	53	44	42
Jan08	43	44	41	42	40	39	42	46	47	46	42	32	26	26	31	39	42	40	39	44	49	66	62	58	43
Jan09	58	64	52	41	41	37	24	35	46	46	43	35	24	30	31	39	38	45	45	50	56	53	53	48	43
Jan10	47	41	41	39	41	41	44	51	48	49	36	31	30	33	34	37	39	45	45	44	48	47	49	52	42
Jan11	44	37	41	42	43	47	47	52	54	49	43	41	33	31	34	37	37	41	41	45	48	47	48	47	43
Jan12	52	46	45	44	46	45	44	48	52	46	41	38	33	35	40	44	44	43	43	45	46	47	46	52	44
Jan13	45	42	44	43	41	42	43	49	52	48	45	36	31	32	36	38	39	40	44	42	47	50	50	47	43
Jan14	44	41	39	39	41	40	42	47	52	50	46	42	33	31	37	42	41	40	41	43	44	44	44	45	42
Jan15	44	42	40	39	39	35	41	45	50	45	39	35	31	31	35	40	40	41	43	41	45	49	49	46	41
Jan16	45	42	38	37	35	40	43	44	48	50	40	38	35	35	41	42	41	41	44	44	46	48	45	46	42
Jan17	42	40	39	39	39	41	44	48	53	45	44	40	32	31	36	41	42	41	47	44	43	45	45	45	42
Jan18	43	41	40	36	37	40	43	45	49	48	39	34	31	32	38	42	44	41	41	43	43	44	45	44	41
Jan19	42	39	38	38	40	39	46	49	50	45	40	32	28	30	37	43	41	42	44	45	45	44	44	43	41
Jan20	43	42	42	42	41	43	44	52	53	48	36	34	34	37	38	41	42	43	43	45	44	44	45	44	42
Jan21	43	41	41	41	42	43	46	50	56	50	44	38	28	24	27	29	32	40	45	39	55	55	53	50	42
Jan22	51	50	49	43	43	44	46	50	50	43	41	37	32	35	36	38	41	43	39	51	55	70	64	57	46
Jan23	52	52	48	41	42	44	46	51	53	50	44	41	37	36	36	39	42	42	44	46	47	58	53	52	46
Jan24	50	47	43	44	42	43	45	49	52	48	43	35	33	34	37	41	42	42	43	46	47	45	45	44	43
Jan25	43	41	40	40	39	39	44	48	51	47	41	37	34	34	36	39	41	43	44	44	44	45	45	45	42
Jan26	44	42	40	40	39	40	44	50	58	57	49	36	31	33	38	39	41	43	43	45	46	46	45	45	43
Jan27	44	42	41	39	40	41	44	48	52	49	42	36	32	27	31	37	42	44	46	46	46	48	46	47	42
Jan28	47	47	45	46	46	49	47	50	49	47	42	40	35	33	35	39	42	44	44	44	44	49	49	65	45
Jan29	80	71	65	64	46	49	47	49	48	43	35	31	26	28	35	38	39	46	46	48	50	53	52	55	47
Jan30	48	48	49	41	46	48	49	49	48	42	37	34	31	34	41	41	49	52	56	59	50	53	67	76	48
Jan31	65	64	58	54	50	46	45	48	51	46	39	34	30	32	39	43	46	47	48	48	49	49	49	50	47

2020, Field component: Z, Base: 43900.0, Unit: nT

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
Jan01	8	7	7	7	7	7	6	5	2	4	5	5	6	8	9	9	9	10	9	9	9	9	8	8	7
Jan02	7	7	7	6	7	7	7	7	8	11	11	9	10	11	12	12	11	11	10	9	9	9	8	7	9
Jan03	7	6	6	6	6	6	6	5	6	8	5	7	11	13	14	13	12	11	11	11	11	11	10	10	9
Jan04	10	10	10	9	9	9	9	9	10	12	11	9	11	14	14	14	15	16	18	18	19	18	17	17	13
Jan05	16	15	13	12	11	11	11	9	8	9	8	10	15	16	14	12	12	13	14	19	22	20	19	17	14
Jan06	16	14	11	11	11	12	11	12	11	13	12	11	15	16	15	14	13	13	14	15	13	13	13	12	13
Jan07	11	11	11	11	12	12	12	12	11	10	9	9	15	16	15	14	14	13	13	13	13	13	11	12	12

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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	12	12	12	11	11	11	10	10	11	13	12	11	15	18	17	16	15	15	17	17	16	16	18	16	14
Jan09	14	12	12	12	11	11	12	9	9	12	13	9	11	16	17	16	17	16	18	20	20	18	16	15	14
Jan10	13	14	14	14	13	13	13	12	9	9	9	8	9	12	14	14	15	15	15	15	15	14	14	14	13
Jan11	13	13	12	12	12	12	13	12	8	11	9	9	9	11	13	14	14	13	13	13	13	12	12	12	12
Jan12	12	12	13	13	12	12	12	13	10	11	12	10	12	11	13	12	13	13	13	13	12	13	13	12	12
Jan13	12	12	12	12	12	12	12	13	11	10	12	8	6	14	15	12	11	12	12	13	13	12	11	11	12
Jan14	11	11	11	11	11	11	11	10	10	7	11	10	8	9	11	11	13	12	12	13	12	13	12	12	11
Jan15	11	11	11	11	11	11	10	10	7	7	15	13	10	9	11	11	11	12	12	12	12	12	12	11	12
Jan16	11	11	11	11	10	10	10	11	12	13	8	13	10	12	14	14	14	14	14	14	13	13	12	11	11
Jan17	11	10	11	11	11	11	10	11	8	7	10	8	9	12	12	12	12	13	13	12	12	12	12	11	11
Jan18	11	10	11	11	10	10	11	12	11	9	10	10	11	14	12	12	11	11	11	11	11	11	11	11	11
Jan19	11	10	10	10	10	11	11	11	11	11	11	11	13	15	15	14	12	12	12	12	12	12	12	12	12
Jan20	12	11	11	11	12	11	11	12	9	11	7	8	10	12	12	13	12	12	12	12	12	12	12	12	11
Jan21	12	11	11	11	11	10	10	10	10	6	2	1	2	7	12	14	15	14	14	16	19	19	17	16	11
Jan22	15	13	13	13	13	11	12	11	11	12	13	13	15	15	15	15	15	15	15	15	15	19	17	14	14
Jan23	13	13	14	14	13	13	13	12	11	10	9	9	11	15	16	17	15	15	13	13	16	17	15	16	14
Jan24	15	14	14	14	14	13	13	13	11	8	7	7	10	13	15	16	15	14	14	13	13	13	13	13	13
Jan25	13	12	13	13	12	12	10	10	11	4	2	4	7	11	13	13	13	13	12	12	12	13	12	12	10
Jan26	12	12	11	11	11	11	11	10	7	4	2	4	6	10	13	16	14	13	13	13	12	12	11	11	11
Jan27	12	12	12	11	11	11	11	10	9	8	7	8	10	13	15	12	13	13	13	13	12	12	12	12	11
Jan28	12	12	12	12	13	12	12	11	8	9	10	9	6	8	10	12	13	13	13	13	13	14	14	14	11
Jan29	14	13	12	12	13	13	12	11	11	11	12	13	13	14	15	16	16	17	19	18	17	17	16	16	14
Jan30	15	14	14	14	13	13	12	11	10	10	11	12	13	14	16	16	18	22	23	24	22	20	19	18	16
Jan31	17	17	17	17	15	14	14	11	11	10	13	14	17	17	19	18	18	17	17	17	17	16	16	15	16

2020, Field component: F, Base: 48600.0, Unit: nT

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
Jan01	104	103	103	103	104	104	106	104	101	101	102	102	103	105	106	106	105	105	106	106	106	105	105	104	104
Jan02	104	104	104	105	106	106	107	108	106	105	102	98	98	101	105	106	105	105	106	106	106	105	105	107	105
Jan03	105	105	105	106	107	108	106	106	105	102	98	99	101	105	106	106	105	107	106	106	104	103	103	103	104
Jan04	103	102	103	106	103	104	104	106	104	107	102	98	101	106	105	105	102	100	103	105	105	104	104	105	104
Jan05	104	105	105	104	104	104	104	103	104	105	104	105	109	111	110	110	107	107	102	98	102	106	104	106	105
Jan06	103	106	101	103	105	104	105	104	105	105	103	101	105	108	109	109	108	106	103	106	109	105	105	105	105
Jan07	104	104	105	105	106	106	108	108	108	101	99	99	105	109	109	107	105	105	107	108	107	105	107	104	105
Jan08	105	105	105	106	107	109	109	108	105	102	100	100	103	108	109	105	108	106	103	106	105	102	103	105	105
Jan09	105	104	102	106	109	109	108	106	99	98	97	95	100	107	108	102	107	107	104	104	105	109	107	107	104
Jan10	106	105	105	106	106	106	107	104	105	101	98	96	99	104	106	106	103	106	108	106	107	107	107	106	104
Jan11	107	108	107	106	106	106	105	108	105	103	103	101	102	104	106	105	106	108	108	108	107	106	106	105	106

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	106	105	105	106	108	108	109	111	105	103	104	101	102	105	107	109	108	108	108	108	107	106	107	107	106
Jan13	106	106	106	106	108	108	109	111	108	106	106	103	105	109	112	110	109	109	108	108	108	108	107	107	108
Jan14	106	106	107	107	108	110	110	112	108	103	103	100	98	101	105	107	107	107	106	107	107	107	107	107	106
Jan15	107	106	107	108	108	110	110	111	108	103	103	107	105	105	106	106	107	106	108	108	108	106	107	107	107
Jan16	106	106	107	108	108	109	111	114	112	108	105	103	102	104	107	108	108	107	108	108	107	107	107	106	107
Jan17	106	105	106	108	108	110	111	111	107	103	101	101	104	109	110	107	105	106	108	109	107	107	107	107	107
Jan18	107	107	107	108	110	109	110	111	107	102	102	104	106	109	110	109	110	110	109	108	108	107	106	107	108
Jan19	106	106	107	108	108	109	110	109	105	102	101	103	105	108	111	112	110	109	109	108	108	108	107	107	107
Jan20	107	106	106	107	107	109	109	109	103	99	101	102	105	107	109	109	109	109	108	109	108	108	107	107	107
Jan21	107	107	108	109	109	110	111	113	110	102	99	98	99	106	109	104	104	109	107	105	103	108	108	108	106
Jan22	106	106	105	105	107	108	108	108	106	106	104	104	107	107	108	109	110	108	109	109	107	108	107	106	107
Jan23	105	102	103	105	108	109	111	111	107	102	99	98	101	105	108	110	109	108	108	107	108	107	108	108	106
Jan24	108	108	107	107	108	109	110	111	108	104	102	103	105	107	110	113	112	110	110	110	110	109	109	109	108
Jan25	109	109	109	109	109	110	113	113	109	104	101	101	103	108	109	110	110	110	109	109	110	109	109	108	108
Jan26	107	107	108	109	110	111	111	112	108	102	98	97	101	105	109	110	108	108	109	110	110	109	109	107	107
Jan27	108	108	108	109	110	111	112	111	108	104	101	99	101	104	108	111	110	110	109	109	109	109	109	108	108
Jan28	108	107	106	108	108	109	111	113	109	107	108	108	105	106	109	110	110	109	109	109	109	107	109	108	108
Jan29	106	105	107	106	106	107	107	109	103	97	99	103	104	106	108	109	108	106	107	108	109	107	111	107	106
Jan30	110	109	108	108	109	109	108	109	105	105	106	106	107	104	111	110	102	103	104	109	110	110	107	109	107
Jan31	108	105	107	107	111	109	109	106	102	98	100	101	108	110	113	111	111	110	110	109	109	109	109	109	108

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.

2020, Field component: X, Base: 20900.0, Unit: nT

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
Feb01	105	102	101	101	103	105	109	112	109	104	103	106	115	113	104	105	103	103	100	109	107	101	97	101	105
Feb02	113	104	106	106	107	107	108	113	112	108	104	106	106	107	108	107	107	104	100	94	99	104	101	102	105
Feb03	104	104	105	106	108	113	114	113	115	111	107	108	106	105	106	108	109	109	107	111	112	112	112	112	109
Feb04	112	112	110	110	117	116	118	117	115	111	105	103	104	105	108	107	113	112	108	101	97	106	94	97	108
Feb05	101	106	108	108	107	110	111	114	113	109	104	106	107	108	109	108	106	107	108	109	104	103	106	107	107
Feb06	108	108	108	108	110	115	114	130	117	121	115	114	109	98	99	106	104	102	110	107	90	98	96	102	107
Feb07	106	108	103	100	103	105	111	111	101	103	101	97	83	84	96	98	102	109	110	107	128	104	90	96	102
Feb08	93	97	97	99	101	103	106	107	106	102	99	94	91	88	99	102	96	96	93	94	95	101	101	101	98
Feb09	104	105	109	111	112	113	115	120	119	112	106	104	104	103	104	107	109	109	107	108	109	111	108	102	109
Feb10	105	112	109	109	110	115	115	115	111	106	105	108	113	114	116	115	111	111	111	113	110	113	110	110	111
Feb11	115	114	109	114	115	112	120	119	122	121	121	118	115	113	110	109	109	111	112	110	113	113	121	115	115
Feb12	110	110	110	115	117	122	130	129	127	118	104	104	115	116	111	109	109	110	110	111	109	107	108	115	113
Feb13	108	107	108	111	114	118	122	123	118	117	112	111	112	114	115	116	113	113	114	114	113	110	107	115	114
Feb14	111	109	108	113	114	118	121	121	117	111	109	112	113	113	114	117	118	118	117	116	115	113	112	112	114
Feb15	113	113	113	113	114	115	118	118	118	117	111	103	97	102	113	116	118	115	115	112	108	109	109	107	112
Feb16	110	108	108	111	111	111	112	111	107	100	100	103	108	111	111	112	113	112	110	110	111	111	111	111	109
Feb17	110	110	110	109	111	115	116	113	111	106	102	102	104	109	108	108	111	111	109	108	106	94	94	103	108
Feb18	107	106	106	110	110	107	112	116	107	90	87	80	80	86	68	47	44	39	49	65	63	81	94	91	85
Feb19	91	92	94	100	114	102	96	102	88	85	80	69	81	89	95	94	91	97	98	99	99	100	104	113	95
Feb20	97	95	97	101	105	106	109	114	111	107	100	93	91	89	89	94	103	106	107	109	108	100	98	98	102
Feb21	126	122	107	107	113	121	115	119	109	107	92	100	98	93	96	100	91	81	99	103	101	115	110	110	105
Feb22	102	102	106	99	102	111	114	114	105	95	88	89	93	98	97	96	98	101	103	104	99	101	100	100	102
Feb23	101	101	102	106	109	111	113	110	105	95	92	89	92	96	100	102	105	107	101	94	91	106	99	99	101
Feb24	96	104	105	101	103	106	109	107	102	95	100	93	97	101	107	110	108	108	109	110	104	101	102	102	103
Feb25	104	110	106	105	107	110	114	113	109	102	100	106	110	109	110	110	111	112	112	111	112	110	111	111	109
Feb26	109	109	110	110	113	119	125	122	117	111	109	111	114	117	118	117	113	111	110	109	105	110	110	111	113
Feb27	108	114	107	109	111	117	121	120	112	100	91	92	96	101	105	107	108	112	112	111	110	108	108	107	108
Feb28	104	106	112	115	112	117	122	122	124	116	108	106	106	106	110	114	114	116	117	117	116	112	108	106	113
Feb29	108	108	110	110	114	121	121	120	112	101	95	91	102	103	106	96	103	100	106	102	105	104	132	102	107

2020, Field component: Y, Base: 1600.0, Unit: nT

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
Feb01	53	53	49	47	45	47	47	52	51	45	40	32	26	29	37	43	45	48	43	51	47	56	60	58	46
Feb02	57	49	46	47	46	46	47	53	54	49	38	34	31	36	39	41	42	42	58	57	49	50	55	48	46
Feb03	51	48	48	49	45	47	49	49	51	47	40	38	35	36	40	40	42	44	46	47	45	46	45	47	45
Feb04	45	46	43	46	44	49	48	50	50	49	43	39	37	36	37	39	40	41	44	50	50	69	61	56	46
Feb05	54	51	48	48	48	48	47	51	50	47	42	35	33	35	40	42	41	46	47	48	49	50	49	48	46

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
Feb06	48	49	47	46	47	47	37	47	61	56	53	36	31	31	32	36	37	42	41	45	84	70	61	57	48
Feb07	49	51	55	44	40	44	51	56	61	55	45	39	39	38	48	45	46	55	53	51	72	70	63	72	52
Feb08	70	57	48	46	48	47	50	57	60	57	50	41	35	33	36	40	41	44	45	47	53	57	56	52	49
Feb09	51	52	42	46	49	50	51	54	58	54	48	47	42	34	34	40	46	45	48	50	54	61	59	56	49
Feb10	50	47	46	48	46	48	51	56	61	58	49	39	34	30	32	39	41	42	42	44	49	50	50	49	46
Feb11	49	53	46	44	48	41	46	53	56	52	43	37	35	36	39	40	43	44	46	47	48	51	52	53	46
Feb12	51	49	46	41	46	44	47	54	55	51	43	37	31	32	36	39	44	46	47	47	49	52	52	51	45
Feb13	49	47	45	44	48	44	44	48	53	52	43	36	35	35	41	46	47	47	48	49	49	51	49	50	46
Feb14	51	50	47	44	42	43	45	49	53	48	40	34	31	30	36	43	45	46	46	49	49	48	48	51	44
Feb15	51	48	45	44	43	44	45	51	55	53	45	38	30	28	39	44	43	44	46	48	48	49	50	49	45
Feb16	53	50	48	47	49	49	49	53	54	52	47	43	34	34	36	41	42	42	44	45	47	48	48	49	46
Feb17	51	51	52	47	47	48	52	58	60	52	39	30	25	29	36	43	42	41	42	50	68	73	59	50	48
Feb18	51	53	51	51	52	49	41	40	45	47	36	32	22	21	16	8	16	23	54	49	60	60	59	58	41
Feb19	54	60	49	50	49	60	56	59	60	54	42	39	31	32	43	44	47	49	54	54	53	54	59	59	50
Feb20	62	54	50	52	55	55	56	64	66	60	48	39	35	32	33	43	47	46	53	56	52	54	56	57	51
Feb21	57	67	63	54	51	49	55	56	63	58	56	39	30	32	37	38	39	55	49	51	55	60	64	52	51
Feb22	56	50	58	48	47	48	50	59	68	63	51	45	35	28	33	46	43	49	46	74	62	64	65	58	53
Feb23	53	48	48	47	48	46	47	53	63	62	50	37	27	23	31	42	49	50	56	59	58	73	77	73	51
Feb24	63	58	55	53	52	50	54	61	66	62	50	38	32	31	37	43	47	49	49	50	51	53	58	54	51
Feb25	52	49	51	51	52	51	55	64	68	61	48	34	27	31	38	45	48	48	49	50	51	52	53	53	49
Feb26	52	50	51	49	49	47	49	56	61	58	47	35	27	29	35	42	45	46	46	49	69	56	50	52	48
Feb27	54	50	52	49	49	47	48	54	58	56	45	36	32	33	39	45	48	49	50	51	54	54	55	58	49
Feb28	58	55	55	55	51	49	53	61	68	65	53	38	30	32	38	42	44	47	47	49	49	54	65	64	51
Feb29	55	50	49	47	44	44	48	59	68	65	44	30	21	18	24	29	45	39	48	61	60	58	87	74	49

2020, Field component: Z, Base: 43900.0, Unit: nT

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
Feb01	15	16	16	17	17	17	17	17	14	13	12	10	8	13	16	17	17	18	19	18	18	18	19	19	16
Feb02	16	16	16	16	16	16	15	16	16	13	11	13	12	16	19	18	17	17	17	20	20	19	19	19	16
Feb03	17	16	16	16	16	15	15	15	14	15	16	16	13	15	18	17	17	17	17	17	16	16	15	15	16
Feb04	15	14	14	13	13	13	12	12	10	7	6	8	10	15	17	16	16	16	16	18	19	18	21	20	14
Feb05	19	18	17	16	16	16	15	16	14	12	12	11	11	14	17	16	17	17	17	17	18	18	17	17	16
Feb06	17	16	16	16	15	14	14	15	16	13	11	10	13	17	20	19	19	19	19	20	23	21	21	20	17
Feb07	18	16	16	17	16	16	16	16	12	11	11	12	17	23	23	22	20	19	19	18	15	16	19	19	17
Feb08	19	19	19	19	18	18	18	18	15	12	12	15	17	19	21	22	22	22	22	23	23	22	22	21	19
Feb09	20	19	18	16	16	15	14	15	11	15	15	17	17	17	19	19	19	18	18	18	18	17	17	18	17
Feb10	18	17	16	16	17	16	16	16	9	7	7	9	12	15	17	18	18	18	18	17	17	17	17	17	15
Feb11	16	15	16	15	16	16	14	13	9	4	1	5	11	15	17	17	17	17	16	17	16	16	15	14	14

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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
Feb12	15	15	16	15	14	14	14	15	12	10	8	6	8	11	15	17	18	17	17	17	17	17	17	17	14
Feb13	17	16	16	16	16	15	16	16	14	9	6	9	9	10	13	15	16	16	16	16	16	16	16	15	14
Feb14	15	15	15	15	15	15	16	19	18	15	10	11	13	16	17	17	16	16	16	16	16	16	16	15	15
Feb15	15	15	15	15	15	15	15	16	15	11	8	10	13	18	20	18	16	17	17	18	18	17	17	17	15
Feb16	16	16	17	16	16	16	17	18	18	15	13	13	13	15	17	17	17	17	17	18	17	17	17	17	16
Feb17	16	17	16	17	16	18	16	17	14	9	8	12	18	18	18	19	17	18	18	18	18	20	21	20	17
Feb18	19	18	18	18	18	18	18	16	12	13	14	17	21	25	29	37	41	48	49	46	43	38	33	31	27
Feb19	29	26	26	24	17	20	18	14	17	16	16	21	25	25	25	26	25	25	24	24	24	24	23	20	22
Feb20	21	22	22	21	21	20	21	20	16	15	15	16	20	24	26	25	24	23	23	24	24	24	20	22	22
Feb21	16	11	13	15	15	15	16	18	16	14	10	13	16	19	22	23	24	29	26	24	24	23	22	22	21
Feb22	19	18	19	21	20	20	21	22	20	15	13	12	14	17	22	24	24	23	23	24	25	25	22	22	18
Feb23	22	22	22	21	20	20	21	23	22	12	7	7	9	13	19	22	22	21	22	21	22	23	23	23	20
Feb24	23	22	21	21	22	22	24	25	20	14	10	10	13	18	21	21	21	21	21	20	20	20	20	20	19
Feb25	22	21	20	21	21	21	21	22	20	12	12	11	13	15	20	21	21	21	20	20	20	21	20	19	20
Feb26	20	20	19	20	20	19	19	20	17	13	8	8	12	15	16	18	18	19	20	20	20	20	20	20	19
Feb27	19	18	19	19	19	19	19	20	18	10	10	10	15	20	23	23	21	21	20	20	20	20	20	21	17
Feb28	20	20	20	18	19	19	21	20	19	10	5	5	11	16	19	20	20	19	19	19	19	20	21	20	19
Feb29	20	20	19	19	19	19	21	22	18	11	4	5	12	17	20	25	24	25	24	25	24	24	17	18	19

2020, Field component: F, Base: 48600.0, Unit: nT

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
Feb01	109	107	107	108	108	109	111	113	109	105	104	103	105	109	108	109	109	110	109	112	111	109	108	110	108
Feb02	113	108	109	109	109	109	109	113	112	108	104	106	105	109	112	111	110	109	108	108	109	111	110	110	109
Feb03	109	109	109	109	110	111	111	111	110	110	109	109	106	108	110	111	111	111	110	112	112	111	111	111	110
Feb04	111	110	109	108	111	111	111	110	108	103	99	100	103	107	110	110	112	111	110	108	108	112	109	109	108
Feb05	110	111	109	110	110	111	111	113	111	107	104	104	105	108	111	110	110	110	111	111	110	110	111	110	109
Feb06	111	110	110	110	110	111	111	118	115	113	108	107	107	107	109	111	111	110	113	110	110	110	109	110	110
Feb07	111	110	108	107	108	109	111	109	104	104	102	102	100	106	111	111	110	113	113	112	119	109	105	108	108
Feb08	107	108	108	108	109	110	111	112	109	104	103	103	103	104	110	112	110	110	109	110	111	113	112	112	109
Feb09	112	112	112	111	112	112	113	114	115	111	108	109	109	108	110	112	113	112	111	112	113	113	112	109	111
Feb10	110	112	110	111	111	113	113	114	108	102	100	103	108	111	113	114	113	112	113	113	112	113	113	112	111
Feb11	113	112	110	112	113	114	113	118	110	105	102	104	108	111	112	111	111	112	112	111	112	112	114	111	111
Feb12	110	110	110	111	112	112	118	116	115	109	101	99	106	109	111	112	112	112	112	112	112	111	110	112	111
Feb13	111	110	110	112	113	114	115	118	113	108	102	105	105	107	110	112	112	112	112	113	112	113	111	111	111
Feb14	111	109	109	111	112	113	115	116	116	110	105	106	108	111	113	114	115	114	114	113	113	113	112	111	112
Feb15	112	111	111	111	112	112	114	114	114	110	104	102	102	109	115	116	115	113	113	113	113	112	112	111	111
Feb16	111	110	110	111	111	112	112	113	111	106	104	105	107	109	112	113	113	112	112	112	113	112	112	111	111
Feb17	111	111	111	111	112	113	114	113	110	103	100	103	109	112	111	112	112	113	112	112	112	109	109	110	110

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
Feb18	112	111	111	113	113	111	114	112	106	99	98	98	102	107	103	101	104	108	115	119	116	119	120	116	109
Feb19	114	113	113	114	113	108	107	108	103	101	98	97	106	109	113	112	111	113	113	114	114	113	115	116	110
Feb20	110	110	111	112	113	113	115	117	114	109	106	103	106	108	110	112	115	116	116	117	116	116	112	112	112
Feb21	117	112	108	109	112	114	114	117	111	108	98	103	105	106	110	112	110	110	115	115	114	114	117	114	111
Feb22	111	111	110	110	112	114	117	118	115	109	101	98	101	106	110	112	113	114	115	116	114	114	113	112	111
Feb23	112	112	113	114	114	114	117	118	113	101	93	94	96	102	109	113	114	115	112	112	111	113	116	112	110
Feb24	111	114	113	112	113	115	117	118	113	103	97	98	102	108	114	115	114	115	115	116	114	113	114	113	112
Feb25	114	115	113	113	114	114	118	118	115	106	103	104	108	109	114	115	115	114	116	115	115	114	114	115	113
Feb26	114	114	114	114	116	117	120	120	115	108	103	104	108	113	114	115	114	116	116	116	115	115	114	114	113
Feb27	113	115	112	113	114	116	119	119	114	104	97	98	103	110	114	116	115	116	116	116	115	115	114	114	112
Feb28	113	113	115	115	114	116	120	121	120	109	100	99	104	109	113	116	116	116	117	116	117	115	115	114	113
Feb29	114	113	114	114	115	117	120	120	113	103	93	92	103	108	112	112	115	114	117	116	116	116	123	110	112

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.

2020, Field component: X, Base: 20900.0, Unit: nT

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
Mar01	99	119	106	105	110	114	117	114	108	104	85	82	93	100	105	105	102	103	105	107	107	109	110	104	105
Mar02	106	107	104	107	110	115	121	119	113	103	95	96	96	101	106	108	114	113	114	113	115	117	115	114	109
Mar03	113	114	108	106	110	117	120	118	116	104	100	92	90	99	99	101	106	105	110	109	103	115	115	110	108
Mar04	109	109	111	112	114	116	121	122	116	112	101	90	94	94	94	85	85	89	95	103	106	106	107	108	103
Mar05	110	110	113	116	120	121	125	126	125	119	114	102	97	101	107	111	110	112	116	117	117	116	115	115	114
Mar06	114	115	118	118	121	128	133	124	119	112	102	97	100	109	109	107	106	113	114	114	114	115	114	115	114
Mar07	115	116	115	113	115	116	122	122	111	98	94	95	92	93	101	107	111	113	115	117	116	116	116	116	110
Mar08	114	111	112	112	111	112	117	118	116	102	91	89	94	99	105	106	105	108	111	109	112	118	116	115	108
Mar09	115	115	116	114	115	125	126	128	...	...	...	99	99	103	103	107	114	110	116	109	111	110	109	109	...
Mar10	122	114	113	115	119	122	125	128	125	108	96	96	100	104	108	108	112	117	118	117	118	118	115	121	114
Mar11	122	115	115	116	121	126	131	131	125	115	107	107	111	117	117	116	114	117	117	117	118	117	118	118	118
Mar12	119	117	110	114	120	129	132	131	126	112	104	103	106	102	103	104	108	98	84	81	98	104	114	107	109
Mar13	106	109	110	113	118	118	120	121	120	104	96	90	102	105	102	102	103	101	104	106	106	108	114	111	108
Mar14	109	109	111	112	114	115	117	122	124	119	112	106	105	108	108	105	106	108	111	116	114	112	113	113	112
Mar15	111	110	110	113	114	118	123	128	130	126	122	113	112	112	110	114	118	121	116	109	110	113	118	125	117
Mar16	124	120	117	114	115	121	126	130	126	120	122	118	110	105	105	104	99	97	96	99	111	114	119	117	114
Mar17	110	110	112	112	117	121	125	121	113	96	94	101	106	107	105	101	98	102	110	112	109	119	117	116	110
Mar18	112	112	115	115	116	119	121	119	113	107	102	105	113	118	112	112	110	109	113	97	104	109	112	114	112
Mar19	119	130	111	114	116	119	121	119	104	96	84	79	84	83	93	99	98	100	113	102	101	105	106	105	104
Mar20	117	112	106	108	113	117	115	114	106	99	93	89	92	97	99	98	93	99	95	102	101	105	96	112	103
Mar21	98	101	104	108	115	117	113	114	103	99	96	99	97	92	96	105	98	99	112	99	109	105	96	109	106
Mar22	110	112	113	115	111	113	114	110	114	105	102	102	102	106	106	103	110	114	111	112	99	106	108	109	106
Mar23	111	114	113	121	112	116	117	112	109	99	84	80	95	101	103	102	103	106	100	108	115	108	108	110	106
Mar24	120	110	112	108	109	113	114	110	110	109	106	106	109	110	111	111	111	110	112	114	113	116	111	111	111
Mar25	111	113	114	112	113	113	111	112	113	114	111	114	113	116	117	108	110	110	111	111	112	113	113	111	111
Mar26	111	111	111	113	115	116	117	113	117	114	104	108	107	105	108	110	109	103	111	107	117	118	119	132	114
Mar27	113	110	106	109	111	112	117	115	112	107	100	100	107	105	108	110	109	110	111	107	111	114	116	115	110
Mar28	114	113	113	112	113	116	117	116	111	108	100	100	110	113	114	114	115	116	117	115	114	127	117	110	113
Mar29	108	108	108	110	112	116	120	113	107	112	115	111	99	102	97	105	103	103	106	109	106	101	103	104	107
Mar30	108	109	108	114	111	116	117	112	114	114	112	110	113	111	105	109	107	97	94	85	84	89	123	116	107
Mar31	107	119	113	89	109	103	101	79	99	108	110	107	94	87	91	90	96	106	103	105	118	111	107	105	102

2020, Field component: Y, Base: 1600.0, Unit: nT

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
Mar01	65	57	53	53	51	53	56	63	68	62	54	44	35	32	35	42	45	47	48	51	52	52	60	57	52
Mar02	55	57	54	54	50	50	53	62	67	63	49	38	29	32	26	34	38	42	45	48	49	50	50	51	48
Mar03	53	55	53	49	48	48	54	62	68	65	50	39	33	30	32	43	42	46	48	49	51	55	63	53	50

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
Mar04	52	51	50	48	47	48	53	63	68	64	51	39	32	29	31	37	57	58	58	62	56	58	56	53	51
Mar05	49	47	45	44	43	47	51	61	70	66	51	40	33	28	30	36	44	47	47	48	48	49	49	49	47
Mar06	48	48	48	48	48	47	51	62	71	65	50	33	28	33	32	36	44	49	51	50	50	51	51	51	48
Mar07	50	49	48	49	50	51	54	66	74	74	62	44	30	28	31	40	46	48	50	51	51	51	50	50	50
Mar08	50	50	48	49	50	51	56	67	73	64	49	30	22	20	28	40	45	45	48	51	60	59	51	49	48
Mar09	49	48	48	49	45	47	54	67	:	:	:	42	30	23	26	37	45	52	56	52	53	57	59	56	:
Mar10	52	50	49	50	50	48	52	65	74	71	60	40	27	23	27	37	42	44	47	49	50	51	53	53	49
Mar11	51	50	49	48	47	46	53	69	77	73	61	43	29	25	30	39	44	46	47	50	50	51	51	54	49
Mar12	57	53	54	51	47	54	54	63	77	78	63	42	23	20	26	32	39	51	69	58	57	54	54	54	51
Mar13	54	53	53	47	50	53	58	68	74	66	54	45	36	33	35	42	46	50	49	53	53	56	55	55	51
Mar14	55	54	53	52	50	48	48	55	62	62	53	44	35	33	35	39	46	47	50	56	57	50	53	53	50
Mar15	54	54	53	52	51	50	55	64	70	70	59	52	44	38	38	40	43	45	46	50	52	52	53	54	51
Mar16	53	54	56	56	54	52	54	63	68	61	47	37	30	28	29	37	44	50	51	54	53	58	54	53	49
Mar17	57	51	52	52	50	51	60	70	73	66	46	33	30	32	41	47	51	50	53	53	53	52	54	50	51
Mar18	51	50	51	52	51	53	61	71	74	66	51	36	27	25	32	42	45	50	66	58	55	58	54	53	51
Mar19	51	72	62	60	58	60	64	70	71	65	50	40	27	27	27	37	44	51	55	57	57	52	55	54	53
Mar20	43	49	54	52	52	54	58	69	76	72	60	44	32	27	31	36	41	51	55	54	63	56	55	71	54
Mar21	63	56	57	58	55	56	57	70	73	64	55	43	31	25	31	43	54	58	63	64	63	62	61	58	55
Mar22	53	51	53	52	56	59	64	70	71	69	52	33	26	28	35	47	51	52	63	72	67	65	58	61	55
Mar23	60	56	58	55	57	59	66	73	74	66	50	38	27	23	37	41	45	53	56	79	71	59	56	55	53
Mar24	55	60	55	54	54	57	67	74	79	69	52	37	27	26	33	42	48	49	51	52	54	55	55	55	52
Mar25	54	50	53	54	55	57	63	70	71	63	50	36	30	30	37	43	47	48	50	53	52	54	55	56	51
Mar26	53	53	55	56	59	62	68	70	67	60	49	34	25	30	33	39	42	45	48	50	51	52	55	56	54
Mar27	65	62	59	58	57	58	66	74	74	63	47	36	32	32	38	45	48	52	62	53	59	66	68	74	54
Mar28	54	54	54	54	55	58	66	73	76	67	50	31	23	26	37	48	51	50	51	53	64	63	62	53	54
Mar29	56	55	55	56	56	58	65	68	68	63	44	30	27	32	38	48	54	58	51	53	64	66	68	64	54
Mar30	62	58	56	59	58	55	65	71	65	62	51	39	39	36	40	46	50	69	73	74	81	75	73	66	59
Mar31	72	82	81	66	56	63	71	69	65	56	42	31	25	29	34	40	61	64	57	60	68	65	61	54	57

2020, Field component: Z, Base: 43800.0, Unit: nT

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
Mar01	119	118	117	119	120	119	121	122	120	115	111	113	114	114	118	121	122	123	123	123	123	122	121	122	119
Mar02	122	121	121	121	121	120	120	120	115	111	111	110	112	114	118	119	119	120	120	120	121	120	120	120	118
Mar03	119	119	119	120	120	120	121	122	120	115	113	114	114	115	119	123	121	123	123	123	122	122	120	121	119
Mar04	121	120	120	120	120	119	119	118	118	114	111	113	115	118	121	125	126	129	128	127	126	124	123	123	121
Mar05	122	121	121	120	119	119	119	122	111	105	104	106	110	113	117	119	120	120	120	120	120	120	120	120	117
Mar06	120	120	121	119	118	117	119	124	121	112	109	112	113	117	122	123	122	121	121	121	120	120	120	120	119
Mar07	120	120	119	119	119	120	123	120	120	117	113	112	114	116	119	122	122	121	121	120	120	120	120	120	119

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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	120	120	120	120	120	120	123	124	119	113	110	110	115	122	126	127	125	123	122	123	122	121	121	121	120
Mar09	120	...	120	120	120	119	122	122	...	...	...	101	106	112	118	121	121	121	121	122	122	122	122	122	...
Mar10	120	119	120	120	119	118	122	124	119	113	109	106	108	111	118	122	122	120	120	120	120	120	120	119	118
Mar11	118	118	119	119	119	118	121	120	112	105	98	93	95	102	111	117	117	118	118	119	119	119	119	118	114
Mar12	118	118	118	119	118	117	121	124	119	110	105	102	102	108	113	119	120	123	128	130	128	126	124	123	118
Mar13	123	122	122	121	118	119	121	122	118	113	111	108	108	110	114	120	122	123	124	124	123	123	121	121	119
Mar14	121	121	121	121	120	119	122	124	122	117	111	108	108	109	113	119	121	122	122	121	121	121	121	120	119
Mar15	121	121	121	121	120	120	122	121	115	110	108	108	107	109	115	118	118	119	120	122	123	123	122	119	118
Mar16	118	117	117	118	119	120	123	125	117	111	106	107	111	113	118	122	124	125	127	127	126	124	123	122	119
Mar17	122	122	121	121	121	121	124	123	120	114	113	111	114	119	123	125	124	124	125	124	124	122	121	121	121
Mar18	121	121	121	121	121	122	124	121	118	112	112	115	115	117	121	123	127	123	124	126	126	125	124	123	121
Mar19	123	114	117	117	118	121	122	120	117	117	115	116	118	121	124	128	129	127	127	127	126	126	125	125	122
Mar20	123	120	122	123	122	122	124	124	118	116	114	111	114	117	121	126	125	129	130	131	130	127	127	124	123
Mar21	125	125	125	125	123	124	125	123	119	115	106	102	104	111	120	124	121	125	125	125	125	123	124	124	120
Mar22	124	123	121	121	122	123	124	123	119	108	100	100	103	110	118	121	125	122	123	125	126	126	123	123	119
Mar23	123	122	122	120	120	122	124	120	120	115	109	107	107	111	116	123	121	125	127	126	125	124	124	124	120
Mar24	121	121	121	122	122	124	125	122	118	111	106	103	105	110	115	119	118	122	123	123	123	123	123	123	119
Mar25	123	123	123	122	122	122	125	122	117	110	100	96	100	105	111	115	120	121	122	123	122	122	122	122	117
Mar26	123	123	123	123	122	123	123	120	118	109	105	106	108	109	113	116	123	122	123	122	124	123	122	119	118
Mar27	121	121	122	123	122	124	124	123	118	109	104	104	104	109	116	122	121	124	125	125	123	124	123	123	119
Mar28	123	123	123	123	123	124	125	126	123	111	102	101	104	110	115	119	126	121	122	123	126	123	120	121	119
Mar29	122	123	123	123	123	124	123	120	115	106	102	105	109	116	122	125	125	128	127	126	126	127	127	127	121
Mar30	126	125	125	124	124	124	124	123	121	116	108	107	112	117	121	124	129	129	131	132	133	132	128	122	123
Mar31	122	120	118	121	121	123	125	122	122	114	110	110	113	118	124	129	129	130	130	130	126	126	126	126	123

2020, Field component: F, Base: 48600.0, Unit: nT

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
Mar01	110	117	110	112	114	116	119	114	114	108	96	96	101	104	110	113	113	114	115	116	116	116	116	114	112
Mar02	115	114	113	114	115	117	120	119	111	104	99	99	101	105	110	113	115	115	116	116	117	118	117	116	112
Mar03	116	115	113	113	115	117	120	116	116	108	105	101	99	105	109	113	114	115	117	116	117	118	117	115	113
Mar04	115	115	115	115	116	116	119	120	116	110	103	99	103	105	108	107	110	112	113	115	117	117	116	116	112
Mar05	116	116	116	117	118	118	121	121	114	105	102	98	100	104	110	114	114	116	117	117	117	117	116	116	113
Mar06	116	116	117	117	118	120	124	123	120	109	101	101	103	111	115	116	116	117	117	118	117	117	117	117	115
Mar07	117	117	116	115	116	117	122	123	116	108	102	100	101	103	109	115	117	117	117	118	118	117	117	117	114
Mar08	116	115	115	115	115	116	120	122	117	105	97	96	102	110	117	119	117	116	117	116	118	119	118	117	114
Mar09	...	...	117	116	117	120	124	124	...	...	...	...	...	...	...	114	...	118	118	116	117	117	116	116	...
Mar10	120	116	116	116	118	118	123	127	121	108	99	96	98	103	111	115	117	118	118	118	118	118	117	119	114
Mar11	118	115	115	116	118	120	124	124	114	104	94	89	91	100	109	114	115	114	116	117	117	116	117	117	112

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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
Mar12	117	116	115	115	117	120	...	...	...	...	...	...	...	99	105	111	113	112	111	111	117	117	117	116	...
Mar13	115	116	116	116	116	117	120	122	117	106	101	95	100	103	106	111	113	113	116	116	116	116	118	116	113
Mar14	115	116	116	116	116	116	119	124	123	116	108	102	101	103	106	111	113	115	116	118	117	117	117	116	114
Mar15	116	115	115	116	116	118	122	124	119	113	110	105	103	106	109	114	116	118	117	116	117	118	120	120	115
Mar16	119	116	115	115	116	119	124	127	120	110	107	105	105	105	110	113	113	113	115	116	120	120	121	119	115
Mar17	116	116	116	117	119	121	125	125	117	104	101	102	107	112	115	118	117	115	119	119	118	121	119	118	115
Mar18	116	116	117	117	118	120	123	121	115	107	104	107	111	114	116	118	117	117	120	114	118	119	119	119	116
Mar19	121	116	119	113	116	119	121	120	110	106	99	97	101	103	110	116	116	117	117	118	117	118	119	117	113
Mar20	120	115	115	114	118	120	121	121	112	107	102	97	101	106	110	114	115	119	119	119	120	120	116	120	114
Mar21	114	116	117	117	120	121	121	119	112	106	96	93	94	98	108	115	118	121	120	120	119	120	117	118	113
Mar22	118	118	118	118	117	119	120	120	116	103	93	92	95	103	111	112	116	118	119	116	116	118	120	118	113
Mar23	118	118	118	120	116	120	121	119	114	106	94	90	96	102	108	114	116	117	117	120	122	116	117	118	113
Mar24	120	116	117	116	117	120	121	119	114	107	102	98	100	105	110	114	115	117	119	119	116	118	118	118	114
Mar25	118	119	118	118	118	119	120	118	115	106	95	91	95	99	104	109	113	115	117	117	118	119	118	117	112
Mar26	118	118	118	118	119	119	119	117	115	108	101	103	104	106	111	110	115	114	117	120	120	120	121	124	115
Mar27	117	116	115	117	117	120	122	120	115	103	97	98	98	102	110	116	117	118	120	118	119	120	120	119	114
Mar28	119	119	118	118	119	120	123	123	119	107	94	92	100	106	111	115	117	118	120	119	119	120	118	116	115
Mar29	116	119	118	118	118	121	122	117	110	103	100	101	99	107	110	116	117	119	118	119	119	123	119	116	114
Mar30	120	119	119	120	119	121	122	119	117	113	105	103	108	112	113	117	118	118	118	116	116	118	128	120	117
Mar31	116	119	115	107	116	115	116	106	112	108	105	103	100	102	110	114	117	123	121	122	125	121	119	118	114

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.

2020, Field component: X, Base: 20900.0, Unit: nT

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
Apr01	105	105	104	107	109	111	114	107	101	102	104	109	113	118	117	112	104	99	98	102	104	102	105	106	107
Apr02	106	106	106	106	105	110	112	104	104	108	110	108	112	113	112	110	110	111	109	101	94	93	104	108	107
Apr03	115	104	103	103	107	105	106	104	99	99	102	111	119	122	117	110	103	102	100	108	122	115	122	113	109
Apr04	100	103	104	106	110	110	108	103	100	100	108	120	122	119	117	114	111	102	110	105	104	106	110	117	109
Apr05	116	116	118	116	122	123	123	113	100	95	99	104	104	105	105	108	108	107	110	111	111	111	116	114	111
Apr06	114	111	112	114	117	117	115	108	100	98	100	105	110	117	116	116	113	112	113	114	114	112	113	113	112
Apr07	112	112	112	113	115	117	119	119	115	117	118	119	121	120	117	117	117	113	113	110	122	122	112	113	116
Apr08	117	120	123	123	120	127	123	117	105	101	105	106	108	107	105	101	96	93	90	100	101	119	118	102	109
Apr09	101	101	103	102	106	108	108	104	99	96	96	104	108	104	104	105	106	108	109	115	108	108	108	116	105
Apr10	109	108	109	110	112	114	113	111	108	99	102	109	111	113	109	112	106	105	105	107	109	110	110	112	109
Apr11	111	113	111	111	112	114	114	110	105	116	118	117	112	106	102	84	80	78	85	98	107	115	111	116	106
Apr12	116	114	113	111	110	109	116	120	116	115	112	112	107	95	92	100	104	106	105	102	101	106	117	116	108
Apr13	109	109	109	108	108	108	116	116	112	106	104	104	104	105	105	109	114	113	112	113	122	117	115	115	111
Apr14	119	115	115	122	128	126	133	127	117	113	111	114	116	112	112	115	115	114	115	115	116	116	114	120	117
Apr15	120	126	110	110	108	108	111	107	107	105	104	104	105	108	113	115	105	109	112	113	112	109	109	107	111
Apr16	110	120	112	110	109	115	116	114	113	111	110	108	104	101	97	100	111	113	112	113	113	113	113	113	110
Apr17	111	113	114	115	115	114	116	113	107	104	107	109	115	116	118	112	103	108	113	113	115	116	121	121	113
Apr18	114	112	111	110	110	111	110	103	97	103	107	120	114	110	106	103	114	113	112	113	113	113	112	113	110
Apr19	113	113	112	112	113	112	109	104	105	109	116	117	115	112	114	114	113	108	111	111	113	114	113	114	112
Apr20	114	114	118	122	116	135	133	128	106	78	56	63	59	58	63	77	87	89	94	96	99	104	108	107	97
Apr21	104	105	107	113	122	122	114	109	104	104	108	103	91	92	104	100	97	85	94	96	95	99	101	114	103
Apr22	115	106	106	108	108	104	100	100	98	96	100	107	110	106	105	105	102	104	106	105	106	113	106	106	105
Apr23	105	105	103	104	105	104	102	97	94	· · ·	106	117	118	114	112	112	111	112	116	117	120	117	113	113	· · ·
Apr24	123	115	111	110	110	111	104	100	97	103	110	115	114	110	108	111	111	117	112	103	109	114	118	114	110
Apr25	110	111	115	113	112	110	103	101	98	103	110	112	111	110	108	108	111	113	114	115	114	114	114	115	110
Apr26	114	113	115	116	115	118	118	110	100	95	94	104	109	108	111	104	99	99	98	102	105	103	95	104	106
Apr27	105	107	119	116	110	109	109	102	101	104	107	109	109	102	104	110	108	114	103	96	95	112	109	113	107
Apr28	123	117	111	105	106	108	108	106	99	103	114	127	123	111	107	105	102	105	106	111	113	112	117	110	110
Apr29	114	112	109	108	109	110	114	115	112	110	113	115	114	114	118	119	119	119	117	114	114	114	113	114	114
Apr30	118	117	112	111	110	110	114	111	109	111	117	115	110	107	108	113	115	116	117	117	116	116	116	117	114

2020, Field component: Y, Base: 1600.0, Unit: nT

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
Apr01	55	56	56	51	56	62	69	71	67	57	41	28	25	30	40	50	55	59	55	57	61	63	62	54	53
Apr02	52	55	60	61	58	60	70	72	65	62	47	35	27	28	38	49	55	55	59	71	76	73	65	52	56
Apr03	57	57	59	61	66	66	71	75	68	54	42	31	28	28	37	48	52	50	49	52	58	62	89	76	56
Apr04	58	58	60	60	62	66	73	77	71	55	42	26	23	29	38	48	54	54	56	61	60	61	55	46	54

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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	49	52	56	58	56	61	68	74	75	66	47	28	18	21	29	44	56	56	55	56	57	56	55	53	52
Apr06	55	57	58	57	56	59	68	78	83	77	59	36	25	27	37	49	54	55	54	54	55	55	55	55	55
Apr07	55	55	55	56	58	62	70	78	79	71	57	39	28	31	41	50	54	54	54	54	67	73	73	65	58
Apr08	59	55	56	64	60	62	72	78	78	70	49	32	14	22	18	30	55	51	54	60	68	59	81	65	55
Apr09	61	63	60	60	61	66	73	80	80	75	62	41	28	27	32	42	50	54	56	63	62	58	59	56	57
Apr10	59	59	59	60	58	59	67	76	77	70	55	40	31	28	32	37	50	70	59	56	57	59	58	59	56
Apr11	61	61	60	59	62	65	70	74	73	67	56	44	32	24	23	33	40	48	52	54	62	72	61	58	55
Apr12	60	59	59	60	63	65	68	74	69	69	62	48	30	24	31	35	41	48	67	54	64	63	63	60	56
Apr13	60	59	62	61	65	61	64	66	64	61	52	38	31	32	36	44	49	52	53	53	57	63	58	59	54
Apr14	57	60	65	60	68	68	65	71	72	65	58	49	43	42	44	48	52	53	54	56	59	56	60	65	58
Apr15	62	64	65	62	66	72	74	78	75	68	50	32	23	25	33	44	55	58	57	60	56	65	62	60	57
Apr16	59	59	62	63	67	68	72	75	73	69	57	40	33	35	39	45	51	61	60	58	58	58	60	59	58
Apr17	59	57	59	60	62	67	73	77	73	63	46	32	23	27	37	44	50	53	54	56	58	61	59	62	55
Apr18	63	65	66	70	66	67	74	77	72	62	49	32	24	31	39	43	49	55	57	59	58	58	58	58	56
Apr19	57	58	58	60	64	69	75	73	68	64	56	41	31	35	43	47	51	57	59	60	59	60	58	57	56
Apr20	57	57	56	61	63	61	70	72	64	55	38	28	24	32	43	65	59	61	59	62	60	58	58	59	55
Apr21	60	61	61	62	65	66	72	74	68	55	37	21	15	32	40	42	49	61	65	65	63	63	61	62	55
Apr22	71	76	67	59	67	68	73	77	71	61	47	33	22	27	39	48	55	74	66	66	68	68	63	61	59
Apr23	60	60	61	62	65	70	77	79	69	...	41	31	27	34	40	48	53	61	54	54	56	56	59	62	...
Apr24	68	64	63	63	69	75	80	80	71	57	42	29	22	34	34	40	48	60	55	61	56	61	80	71	57
Apr25	63	63	60	66	71	75	76	73	66	57	48	37	30	27	36	42	49	52	57	56	61	59	59	59	56
Apr26	60	61	61	63	67	65	74	76	68	52	31	14	9	18	28	33	44	51	55	56	61	78	73	63	53
Apr27	62	61	57	64	74	80	85	82	72	62	53	39	31	33	44	46	52	73	66	70	69	61	61	61	61
Apr28	67	73	76	71	73	76	80	80	73	62	51	35	25	30	38	47	56	59	60	65	65	62	66	63	60
Apr29	59	61	65	68	72	74	77	79	75	65	50	37	34	42	45	46	47	50	55	58	59	61	62	64	59
Apr30	63	64	63	63	66	68	73	76	70	59	49	34	28	27	33	40	47	53	54	56	57	58	58	59	55

2020, Field component: Z, Base: 43900.0, Unit: nT

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
Apr01	26	26	27	26	25	27	28	28	26	22	17	15	16	21	26	28	28	29	30	30	29	29	28	27	26
Apr02	26	26	26	26	26	26	25	23	21	16	10	9	10	15	23	26	26	26	27	29	30	31	29	27	23
Apr03	23	25	26	26	26	28	28	25	25	19	15	16	15	15	19	24	27	27	29	29	27	25	22	21	24
Apr04	24	25	26	27	27	28	28	27	23	15	6	5	11	15	18	23	24	24	25	27	28	28	27	26	22
Apr05	24	24	24	24	27	25	26	26	23	14	5	6	9	14	19	24	26	25	25	26	26	26	26	25	22
Apr06	25	25	25	26	24	27	30	28	23	16	7	5	9	16	20	24	25	22	24	25	25	25	25	25	22
Apr07	25	25	26	26	25	27	26	25	20	9	3	1	7	13	17	20	21	22	24	26	25	24	24	25	20
Apr08	25	25	24	23	24	24	26	24	20	12	6	6	9	15	25	29	34	35	34	33	32	29	23	26	24
Apr09	27	28	28	29	29	31	32	32	31	28	22	16	18	24	27	28	29	29	28	27	27	28	28	27	27

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	26	27	27	27	27	29	32	32	28	21	15	10	13	18	21	25	30	31	31	30	29	28	28	28	26
Apr11	27	27	27	27	28	29	29	27	25	20	11	7	8	15	22	30	38	38	38	36	34	32	31	29	26
Apr12	28	28	27	28	28	28	27	23	22	18	10	5	7	11	20	26	29	31	31	32	32	30	29	29	24
Apr13	29	29	28	29	28	27	26	25	25	23	16	11	13	17	19	23	28	29	29	29	28	26	26	27	25
Apr14	26	26	26	25	22	22	24	22	24	23	14	8	8	13	20	24	25	26	26	27	27	27	27	26	22
Apr15	24	20	22	25	25	25	26	28	27	21	12	9	16	21	25	29	30	28	27	27	28	28	28	28	24
Apr16	28	25	25	26	26	27	30	32	31	26	18	13	15	20	23	26	29	29	29	28	28	28	28	28	26
Apr17	28	27	27	27	27	29	29	25	25	23	16	13	17	22	26	28	29	28	27	27	28	28	27	26	26
Apr18	27	28	27	27	28	27	30	29	22	25	19	14	11	15	21	24	28	28	28	27	28	28	28	28	25
Apr19	28	28	28	28	27	27	26	24	22	17	12	7	10	15	19	22	25	26	27	28	28	28	28	28	23
Apr20	28	28	27	25	24	22	24	19	16	15	16	14	24	32	37	41	40	37	35	34	34	33	33	32	28
Apr21	32	32	32	31	30	31	34	32	27	21	17	14	15	17	22	28	33	40	38	38	37	36	35	32	29
Apr22	29	28	31	29	27	29	32	30	28	23	16	14	22	30	32	34	35	33	33	33	32	31	31	31	29
Apr23	31	31	31	32	33	31	32	31	27	...	14	11	16	23	26	28	30	29	29	29	29	29	29	30	...
Apr24	28	29	29	31	32	34	32	28	26	23	16	10	12	18	25	28	31	31	32	33	33	32	30	30	27
Apr25	30	30	30	29	31	33	36	35	28	20	13	8	11	18	22	26	27	28	29	29	29	29	29	29	26
Apr26	29	29	29	28	29	31	33	33	30	24	15	8	14	22	31	37	38	39	39	38	37	36	35	35	30
Apr27	34	33	29	28	29	31	32	31	29	22	16	13	17	25	30	33	35	36	37	37	37	36	34	33	30
Apr28	30	27	29	30	31	29	28	25	26	23	17	12	14	18	23	29	32	33	34	33	33	32	31	31	27
Apr29	31	30	30	31	32	31	29	28	26	21	16	12	15	20	24	26	26	27	29	30	31	31	31	31	27
Apr30	30	29	30	30	31	30	29	26	24	25	20	11	12	22	26	28	30	30	29	29	29	29	29	29	27

2020, Field component: F, Base: 48600.0, Unit: nT

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
Apr01	118	118	118	119	119	122	122	122	116	113	109	109	112	118	122	122	119	118	119	120	121	120	120	120	118
Apr02	118	118	119	119	118	120	121	115	114	110	105	103	106	111	118	120	120	121	121	119	118	118	121	120	116
Apr03	120	116	117	118	119	120	121	119	115	109	106	111	113	115	116	118	118	117	119	122	126	123	123	117	117
Apr04	114	117	118	119	121	122	121	119	114	107	100	105	111	113	116	119	119	119	120	119	119	120	121	123	116
Apr05	120	121	122	121	124	125	127	122	114	103	96	98	101	106	111	117	120	120	121	121	121	121	122	121	116
Apr06	121	120	120	121	123	125	126	122	114	107	98	99	104	113	115	121	121	120	120	120	121	121	120	120	117
Apr07	120	120	121	121	122	124	125	123	118	109	102	101	107	111	116	118	119	118	119	120	125	124	120	121	118
Apr08	123	123	124	123	123	126	126	123	113	104	100	100	103	107	116	118	121	121	119	122	123	127	121	117	118
Apr09	118	118	119	119	122	124	125	122	121	117	110	108	111	115	117	119	121	122	122	124	121	121	121	123	119
Apr10	120	120	121	121	122	125	127	124	122	112	106	105	108	113	114	120	122	123	122	122	122	122	122	122	119
Apr11	122	123	122	122	122	122	124	119	119	118	107	102	101	99	107	112	118	117	120	123	126	128	125	126	119
Apr12	125	124	123	122	122	122	124	120	120	115	107	102	105	109	111	115	120	122	123	123	122	123	124	123	118
Apr13	122	122	122	122	121	122	123	122	116	116	109	104	105	109	111	117	124	124	124	124	127	128	123	123	119
Apr14	124	122	123	125	124	124	128	124	122	119	109	106	106	109	115	120	121	121	122	123	124	124	123	125	120

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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	123	122	117	119	118	119	121	121	120	114	105	101	108	114	120	125	126	125	123	123	123	123	122	121	119
Apr16	122	124	121	120	120	124	127	127	127	121	113	107	107	110	111	115	121	123	124	124	123	123	123	123	120
Apr17	122	123	123	123	124	125	126	124	119	115	110	107	113	118	123	123	123	124	122	123	124	125	126	125	121
Apr18	123	122	122	122	122	123	124	120	116	116	116	112	107	109	113	115	118	122	123	123	123	123	123	123	119
Apr19	123	123	122	123	123	123	120	116	114	112	109	105	108	110	115	118	121	122	122	123	124	123	123	124	119
Apr20	123	123	125	125	121	127	128	123	110	96	88	88	95	102	109	119	123	122	121	122	123	124	126	125	116
Apr21	124	124	124	126	129	130	129	125	119	113	111	105	101	104	114	118	120	123	125	125	124	125	125	128	120
Apr22	126	121	121	121	120	120	123	121	117	111	107	108	115	121	123	125	125	124	125	124	126	125	123	123	121
Apr23	123	123	122	124	124	123	123	120	115	110	107	109	114	118	121	123	124	123	125	126	126	127	126	125	121
Apr24	128	125	124	125	127	127	124	119	115	115	111	107	108	112	118	121	124	128	127	124	126	128	128	126	121
Apr25	124	125	126	124	126	127	127	125	117	112	108	104	106	112	115	119	122	123	124	125	125	125	125	125	120
Apr26	125	125	125	125	126	128	130	127	120	112	103	100	108	115	124	127	125	126	127	128	128	127	122	126	122
Apr27	125	126	127	125	124	125	126	122	119	114	109	107	111	115	120	126	127	131	127	125	124	126	127	128	122
Apr28	130	125	122	122	123	123	122	118	116	115	114	114	114	113	116	120	122	125	126	127	127	126	128	125	121
Apr29	126	124	124	122	124	125	125	122	122	116	112	109	111	116	121	123	124	125	126	126	127	127	127	127	122
Apr30	128	126	125	124	125	125	125	121	119	120	117	108	107	114	118	123	125	126	126	126	125	126	126	126	122

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.

2020, Field component: X, Base: 20900.0, Unit: nT

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
May01	117	120	119	119	120	118	119	118	112	114	122	127	120	114	106	105	108	108	112	114	115	115	115	116	115
May02	118	118	118	115	116	116	113	100	95	107	110	110	104	105	107	110	114	112	115	116	114	118	118	121	113
May03	117	114	114	113	111	110	112	105	110	102	125	121	119	113	115	116	117	119	123	128	130	128	124	129	119
May04	116	116	117	116	118	121	120	115	110	112	124	133	132	119	113	110	112	117	117	116	118	119	119	115	118
May05	113	113	113	112	113	107	103	100	100	112	120	125	127	125	117	115	110	103	105	107	102	105	104	109	111
May06	107	118	118	114	118	108	100	93	95	103	112	116	117	112	109	110	116	109	108	111	109	111	110	110	109
May07	111	111	111	112	111	111	110	105	110	113	118	117	114	109	111	113	115	116	115	118	117	117	110	116	113
May08	117	118	118	119	120	116	106	103	109	112	116	120	119	116	116	117	115	116	118	119	120	120	117	112	116
May09	112	114	114	118	120	116	109	103	100	101	106	111	115	118	119	120	121	118	119	121	120	122	122	112	115
May10	120	120	120	121	123	119	114	108	102	98	102	112	116	115	119	123	128	127	128	130	135	128	127	118	119
May11	115	114	116	122	123	117	112	105	95	91	98	104	110	111	109	110	113	117	119	119	117	116	116	117	112
May12	118	121	118	122	126	122	117	113	109	108	112	118	122	122	122	120	118	115	115	117	119	122	123	125	119
May13	119	118	118	119	120	121	116	110	102	97	104	111	118	120	118	118	118	117	120	122	120	123	121	121	117
May14	123	123	123	124	126	127	121	113	107	107	111	116	121	126	128	127	127	122	122	123	123	124	120	120	121
May15	120	121	120	121	124	125	124	125	127	127	118	115	117	119	119	116	116	118	119	119	118	119	118	118	120
May16	117	115	114	114	117	121	123	124	121	123	122	124	124	123	110	118	118	120	123	123	123	123	118	123	120
May17	124	122	122	123	121	115	107	106	114	124	126	122	121	123	116	118	118	118	122	125	125	124	121	122	120
May18	123	121	121	124	124	117	110	108	108	114	120	126	126	119	111	114	119	127	125	131	127	128	128	128	121
May19	126	122	120	125	124	120	112	108	110	117	126	116	117	114	107	107	111	115	117	119	120	120	115	115	117
May20	113	113	115	117	118	114	106	101	100	102	104	113	116	118	117	115	112	115	117	117	120	120	120	118	113
May21	117	119	119	119	124	123	116	109	105	98	102	108	109	109	111	115	121	119	119	124	120	120	120	117	115
May22	120	118	122	125	128	126	119	111	104	101	111	124	130	128	125	121	115	108	113	120	122	120	116	115	118
May23	117	119	115	116	117	113	106	102	99	102	118	127	126	119	113	112	110	114	117	119	118	116	116	114	114
May24	115	118	118	119	120	114	108	104	102	106	116	120	121	126	121	129	124	112	110	111	108	112	115	115	114
May25	114	116	119	122	123	121	106	94	87	86	94	108	120	127	121	120	120	119	124	125	122	117	122	125	115
May26	118	122	123	122	122	115	106	96	84	84	96	..	..	119	115	118	117	119	118	122	118	115	113	126	..
May27	117	116	120	125	130	120	107	99	89	94	115	122	120	118	121	119	120	121	122	122	122	122	122	121	117
May28	121	119	119	123	126	120	111	105	103	102	102	111	115	114	109	109	110	114	117	121	124	124	122	121	115
May29	122	124	125	127	128	121	114	105	106	109	116	123	124	120	114	112	116	119	122	123	126	130	127	131	120
May30	129	133	133	140	142	143	116	106	103	101	93	90	100	103	98	100	105	116	112	112	116	137	107	104	114
May31	102	107	107	110	101	101	95	97	93	93	98	106	105	100	97	101	107	109	112	115	114	113	110	110	105

2020, Field component: Y, Base: 1600.0, Unit: nT

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
May01	60	59	59	61	66	66	71	75	77	66	60	48	32	28	33	39	49	54	58	58	59	58	57	58	56
May02	60	60	61	66	72	80	84	82	74	65	49	32	26	36	45	55	58	59	58	60	61	60	58	59	59
May03	61	64	66	70	76	77	77	74	63	50	38	29	27	38	47	55	59	57	52	50	55	55	55	60	57

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
May04	62	63	67	70	70	74	79	76	63	45	38	34	33	38	47	56	60	59	58	58	57	60	62	61	58
May05	64	62	64	63	68	73	73	72	64	55	43	31	26	30	43	53	59	61	59	62	64	64	64	70	58
May06	69	67	70	67	72	76	75	72	62	48	33	30	28	39	51	59	63	65	61	59	62	60	61	63	59
May07	65	66	67	69	73	77	78	75	65	51	39	30	26	36	46	53	57	58	56	57	58	59	61	61	58
May08	62	60	62	64	66	71	75	75	69	56	42	32	29	32	39	44	51	57	57	57	59	61	66	67	56
May09	65	63	64	63	67	72	76	79	72	61	50	40	36	40	46	50	55	56	55	56	58	58	58	58	58
May10	59	58	59	62	71	79	82	81	75	61	45	28	19	26	36	45	48	50	53	52	52	55	66	70	56
May11	64	67	68	73	75	75	81	81	71	57	44	40	38	43	48	53	58	61	60	59	57	62	62	61	61
May12	61	62	63	66	74	75	77	74	65	55	45	40	38	41	45	50	58	59	59	57	57	59	58	60	58
May13	64	61	64	69	76	81	85	87	79	67	49	38	35	37	41	48	52	55	54	54	55	56	59	59	60
May14	61	63	63	67	78	87	89	86	78	66	50	33	26	29	36	45	53	56	53	55	56	56	57	58	58
May15	59	59	62	63	71	82	90	90	81	66	54	43	38	42	49	57	60	61	57	56	56	54	58	58	61
May16	59	60	62	65	79	87	85	79	66	52	39	31	32	35	45	55	57	57	56	53	53	54	56	57	57
May17	58	60	62	65	71	75	72	65	56	45	36	31	34	39	43	49	54	54	52	52	54	56	57	59	54
May18	61	62	61	67	76	82	80	76	67	55	46	39	37	40	43	48	54	56	56	55	56	56	57	59	58
May19	63	65	68	70	74	78	80	74	66	56	43	35	31	34	39	42	46	52	52	55	60	60	57	59	58
May20	67	69	63	65	68	72	74	77	74	66	50	34	23	29	40	50	57	60	56	58	61	60	65	68	59
May21	63	63	60	61	61	72	90	96	93	82	66	44	27	24	29	39	47	55	59	61	61	61	63	63	60
May22	66	63	66	70	73	78	83	82	71	54	38	28	22	24	27	42	53	60	59	58	56	58	59	63	57
May23	63	64	66	73	82	83	84	79	67	55	46	40	32	33	40	50	58	62	61	61	62	61	62	62	60
May24	60	60	64	68	73	84	88	86	77	62	39	24	17	16	26	44	64	67	64	63	63	60	61	61	58
May25	67	74	77	79	81	83	93	89	76	54	34	21	20	23	34	49	55	57	57	57	59	61	61	64	59
May26	63	64	67	71	82	93	93	90	77	57	41	...	...	33	42	50	59	61	60	60	59	61	63	59	...
May27	63	66	67	71	73	78	79	79	74	62	46	34	29	31	39	47	53	57	55	58	58	59	61	62	58
May28	63	63	63	68	72	79	80	79	78	67	51	36	24	24	34	47	55	59	57	56	58	60	62	62	58
May29	61	63	64	67	74	82	81	77	70	56	44	39	37	35	40	48	55	59	57	57	58	57	58	58	58
May30	56	60	64	71	86	89	95	82	79	68	44	27	24	25	37	55	62	62	65	74	70	81	80	78	64
May31	75	76	73	75	78	77	71	69	64	58	49	40	35	39	43	50	55	58	59	60	62	64	66	64	61

2020, Field component: Z, Base: 43900.0, Unit: nT

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
May01	29	29	29	29	32	31	30	28	26	23	16	8	11	19	28	31	32	31	31	31	30	30	30	30	27
May02	30	30	30	31	33	31	28	27	25	26	23	18	17	22	26	29	31	29	29	30	31	31	30	29	28
May03	28	29	29	30	30	29	26	19	14	12	11	8	10	17	22	27	28	27	27	28	28	28	29	27	24
May04	28	29	29	30	31	29	28	26	22	16	11	12	17	24	28	28	28	28	28	29	29	29	29	30	26
May05	28	29	30	31	31	29	28	21	14	9	7	5	5	12	21	28	32	33	34	35	35	35	35	34	25
May06	31	31	29	30	27	28	29	26	21	20	17	10	15	24	30	32	33	32	33	33	33	32	32	32	28
May07	32	32	32	33	34	30	31	31	24	16	16	20	23	23	26	29	31	31	31	31	31	31	31	31	28

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
May08	31	31	30	31	32	30	31	28	22	16	11	9	12	17	22	25	27	28	28	29	29	29	30	30	25
May09	31	31	31	32	33	35	35	30	24	17	15	17	17	22	26	28	29	30	29	29	30	29	29	29	27
May10	29	29	30	31	33	32	33	32	28	23	18	16	18	19	21	24	25	26	27	28	27	28	28	28	26
May11	29	28	29	31	31	32	32	32	27	20	15	12	15	22	25	30	32	31	30	30	30	30	30	30	27
May12	30	29	29	31	30	27	24	20	16	13	10	7	12	19	22	26	30	30	31	31	31	31	31	29	25
May13	28	28	29	30	31	29	25	26	26	21	16	9	13	19	25	30	32	31	30	30	30	30	29	30	26
May14	29	29	29	31	32	31	32	30	26	21	15	12	15	21	27	31	33	31	29	29	29	29	29	30	27
May15	29	29	30	32	33	31	29	26	22	18	12	6	8	18	25	30	30	29	28	29	29	30	30	30	26
May16	30	30	30	31	31	28	28	30	27	18	8	4	9	21	27	29	30	29	28	29	29	30	29	29	25
May17	29	29	30	31	32	31	27	24	23	22	17	16	15	22	25	28	31	32	30	30	30	30	30	30	27
May18	30	29	31	33	33	31	33	33	29	21	15	12	17	20	23	25	28	28	28	29	29	29	28	29	27
May19	29	29	30	28	26	24	25	26	24	19	15	12	10	14	21	27	29	30	31	31	29	31	32	31	25
May20	31	31	31	31	31	30	30	31	27	17	11	12	15	21	29	32	32	31	30	31	30	30	30	30	27
May21	30	30	31	33	33	34	34	32	31	24	14	9	12	18	25	30	32	33	32	32	32	31	31	32	28
May22	30	31	31	32	32	29	30	32	28	19	13	10	14	19	25	32	37	39	36	34	34	33	33	33	29
May23	32	31	31	32	32	30	33	31	26	21	16	15	16	19	27	32	32	32	32	32	31	31	31	32	28
May24	32	31	31	31	33	32	32	29	22	10	11	12	13	21	25	33	39	40	37	37	36	36	35	34	28
May25	33	32	32	32	32	32	35	35	32	21	17	21	19	20	26	33	33	33	37	33	35	36	35	30	29
May26	31	31	32	34	36	33	28	26	23	18	12	⋮	⋮	20	23	26	30	33	33	33	33	33	33	31	⋮
May27	31	31	32	32	32	33	33	31	32	25	16	10	16	22	30	34	33	31	31	31	30	31	31	31	29
May28	31	31	32	33	33	32	32	29	19	14	13	8	12	19	30	34	32	33	31	32	32	31	31	31	27
May29	32	32	31	34	38	40	40	38	30	23	25	20	20	26	30	31	33	34	36	37	36	36	35	30	31
May30	31	32	31	31	28	27	26	26	24	17	18	14	17	23	25	32	34	34	33	30	35	31	30	32	28
May31	33	34	34	35	33	29	28	25	22	23	21	23	27	29	30	31	31	33	33	34	35	36	36	35	30

2020, Field component: F, Base: 48600.0, Unit: nT

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
May01	126	127	127	127	130	129	128	123	121	119	116	111	109	115	120	122	124	124	126	126	126	126	126	127	123
May02	127	127	127	127	129	127	125	124	119	117	117	112	109	113	118	122	126	124	125	127	126	128	127	128	123
May03	127	126	125	125	125	124	122	118	114	113	113	108	108	113	118	123	125	125	127	129	131	130	129	130	122
May04	127	126	126	127	128	129	127	123	117	112	112	117	120	122	123	122	123	125	125	126	126	127	127	126	123
May05	127	125	125	126	126	122	120	112	105	106	107	106	108	113	119	124	127	124	125	127	125	126	126	127	120
May06	127	124	127	126	125	122	119	114	110	111	112	108	112	119	123	126	127	126	126	128	126	127	126	126	121
May07	127	126	126	128	128	125	123	119	112	112	113	117	118	116	120	124	127	125	126	127	128	128	128	127	124
May08	127	126	128	129	130	127	123	120	116	112	108	109	110	114	118	122	124	125	126	127	127	127	126	126	122
May09	125	126	127	129	131	131	128	122	115	108	109	112	114	120	124	126	128	127	129	128	128	128	128	126	124
May10	128	127	128	130	133	131	129	125	119	113	109	111	115	115	119	124	127	127	127	127	132	130	129	128	124
May11	125	124	126	130	131	130	128	124	115	107	105	105	110	116	119	124	127	128	127	127	127	127	127	127	122

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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
May12	127	128	129	131	131	127	122	117	111	107	106	106	112	118	121	124	127	126	127	128	129	130	128	129	123
May13	128	126	126	129	130	128	123	121	117	110	108	105	111	118	122	127	129	128	128	129	128	129	129	128	123
May14	129	128	129	132	133	133	131	126	120	115	111	110	114	121	128	132	134	130	128	129	129	130	129	128	126
May15	128	128	128	131	133	132	130	128	125	121	110	104	107	116	123	126	126	126	126	127	127	127	127	127	124
May16	127	126	126	127	129	127	129	130	126	118	109	105	110	120	120	127	127	127	128	128	128	129	129	129	124
May17	129	129	129	131	131	127	121	117	120	122	118	115	114	119	122	124	128	129	129	130	130	130	129	129	125
May18	129	128	129	133	133	129	128	127	123	117	114	113	118	118	118	121	126	129	129	132	130	130	130	130	126
May19	130	128	128	129	127	123	121	120	119	117	116	109	108	111	114	119	123	126	127	128	129	129	128	127	122
May20	127	127	127	128	128	126	123	122	117	109	104	108	111	118	125	128	126	127	127	127	128	128	128	127	123
May21	127	129	128	130	133	134	131	127	123	114	106	104	106	111	119	126	130	131	129	131	130	130	129	129	124
May22	129	128	130	133	134	131	129	127	120	110	108	111	117	120	125	130	132	131	130	132	131	131	129	129	126
May23	129	129	128	130	130	127	121	120	115	112	114	118	118	116	122	126	126	128	129	129	129	128	128	127	124
May24	128	128	128	129	131	128	123	115	106	104	108	110	112	121	123	134	138	134	130	131	129	130	130	130	124
May25	129	129	130	131	132	131	128	123	116	105	104	114	117	120	124	130	131	130	131	131	130	128	131	131	125
May26	128	131	131	133	135	129	121	116	106	102	101	106	114	118	119	123	127	130	130	130	130	129	128	132	123
May27	128	128	130	133	135	131	126	121	118	112	112	110	114	119	128	131	131	129	129	130	130	130	130	130	126
May28	129	129	130	132	133	131	127	122	112	107	105	104	108	115	123	127	126	129	128	130	131	131	130	130	124
May29	131	132	132	135	139	139	135	130	123	117	121	120	120	124	125	125	129	130	129	131	132	133	131	133	129
May30	133	132	135	138	137	139	137	119	116	109	106	100	107	113	114	122	126	130	131	132	132	137	124	124	124
May31	124	126	127	129	127	119	116	114	112	111	111	115	119	118	118	120	124	126	128	130	130	131	130	129	122

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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.

2020, Field component: X, Base: 20900.0, Unit: nT

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
Jun01	110	111	112	116	116	116	106	101	101	107	116	115	110	108	108	112	113	121	124	125	121	117	123	117	113
Jun02	113	118	125	119	125	125	101	94	93	90	94	96	95	94	94	101	106	109	115	117	114	114	114	117	107
Jun03	112	112	112	111	113	110	107	107	106	101	101	...	...	...	110	112	107	111	114	115	115	123	118	114	...
Jun04	112	112	112	114	116	107	100	99	106	110	120	121	119	120	116	119	122	114	117	119	123	124	123	118	116
Jun05	118	118	118	119	118	111	99	92	97	102	111	117	119	120	115	115	114	114	119	123	121	120	119	119	114
Jun06	119	117	119	120	122	119	112	105	101	108	118	120	124	129	127	125	122	119	122	125	126	125	125	124	120
Jun07	123	125	126	124	124	119	110	105	106	103	111	125	130	132	130	135	137	125	...	136	133	131	128	126	...
Jun08	121	...	125	124	125	120	112	99	86	80	85	93	100	105	113	117	113	111	116	116	118	115	114	120	...
Jun09	118	119	120	122	123	117	108	101	100	102	108	115	115	114	113	113	117	122	125	123	118	124	114	121	116
Jun10	117	118	120	123	122	121	101	101	97	87	97	100	104	102	104	105	111	114	116	117	116	116	116	118	110
Jun11	117	117	116	120	120	116	114	108	106	104	106	105	107	112	115	121	122	119	119	115	114	113	114	115	114
Jun12	115	114	116	121	122	121	116	111	102	111	109	118	123	122	116	115	122	115	117	121	121	120	120	117	116
Jun13	116	116	117	116	116	116	109	110	112	115	117	121	122	124	113	113	113	113	116	124	121	120	121	122	116
Jun14	119	117	117	119	124	119	115	109	102	102	113	...	120	116	112	110	115	122	130	133	121	119	128	126	...
Jun15	125	123	121	121	118	115	105	100	102	109	111	114	106	107	105	106	113	120	119	122	123	120	119	119	114
Jun16	119	121	121	123	123	115	102	...	112	111	111	121	129	130	125	123	116	118	119	123	121	118	120	119	...
Jun17	118	118	126	127	126	124	122	118	113	116	128	140	140	129	125	112	114	117	121	125	126	120	120	118	...
Jun18	120	119	120	123	124	118	116	114	108	106	115	118	116	114	117	117	121	119	121	124	126	125	126	116	119
Jun19	122	125	125	122	123	122	115	105	105	101	105	118	127	125	123	119	115	119	121	127	126	123	121	120	119
Jun20	123	127	130	131	128	110	92	93	93	99	108	116	125	125	119	119	118	120	124	127	126	122	120	120	117
Jun21	114	114	114	118	119	117	119	119	112	106	111	117	120	127	128	128	123	122	121	121	119	116	117	117	118
Jun22	116	118	118	120	120	117	108	102	100	105	114	118	125	124	122	117	112	116	119	121	121	117	123	123	116
Jun23	121	121	121	124	123	118	110	105	100	106	111	113	114	115	117	120	116	114	123	123	127	123	122	122	117
Jun24	117	118	121	123	123	124	118	104	96	92	91	106	121	127	127	122	118	118	122	124	122	123	124	123	116
Jun25	122	124	127	127	126	118	111	111	104	103	116	122	120	119	119	122	118	118	123	125	124	123	124	124	119
Jun26	121	121	123	124	123	121	115	111	113	112	115	115	114	116	120	...	...	121	124	125	117	124	126	119	...
Jun27	111	115	116	119	118	112	114	113	106	105	102	96	115	122	112	116	117	114	115	120	121	118	118	116	114
Jun28	111	110	110	111	112	112	105	101	99	105	108	110	111	110	111	111	110	111	114	118	121	122	118	117	111
Jun29	119	118	118	113	114	114	111	108	106	103	103	103	111	116	119	118	117	117	120	121	121	118	118	118	114
Jun30	119	125	119	122	114	113	110	108	115	115	116	118	119	118	115	111	114	116	120	122	121	119	116	117	117

2020, Field component: Y, Base: 1600.0, Unit: nT

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
Jun01	63	65	64	69	79	85	81	78	72	60	49	40	36	39	44	51	54	54	53	55	59	68	71	71	61
Jun02	77	77	84	83	82	92	97	95	85	65	46	33	32	29	36	45	54	57	61	62	67	66	64	62	65
Jun03	64	63	65	67	75	89	95	96	88	70	51	...	...	...	45	54	59	61	61	62	64	62	63	63	...
Jun04	66	67	67	72	80	88	89	83	75	60	44	35	35	41	48	53	57	60	62	60	59	64	67	65	62

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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	65	64	65	72	84	91	85	79	69	55	40	25	21	29	41	49	57	60	59	58	59	60	61	61	59
Jun06	62	64	66	71	80	88	84	84	77	59	41	32	35	40	42	50	53	55	53	54	56	58	60	64	59
Jun07	66	65	70	76	82	88	86	82	75	59	45	38	35	29	26	32	37	48	::	55	68	63	62	64	::
Jun08	66	::	64	71	72	77	84	86	81	67	52	41	35	37	44	52	61	62	63	63	63	64	65	66	::
Jun09	66	66	66	70	79	86	82	80	72	62	54	44	38	39	43	45	47	53	56	61	60	61	77	71	62
Jun10	66	66	67	68	73	83	85	86	75	63	50	37	29	34	41	50	58	63	63	62	62	63	64	65	61
Jun11	64	62	63	65	75	90	96	93	81	64	57	51	49	52	53	58	61	62	62	62	63	63	63	62	65
Jun12	64	65	66	70	79	89	92	89	81	69	55	43	40	43	50	53	57	59	58	57	60	56	59	63	63
Jun13	64	64	65	70	79	88	88	83	77	65	53	46	47	44	45	48	58	61	60	60	55	61	61	61	63
Jun14	62	65	68	72	78	86	82	81	82	75	63	::	47	44	44	50	55	54	52	53	52	54	59	62	::
Jun15	63	64	69	74	83	88	86	85	76	64	49	40	39	39	44	50	52	51	52	57	59	62	64	65	61
Jun16	66	67	68	73	79	85	82	::	70	57	47	40	40	46	51	60	64	64	61	62	60	61	64	66	::
Jun17	67	67	69	72	76	78	78	81	76	67	46	33	32	34	39	46	58	60	59	59	59	61	62	63	60
Jun18	64	64	66	72	79	84	79	78	74	65	52	43	42	45	53	57	58	58	59	59	61	61	64	67	63
Jun19	69	68	69	75	79	87	88	85	79	69	53	42	40	40	44	52	56	59	57	58	59	61	66	65	63
Jun20	65	69	71	79	87	98	84	76	68	62	50	41	37	36	39	47	53	52	53	57	61	63	64	67	62
Jun21	68	67	69	75	77	79	84	91	89	76	62	47	44	43	52	60	63	63	61	61	61	62	64	67	66
Jun22	70	69	69	75	83	84	82	82	75	64	49	42	37	36	43	49	54	55	61	62	64	64	65	65	62
Jun23	67	67	68	72	81	91	97	89	80	76	59	48	39	32	38	47	53	59	62	60	61	60	63	67	65
Jun24	72	67	71	71	74	80	88	90	80	65	48	38	35	32	35	44	55	60	61	60	63	63	64	65	62
Jun25	67	70	71	78	91	96	91	93	89	77	66	58	51	43	45	50	55	58	57	59	59	60	67	64	67
Jun26	62	61	66	73	81	90	95	96	89	77	61	52	44	43	43	::	58	59	59	63	62	61	67	78	::
Jun27	70	79	79	81	87	92	91	84	77	63	45	39	37	40	48	55	58	61	63	64	67	68	75	72	66
Jun28	74	74	76	77	75	79	89	94	91	78	61	53	50	49	49	52	60	61	61	64	67	67	67	67	68
Jun29	66	67	72	78	81	84	86	87	82	74	59	45	35	39	47	55	62	63	62	66	65	65	65	66	65
Jun30	67	68	67	76	86	87	91	88	82	72	57	45	43	46	48	53	59	60	62	62	62	63	66	66	66

2020, Field component: Z, Base: 43900.0, Unit: nT

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
Jun01	35	35	36	38	41	38	37	34	30	23	20	23	27	28	33	36	36	34	33	34	35	35	34	32	33
Jun02	32	33	32	34	32	30	26	23	18	21	21	22	26	29	30	34	34	35	36	37	37	37	36	35	31
Jun03	35	35	35	37	37	38	38	35	33	27	22	::	::	25	31	34	33	33	34	35	35	35	34	35	::
Jun04	35	35	36	35	35	35	35	33	25	22	24	22	21	25	28	30	30	33	34	34	34	34	34	34	31
Jun05	34	35	35	36	37	35	30	28	25	17	13	12	16	24	29	32	32	31	32	33	34	35	34	34	29
Jun06	34	34	35	36	36	35	34	29	23	17	15	14	14	19	25	31	33	33	33	32	34	34	34	34	29
Jun07	33	33	33	35	35	37	36	33	31	32	28	20	21	25	29	30	31	40	::	32	35	37	36	36	::
Jun08	35	::	35	37	39	40	40	37	37	35	32	24	22	27	34	37	39	40	37	35	36	35	35	36	::
Jun09	35	35	35	37	39	39	40	37	31	24	22	23	27	27	29	31	33	34	35	35	36	35	34	33	33

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	33	34	35	37	37	32	30	29	26	23	22	15	15	22	28	34	36	37	37	37	36	36	36	35	31
Jun11	35	36	37	36	37	35	29	26	24	20	21	29	31	30	30	35	41	39	38	37	36	36	36	36	33
Jun12	36	36	37	38	39	36	33	32	26	19	18	19	20	25	30	36	37	37	36	36	35	35	35	35	32
Jun13	35	35	36	37	38	35	33	31	27	24	23	19	24	29	31	32	34	36	35	35	36	35	34	35	32
Jun14	35	35	36	38	38	39	36	30	28	24	21	..	27	28	32	37	36	35	33	33	33	34	34	34	..
Jun15	34	34	34	37	40	34	29	30	30	28	27	31	31	32	33	34	33	33	34	35	35	34	36	34	33
Jun16	35	35	36	36	36	33	31	..	24	22	19	19	24	27	27	30	32	34	35	36	35	35	36	35	..
Jun17	35	35	35	35	36	31	30	30	29	27	20	12	14	21	25	29	31	34	34	34	35	35	35	35	30
Jun18	34	33	36	37	37	34	35	31	31	16	14	13	11	16	24	28	28	31	34	34	34	34	34	33	29
Jun19	33	33	35	37	37	34	34	34	23	10	5	8	8	15	24	31	28	32	32	34	35	34	34	35	28
Jun20	35	33	34	36	35	34	35	29	28	35	29	24	26	29	31	33	35	34	34	37	36	35	36	36	33
Jun21	36	37	37	38	40	38	35	34	32	27	22	23	23	26	32	35	35	36	37	37	36	36	36	36	33
Jun22	36	35	36	36	35	33	33	35	35	31	22	21	26	25	25	30	33	35	34	34	34	35	35	35	32
Jun23	35	35	36	37	35	35	33	35	34	33	31	30	26	28	32	35	36	39	37	34	37	36	35	35	34
Jun24	35	37	37	38	38	38	40	43	41	36	28	24	24	28	29	37	39	37	36	37	36	36	36	36	35
Jun25	36	35	37	40	39	36	34	35	33	30	26	24	23	27	29	36	38	37	38	35	36	36	36	36	34
Jun26	36	36	36	36	35	35	34	34	33	36	33	30	29	28	30	..	37	37	38	39	37	38	37	35	..
Jun27	37	35	36	37	36	35	34	34	34	34	32	27	26	26	29	37	38	38	38	38	37	37	37	37	34
Jun28	37	38	38	39	39	40	39	39	34	33	27	22	26	31	36	38	39	39	39	39	38	38	37	37	36
Jun29	37	37	37	39	40	37	34	35	35	33	32	24	17	21	27	34	38	39	38	38	37	36	36	36	34
Jun30	36	36	36	37	37	34	34	37	36	28	23	16	19	25	33	38	38	38	36	36	37	37	37	37	33

2020, Field component: F, Base: 48600.0, Unit: nT

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
Jun01	128	129	130	134	137	132	129	124	120	117	117	119	121	120	125	130	131	132	133	134	133	132	134	129	128
Jun02	128	128	130	132	133	127	118	112	107	108	109	110	113	115	117	123	126	128	131	133	132	132	131	130	123
Jun03	129	130	130	131	132	132	131	128	125	117	112	116	120	123	125	128	125	127	129	130	131	130	130	130	127
Jun04	129	129	130	131	132	128	125	123	118	117	122	121	120	123	124	128	129	133	130	133	133	133	131	131	127
Jun05	131	131	132	133	135	130	120	115	114	109	108	110	114	121	124	128	127	127	130	133	132	132	132	131	125
Jun06	131	131	132	135	136	134	129	121	115	111	113	113	114	122	126	131	131	130	131	133	134	134	133	133	127
Jun07	133	133	134	135	135	136	130	125	123	123	122	121	123	128	130	134	135	133	134	137	132	132	133	134	131
Jun08	134	133	135	137	139	138	135	127	120	116	115	110	111	119	128	133	130	132	135	132	132	131	131	131	129
Jun09	132	132	133	136	138	136	132	127	121	116	116	120	123	122	124	126	130	132	135	134	135	135	134	132	129
Jun10	130	131	133	136	136	132	121	120	116	108	110	105	107	112	119	125	130	137	133	132	132	132	132	130	125
Jun11	132	132	133	134	135	132	126	121	118	112	114	121	123	124	126	133	139	132	133	132	131	131	132	131	128
Jun12	131	131	133	136	138	135	130	127	118	110	112	117	120	124	126	131	132	132	132	131	133	132	131	133	128
Jun13	132	132	133	134	134	137	127	125	123	121	120	119	123	129	126	126	129	130	131	133	135	133	132	132	129
Jun14	132	132	132	135	138	137	132	125	119	116	117	121	125	124	126	130	132	133	135	136	137	136	135	134	130

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	134	133	133	136	137	127	120	120	121	121	123	126	122	123	124	126	128	130	131	133	134	133	133	133	128
Jun16	133	133	134	136	135	129	128	124	120	117	114	118	126	129	128	129	128	131	132	133	133	132	133	132	129
Jun17	132	132	136	136	134	131	129	128	125	124	122	119	121	124	125	123	127	130	132	133	133	133	133	132	129
Jun18	132	132	134	136	137	134	132	127	117	110	112	112	109	112	122	125	125	130	133	134	134	134	134	134	127
Jun19	132	134	135	136	136	133	131	126	116	103	99	107	110	117	123	127	127	129	131	133	133	132	132	132	126
Jun20	135	135	136	139	137	129	122	116	116	124	122	121	126	129	128	130	132	131	133	135	135	135	134	134	130
Jun21	132	132	133	135	138	135	134	132	127	121	118	120	121	127	133	136	134	135	135	134	133	132	132	132	131
Jun22	132	133	133	135	133	128	126	126	124	123	118	119	126	125	124	127	127	132	134	134	133	134	133	134	129
Jun23	133	133	134	136	135	133	128	127	126	125	126	125	121	123	128	132	132	131	132	133	135	135	134	134	130
Jun24	132	134	135	137	137	137	138	134	128	121	113	116	123	127	128	135	135	135	136	136	134	135	135	135	132
Jun25	134	135	138	141	140	134	129	127	124	123	123	123	121	123	127	134	135	134	135	136	135	136	136	135	131
Jun26	134	134	135	136	134	134	133	133	135	131	128	126	125	124	127	132	134	135	137	139	135	137	137	133	133
Jun27	131	131	133	135	133	129	130	130	126	126	122	114	122	125	124	133	134	133	133	135	135	134	134	133	130
Jun28	131	131	131	133	134	135	131	130	124	125	121	116	121	124	130	132	132	133	134	135	136	136	134	134	130
Jun29	134	133	133	134	135	133	129	129	127	125	123	115	112	117	125	131	134	135	135	136	135	134	133	133	130
Jun30	134	134	136	136	133	129	129	130	130	124	120	114	117	122	128	131	133	133	134	135	135	135	134	133	130

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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
2020, Field component: X, Base: 20900.0, Unit: nT																									
Jul01	116	118	114	115	116	117	118	109	106	102	106	114	119	122	120	119	...	...	126	131	128	121	117	128	...
Jul02	119	120	120	122	122	120	115	109	109	111	119	126	123	121	120	120	119	122	122	124	127	126	125	126	120
Jul03	127	127	126	128	129	126	121	121	122	120	117	115	112	113	113	114	113	116	121	120	120	113	121	120	120
Jul04	121	121	123	124	128	123	112	102	98	99	109	122	130	128	130	132	130	131	132	130	130	113	116	114	121
Jul05	113	117	121	127	126	118	113	101	87	96	98	96	99	103	107	110	109	111	110	111	115	111	111	115	110
Jul06	114	114	115	120	119	117	112	101	100	105	109	113	116	115	114	112	109	111	111	116	119	116	116	115	113
Jul07	118	117	118	123	127	126	115	101	93	90	94	95	99	109	117	120	119	117	116	118	117	119	118	118	113
Jul08	118	117	118	119	117	114	114	113	109	106	106	109	111	110	111	114	120	123	122	122	122	122	121	121	116
Jul09	119	119	121	125	125	122	115	112	115	115	112	110	113	111	110	111	112	117	116	120	119	118	118	117	116
Jul10	116	115	114	117	123	128	125	116	107	107	108	108	107	106	110	114	116	116	118	118	119	118	119	119	115
Jul11	118	119	116	118	120	120	122	119	117	114	111	103	105	108	110	114	116	117	118	120	120	119	119	119	116
Jul12	121	120	120	121	121	121	112	113	112	113	117	120	125	125	122	118	118	122	127	130	131	130	130	131	121
Jul13	132	132	128	127	130	129	130	127	119	107	98	104	114	116	117	116	119	124	127	130	131	125	125	108	121
Jul14	124	121	118	116	123	103	91	93	99	99	98	100	99	95	97	106	106	104	109	114	113	114	114	111	107
Jul15	110	110	111	113	118	115	115	113	112	107	101	101	107	111	105	101	102	109	110	111	109	108	107	106	109
Jul16	107	108	112	115	117	112	106	104	103	105	101	92	94	103	100	100	105	112	115	118	119	119	119	119	109
Jul17	117	117	114	113	111	109	111	110	107	101	97	93	95	106	109	111	105	115	123	120	119	120	121	122	111
Jul18	120	113	114	113	112	106	98	97	108	107	105	103	102	100	99	102	107	113	116	120	121	120	120	119	110
Jul19	116	115	115	116	120	118	112	110	106	101	102	102	98	100	105	109	117	123	126	126	124	126	124	122	114
Jul20	117	117	116	120	118	115	112	105	102	107	109	110	109	109	113	115	117	119	120	121	122	121	120	117	115
Jul21	118	118	117	119	119	119	116	110	106	103	100	105	111	116	119	117	111	110	116	120	120	118	117	120	114
Jul22	118	118	118	123	123	118	109	99	95	93	92	96	104	111	115	117	117	113	118	122	125	123	123	122	113
Jul23	120	121	118	121	124	118	109	100	95	95	106	112	112	113	112	111	113	120	123	126	126	123	123	124	115
Jul24	126	126	129	121	124	111	94	91	88	83	90	...	102	107	103	91	86	84	87	94	87	96	107	110	...
Jul25	122	123	114	110	106	107	102	98	90	95	106	103	90	106	108	110	108	112	115	116	119	116	121	127	110
Jul26	118	115	109	107	107	106	107	98	90	84	82	83	90	101	104	104	107	111	114	116	116	115	115	119	105
Jul27	114	113	111	112	112	112	107	109	110	105	100	99	104	114	117	124	121	118	120	122	121	121	119	119	114
Jul28	115	116	120	114	116	113	105	99	98	102	105	104	105	108	114	113	108	116	113	...	119	118	118	118	...
Jul29	121	116	113	117	116	117	115	113	113	108	109	114	113	110	109	105	108	117	123	119	119	118	119	120	115
Jul30	121	121	122	126	124	120	110	105	105	104	108	120	119	109	105	105	107	109	112	115	115	123	116	116	114
Jul31	114	112	113	119	123	118	108	108	106	106	112	122	119	111	109	111	109	111	111	117	119	118	117	117	114
2020, Field component: Y, Base: 1600.0, Unit: nT																									
Jul01	70	72	77	81	87	92	82	80	76	65	52	43	41	41	49	...	...	...	57	58	62	69	70	66	...
Jul02	73	72	73	76	84	91	92	87	75	61	50	40	30	32	41	51	59	59	59	60	60	62	61	63	63
Jul03	66	68	71	76	82	88	94	97	94	86	75	63	50	43	45	51	56	57	61	62	63	62	61	65	68

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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	66	64	63	69	77	83	81	79	70	59	44	36	38	36	33	37	47	52	55	56	63	72	73	74	59
Jul05	75	72	69	73	82	83	95	95	86	78	56	46	41	42	47	58	67	68	66	64	71	72	81	70	69
Jul06	68	71	70	74	79	89	89	85	79	72	64	55	47	43	49	57	60	66	67	65	69	65	64	66	67
Jul07	68	70	72	73	80	85	93	100	92	79	62	45	35	33	38	49	61	68	69	66	65	64	67	68	67
Jul08	68	69	70	73	80	88	88	87	82	72	63	54	49	50	51	52	54	56	55	57	60	63	65	66	66
Jul09	69	68	69	73	78	85	88	89	88	78	61	50	46	47	51	57	61	61	62	63	64	63	65	67	67
Jul10	68	67	70	74	75	80	85	86	79	67	59	49	43	41	41	47	53	61	61	62	64	64	64	63	64
Jul11	64	68	70	72	75	79	82	85	85	79	59	49	47	48	50	56	63	63	62	63	64	64	65	67	66
Jul12	69	71	73	76	83	79	87	86	86	65	53	54	51	49	52	55	58	58	57	58	59	63	66	68	66
Jul13	70	70	70	74	79	89	96	80	80	82	63	51	46	42	39	46	58	61	60	57	57	58	73	88	67
Jul14	87	96	82	73	87	86	81	92	92	83	70	56	48	41	44	50	62	67	65	64	66	68	68	69	70
Jul15	72	73	73	75	76	77	83	93	86	84	73	61	48	41	42	55	64	71	70	68	67	67	69	70	69
Jul16	71	70	71	74	80	84	82	84	91	69	53	41	36	37	41	49	57	61	62	62	64	64	66	68	64
Jul17	68	69	69	77	82	83	83	86	82	75	65	54	45	41	45	54	62	67	65	65	64	63	65	63	66
Jul18	69	71	71	76	84	88	87	86	84	70	57	43	40	47	55	59	61	62	62	62	64	62	66	67	66
Jul19	68	70	72	75	81	88	86	82	76	68	66	60	53	48	49	56	59	59	61	61	59	61	69	70	66
Jul20	69	70	70	71	83	88	83	81	89	70	64	53	49	51	56	62	67	68	66	66	67	66	69	73	68
Jul21	71	71	72	72	81	92	94	92	83	75	55	38	29	31	37	48	61	68	71	69	67	67	68	76	67
Jul22	73	70	72	77	80	88	87	87	92	75	61	46	38	41	50	57	64	66	69	62	66	67	67	66	67
Jul23	68	70	72	76	86	91	92	91	83	71	54	45	44	41	43	49	54	61	63	66	66	65	65	66	66
Jul24	69	71	72	77	84	88	86	92	91	78	62	⋮	⋮	33	36	39	71	84	79	85	96	87	78	92	⋮
Jul25	104	111	94	81	80	75	88	92	81	68	53	40	37	36	45	52	59	63	65	65	68	67	69	90	70
Jul26	74	75	78	79	84	90	95	96	96	91	73	57	46	42	45	54	63	69	68	68	68	70	71	72	72
Jul27	75	79	81	84	88	89	87	88	81	73	64	53	46	47	50	50	54	60	62	64	66	67	72	75	69
Jul28	76	78	76	80	86	90	88	84	86	78	63	54	48	44	46	53	60	62	63	⋮	66	65	66	74	⋮
Jul29	71	76	77	77	83	88	91	89	86	78	68	54	47	47	51	54	56	59	60	65	66	65	66	67	68
Jul30	71	71	74	78	83	94	90	85	80	72	66	54	47	46	49	56	62	64	65	67	68	69	69	68	69
Jul31	69	72	73	78	88	92	89	88	81	66	53	49	47	51	56	58	60	67	64	64	65	66	68	70	68
2020, Field component: Z, Base: 43900.0, Unit: nT																									
Jul01	37	37	38	39	36	33	36	35	33	35	33	29	29	32	33	35	⋮	⋮	37	⋮	⋮	39	40	38	⋮
Jul02	36	37	38	40	40	37	33	28	27	25	22	17	20	25	30	33	36	37	36	36	36	37	37	37	33
Jul03	37	38	38	39	38	38	39	38	35	29	24	25	28	24	25	33	37	38	37	37	37	37	37	37	34
Jul04	37	36	37	38	39	36	37	41	37	27	18	23	28	27	24	27	30	33	36	36	38	40	40	40	33
Jul05	39	39	41	41	41	41	38	38	37	34	30	26	28	31	36	41	44	42	41	41	40	40	39	40	38
Jul06	40	40	41	42	43	41	38	41	41	42	42	42	38	37	36	41	45	43	44	43	41	39	40	40	41
Jul07	40	40	40	42	43	43	42	43	41	37	30	28	26	28	34	41	45	43	41	41	39	39	39	39	38

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	39	39	41	43	45	43	38	35	30	29	29	27	25	30	33	36	36	38	39	38	38	39	39	38	36
Jul09	38	38	39	39	39	40	43	42	39	36	28	24	24	22	25	31	34	38	39	39	39	38	38	38	35
Jul10	39	39	39	38	39	38	39	39	35	29	25	23	24	27	35	40	41	40	40	40	39	38	38	38	36
Jul11	39	39	40	41	42	40	38	37	31	30	27	22	25	30	34	36	41	39	40	39	39	39	38	38	36
Jul12	38	38	39	41	41	40	42	39	33	26	20	19	22	27	34	39	40	38	38	37	37	37	37	37	35
Jul13	36	36	36	39	41	38	35	36	37	33	26	22	24	26	32	37	34	37	38	38	42	39	38	38	35
Jul14	32	29	31	34	31	34	37	33	27	28	26	30	36	42	44	46	46	45	43	42	42	42	42	42	37
Jul15	42	42	42	42	44	41	40	40	38	28	24	27	28	32	38	46	46	46	45	42	42	42	42	42	39
Jul16	42	42	42	43	44	43	39	42	40	35	28	31	32	35	41	45	46	45	43	43	43	40	42	41	40
Jul17	41	42	42	42	43	43	44	45	40	34	27	24	19	24	34	40	41	42	41	41	41	40	40	41	38
Jul18	39	40	41	42	42	42	38	40	42	33	25	26	35	36	36	41	42	41	41	41	41	41	41	40	39
Jul19	40	40	41	43	43	38	35	35	32	30	25	23	23	28	33	39	41	40	41	41	40	40	40	40	36
Jul20	40	40	41	42	43	41	37	36	36	31	25	27	28	31	34	37	37	38	40	41	41	40	40	40	37
Jul21	40	40	41	42	45	44	43	42	40	32	21	16	20	27	35	39	42	42	42	42	40	40	41	40	37
Jul22	40	40	40	41	43	41	39	37	32	32	32	32	35	36	36	43	44	43	41	42	41	41	40	40	39
Jul23	40	40	41	44	45	44	45	46	43	34	25	23	26	32	34	38	38	38	41	42	40	39	39	39	38
Jul24	40	40	40	39	41	39	44	43	43	43	34	..	..	38	43	52	62	65	59	56	53	51	48	43	..
Jul25	38	31	35	40	43	46	47	46	41	38	35	35	39	39	40	44	45	43	43	44	45	45	44	42	41
Jul26	43	43	43	46	47	45	47	46	43	37	29	26	30	34	37	46	40	42	43	42	44	43	43	42	41
Jul27	42	42	42	43	45	46	45	42	40	35	29	29	33	34	34	39	41	41	42	42	42	42	42	42	40
Jul28	41	40	39	41	42	42	42	43	39	34	32	31	32	30	33	41	43	45	44	..	..	43	43	43	..
Jul29	42	41	42	43	43	42	39	42	40	36	32	32	33	34	39	44	43	42	42	42	42	43	42	42	40
Jul30	42	42	42	42	44	39	40	39	35	36	31	25	29	34	40	43	43	41	42	42	43	43	43	43	39
Jul31	43	43	43	43	41	37	38	38	35	31	29	28	30	32	36	39	41	42	43	43	42	42	42	42	38

2020, Field component: F, Base: 48700.0, Unit: nT

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
Jul01	33	34	34	35	33	31	33	29	26	25	24	25	26	30	31	31	32	33	37	40	38	37	36	39	32
Jul02	34	35	35	38	39	36	30	23	21	20	20	18	20	24	27	32	33	36	35	36	37	37	37	38	31
Jul03	38	38	39	40	40	39	38	38	35	28	22	22	22	19	20	28	31	33	35	34	35	36	35	35	32
Jul04	36	34	36	38	40	36	32	31	25	16	12	22	31	28	26	30	32	35	38	38	40	35	36	35	32
Jul05	34	35	39	42	42	37	34	28	21	22	18	14	17	21	28	34	36	36	34	34	35	37	33	36	31
Jul06	35	35	36	40	39	36	33	31	30	33	34	35	34	32	31	35	37	37	37	38	38	36	35	35	35
Jul07	36	36	37	41	43	43	38	33	28	22	17	15	15	20	29	38	42	39	37	36	36	36	35	35	33
Jul08	36	36	37	39	41	39	34	30	24	22	22	21	19	23	27	31	34	37	37	36	37	36	37	36	33
Jul09	36	36	37	39	39	39	39	37	35	33	23	18	19	16	19	25	28	34	35	36	36	37	35	36	32
Jul10	34	34	34	35	38	39	40	28	28	23	19	16	17	19	28	34	36	36	36	36	35	35	35	35	32
Jul11	35	36	36	37	39	38	37	35	29	27	21	13	16	22	27	31	37	35	36	37	36	35	35	35	32

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	36	36	37	39	39	37	36	34	28	22	18	18	23	28	33	35	36	37	38	39	38	39	39	39	33
Jul13	39	39	37	39	43	40	38	38	35	26	15	14	20	23	27	32	32	36	39	39	40	38	38	31	33
Jul14	33	28	29	31	32	25	23	20	17	18	16	19	24	27	31	36	37	35	35	37	36	36	36	35	29
Jul15	35	35	35	36	38	37	36	35	33	22	15	17	21	26	28	34	35	38	37	35	34	34	34	33	32
Jul16	34	35	37	39	40	35	31	33	30	26	18	17	18	24	29	33	36	38	38	39	39	39	39	38	33
Jul17	37	36	36	37	37	36	38	39	33	24	15	11	7	16	26	33	31	38	39	38	37	38	38	39	32
Jul18	37	34	36	37	37	34	27	28	34	26	17	17	25	25	25	31	33	35	36	38	39	38	38	37	32
Jul19	35	36	37	38	40	35	30	29	24	20	16	14	12	17	24	32	37	39	41	40	39	40	39	38	31
Jul20	36	36	37	40	40	38	32	27	26	24	19	21	22	24	29	32	33	39	37	40	39	38	38	36	32
Jul21	37	37	37	39	42	40	37	34	31	22	13	11	16	24	31	34	35	35	38	39	38	37	37	38	33
Jul22	37	36	37	40	42	38	32	27	20	19	18	20	25	29	31	38	40	37	37	40	40	39	38	38	33
Jul23	38	38	38	41	44	41	38	35	30	22	18	18	21	27	28	32	32	36	40	42	40	38	39	39	34
Jul24	40	40	40	41	39	39	40	30	29	25	19	18	25	28	32	35	43	45	41	41	36	37	39	36	35
Jul25	38	32	31	34	34	34	37	34	25	25	27	25	28	30	31	36	36	37	38	39	41	40	42	43	34
Jul26	40	38	36	37	39	37	37	35	26	20	11	8	15	24	27	30	32	35	37	39	39	39	38	39	32
Jul27	37	37	36	37	40	37	37	32	33	26	18	18	24	29	31	38	38	37	39	40	40	40	39	39	34
Jul28	37	36	37	36	38	36	34	32	28	25	23	22	23	23	28	35	37	40	38	39	39	40	39	39	33
Jul29	39	37	36	39	38	39	35	37	35	29	26	27	28	27	31	35	35	37	40	38	39	38	39	40	35
Jul30	40	40	40	42	43	38	34	34	31	27	24	23	27	27	30	33	34	40	36	37	38	38	38	38	34
Jul31	38	37	38	40	40	35	33	31	27	23	24	27	27	25	29	32	34	35	36	38	39	39	38	39	34

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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.

2020, Field component: X, Base: 20900.0, Unit: nT

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
Aug01	117	116	116	118	116	113	110	101	98	107	118	125	130	128	123	118	115	121	123	126	127	123	124	125	118
Aug02	124	122	119	119	118	121	123	117	121	126	127	121	105	100	104	89	93	99	120	121	124	117	111	120	115
Aug03	128	141	133	121	112	114	103	100	83	81	86	102	103	99	100	99	98	110	108	113	137	137	111	109	109
Aug04	110	116	115	114	110	101	100	94	95	97	98	100	105	109	108	114	117	116	118	117	115	114	109	107	108
Aug05	107	110	109	112	110	103	96	91	85	88	95	104	111	114	112	113	114	111	117	115	120	122	111	110	107
Aug06	110	110	111	114	115	112	107	105	99	94	100	102	105	104	112	109	107	112	114	113	113	116	110	107	109
Aug07	109	109	110	112	114	113	110	105	100	95	99	110	117	116	112	99	101	112	107	118	117	117	110	116	111
Aug08	114	113	115	113	113	108	107	95	85	87	99	106	101	95	99	108	109	100	115	112	115	114	117	112	105
Aug09	112	114	115	115	116	115	111	104	95	87	92	102	110	111	108	99	101	110	107	116	116	117	115	119	110
Aug10	117	118	119	119	118	115	108	99	96	101	109	115	114	112	111	108	108	113	112	116	117	116	116	117	112
Aug11	116	115	113	116	115	115	106	103	103	105	111	116	116	114	110	107	109	113	116	118	119	121	121	121	113
Aug12	120	120	121	120	118	116	112	104	104	107	110	108	104	108	108	113	119	118	119	123	123	123	123	120	115
Aug13	121	118	116	116	117	118	112	107	104	108	113	119	121	117	115	113	116	117	117	119	120	119	118	121	116
Aug14	122	119	120	117	121	121	119	109	105	108	116	128	129	124	118	118	116	114	114	119	114	113	113	114	117
Aug15	114	114	114	114	113	111	109	108	110	117	122	126	126	123	118	116	115	116	115	114	117	116	116	114	116
Aug16	116	112	111	112	117	120	119	116	115	111	121	125	117	114	115	116	115	119	124	126	126	128	126	126	119
Aug17	124	122	120	118	120	118	115	112	108	105	110	116	119	122	123	123	123	120	121	122	123	119	118	116	118
Aug18	116	114	114	116	118	114	114	108	107	112	115	116	113	115	117	114	114	113	114	114	110	120	120	135	115
Aug19	117	113	112	119	120	112	105	94	90	105	122	128	128	125	119	114	109	107	110	113	115	116	112	111	113
Aug20	113	113	113	118	120	117	108	99	96	102	109	118	131	130	127	122	119	116	118	121	123	122	123	121	117
Aug21	120	121	122	121	122	119	110	101	94	97	106	120	130	129	127	120	117	117	121	117	120	119	116	116	117
Aug22	116	117	118	118	117	117	106	100	92	97	101	104	105	108	109	110	110	106	110	107	114	119	115	120	109
Aug23	114	111	114	115	114	113	108	99	87	83	95	103	114	117	112	115	118	117	118	120	120	113	118	116	111
Aug24	112	114	115	116	114	126	123	115	107	90	105	109	118	120	114	110	112	116	118	129	125	122	118	117	112
Aug25	118	120	120	124	127	126	123	107	115	103	105	113	118	118	121	119	118	120	124	115	118	122	120	120	119
Aug26	121	122	124	119	120	119	112	104	102	99	91	96	107	113	116	115	117	108	113	115	118	118	119	123	113
Aug27	112	115	113	113	116	109	98	92	94	100	111	115	104	85	102	104	107	110	113	110	112	117	115	114	113
Aug28	113	112	113	113	114	110	102	97	100	108	113	113	111	113	117	110	93	102	116	117	114	115	112	109	108
Aug29	108	116	115	108	111	102	84	86	85	84	89	104	106	104	100	99	102	107	⋮	99	101	105	116	111	⋮
Aug30	110	111	110	112	110	99	107	95	93	97	103	99	99	96	100	99	92	97	⋮	98	128	105	116	119	103
Aug31	113	106	101	110	127	111	111	103	94	94	100	59	65	90	91	87	102	96	⋮	101	109	128	107	115	101

2020, Field component: Y, Base: 1600.0, Unit: nT

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
Aug01	71	71	72	74	81	84	80	81	82	75	65	54	48	47	50	55	61	61	61	64	68	69	69	70	67
Aug02	69	69	71	75	81	88	90	89	79	64	44	33	33	33	30	44	60	74	60	60	62	70	79	69	64
Aug03	68	73	85	77	92	95	93	93	86	77	70	57	52	54	54	61	79	65	67	67	79	84	76	74	74

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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
Aug04	74	69	71	78	79	78	91	96	96	86	76	58	49	44	48	55	62	67	68	67	77	81	83	75	72
Aug05	70	71	72	76	80	83	87	93	91	78	65	49	44	45	53	59	66	69	69	71	76	78	74	72	70
Aug06	72	71	67	67	78	87	94	96	92	81	64	49	38	37	44	55	70	70	68	69	69	74	79	75	69
Aug07	74	73	77	75	81	87	96	99	97	87	69	52	43	41	47	59	67	69	69	70	70	75	72	71	72
Aug08	71	69	75	79	86	88	91	97	95	86	72	54	42	47	57	61	68	69	67	68	69	70	69	70	72
Aug09	71	71	72	74	82	90	91	91	85	77	67	53	41	36	41	52	64	72	70	69	68	68	68	68	68
Aug10	71	72	72	72	78	83	92	96	89	72	56	46	44	51	60	69	75	69	68	68	68	67	66	72	70
Aug11	73	72	71	74	82	89	94	96	90	79	63	54	48	49	57	64	68	69	68	67	68	67	69	71	71
Aug12	73	73	72	77	83	87	87	93	96	77	64	56	54	57	56	58	64	66	65	64	65	66	68	70	70
Aug13	68	75	75	78	83	85	85	86	82	73	59	48	44	45	48	56	63	66	66	67	68	69	70	70	68
Aug14	74	75	73	77	75	82	87	91	91	82	68	57	50	52	57	62	68	69	69	70	73	76	75	75	72
Aug15	74	74	74	75	78	79	80	84	83	75	61	47	42	45	48	53	62	68	71	70	69	71	71	71	68
Aug16	72	76	76	77	81	86	88	88	81	78	72	56	48	50	52	57	64	67	66	67	70	71	69	69	70
Aug17	72	75	74	76	83	88	92	92	87	77	61	47	42	49	56	62	68	70	68	69	72	74	75	73	71
Aug18	73	76	77	78	87	95	99	94	87	77	61	48	45	51	56	59	64	73	68	69	72	69	74	93	72
Aug19	81	77	67	77	81	80	85	92	89	67	49	38	36	46	64	75	78	64	64	64	70	73	73	73	70
Aug20	73	74	74	75	81	85	91	96	93	79	58	41	33	38	47	58	64	69	69	67	81	72	72	74	68
Aug21	74	74	74	74	79	86	94	92	92	75	62	47	40	41	49	56	65	71	77	80	74	79	79	78	71
Aug22	74	74	76	75	83	91	87	97	87	74	58	45	40	42	49	56	65	65	66	76	74	79	76	88	72
Aug23	89	80	82	84	83	91	97	98	88	84	65	44	32	31	39	59	69	74	69	68	72	84	73	80	71
Aug24	79	75	74	75	79	87	96	99	91	75	60	47	43	45	52	61	63	69	63	71	67	70	71	72	69
Aug25	73	74	74	75	78	81	87	89	88	81	67	50	42	42	47	53	72	72	73	66	71	70	73	74	73
Aug26	74	70	66	66	76	85	92	96	97	86	69	54	50	52	56	63	65	67	72	70	79	73	80	85	73
Aug27	74	78	73	72	80	89	96	99	94	83	69	53	49	47	56	59	101	74	67	75	75	73	71	72	72
Aug28	73	73	75	76	82	88	92	90	81	66	54	48	49	47	53	54	70	69	67	69	75	81	74	85	72
Aug29	67	61	71	79	83	81	83	75	78	63	51	50	52	57	63	65	77	81	78	99	:	:	:	:	:
Aug30	76	72	77	80	82	69	82	89	83	72	57	49	53	59	67	71	90	85	71	77	75	73	79	96	74
Aug31	89	97	86	55	78	88	100	104	95	85	60	54	55	58	62	81	75	73	67	76	99	86	75	74	79

2020, Field component: Z, Base: 43900.0, Unit: nT

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
Aug01	42	42	43	44	44	40	41	44	42	37	29	27	26	29	32	38	40	40	40	41	40	41	41	41	39
Aug02	40	40	41	43	45	42	41	42	38	28	25	28	37	41	47	51	51	50	47	45	44	45	44	45	42
Aug03	44	39	35	37	39	40	43	42	39	38	39	41	40	38	41	48	52	48	48	47	46	42	42	43	42
Aug04	44	43	42	43	46	44	41	41	42	40	36	35	36	36	39	45	47	47	46	45	45	45	45	45	42
Aug05	45	44	45	45	46	45	48	49	44	37	29	27	32	39	46	49	48	44	44	45	45	43	43	44	43
Aug06	44	45	45	46	47	46	46	44	43	41	36	35	39	42	46	52	53	52	48	47	46	46	45	46	45
Aug07	45	46	46	48	50	49	49	50	47	40	38	40	41	44	46	47	48	47	46	45	46	45	45	44	46

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
Aug08	45	45	44	46	49	50	50	49	48	43	37	37	39	44	48	51	53	51	48	48	46	45	46	46	46
Aug09	46	46	46	47	48	46	47	49	51	48	44	42	42	40	41	45	47	46	45	45	45	45	45	45	45
Aug10	45	44	45	47	49	50	50	48	43	37	37	37	39	40	43	45	44	44	44	45	45	45	44	44	44
Aug11	44	45	45	46	48	50	47	46	43	42	35	28	32	36	41	43	45	45	45	45	46	46	45	45	43
Aug12	44	44	44	46	48	47	46	45	43	42	38	36	37	38	38	38	40	41	42	43	44	44	44	44	42
Aug13	44	42	43	45	46	47	47	43	36	34	31	28	32	35	35	39	42	43	43	44	45	45	45	45	41
Aug14	43	43	44	45	46	42	45	48	46	44	38	36	34	39	40	41	43	45	46	46	47	46	47	46	43
Aug15	46	43	44	46	45	45	40	44	42	42	38	30	26	30	33	37	41	43	45	46	47	46	46	46	41
Aug16	45	44	45	46	46	46	45	44	42	33	29	28	30	33	35	39	42	42	43	44	45	43	42	42	41
Aug17	42	43	44	44	47	46	44	44	42	41	37	34	34	31	34	40	44	43	42	44	45	44	43	44	41
Aug18	45	44	43	44	46	43	38	35	32	32	34	32	36	35	39	40	42	43	44	45	45	45	45	41	40
Aug19	42	44	44	43	43	44	47	50	47	38	33	32	39	43	46	48	46	44	45	45	45	44	45	46	43
Aug20	46	46	46	46	47	48	50	50	50	42	35	31	36	40	43	46	47	46	46	46	47	46	44	44	44
Aug21	44	44	44	45	47	46	48	50	45	46	39	33	33	35	42	47	49	46	46	46	47	46	46	46	44
Aug22	46	46	46	48	50	50	49	48	45	42	41	40	37	39	44	49	51	50	51	51	50	49	48	47	46
Aug23	47	47	47	47	46	46	46	46	46	45	35	29	34	41	46	45	47	46	45	45	46	47	46	45	44
Aug24	47	46	46	46	47	47	49	49	46	42	36	32	31	33	35	40	44	43	43	44	45	45	46	46	43
Aug25	45	45	45	45	46	47	49	47	47	43	37	35	37	38	39	44	45	44	44	44	45	44	44	44	44
Aug26	46	46	45	45	46	48	52	51	52	51	44	42	43	43	42	44	47	48	47	47	47	46	46	45	46
Aug27	45	45	46	47	48	50	49	49	48	43	39	41	45	49	46	47	48	48	47	48	48	47	47	47	47
Aug28	47	47	47	48	49	51	51	49	44	41	38	39	41	42	43	48	59	56	51	50	50	49	50	47	47
Aug29	48	46	45	47	48	51	52	49	46	47	45	45	44	46	44	45	48	48	··	48	··	··	··	··	··
Aug30	47	48	47	48	49	51	50	52	47	43	38	41	44	47	48	50	53	54	53	53	53	53	50	46	49
Aug31	43	42	45	45	40	46	49	45	44	44	41	44	51	52	54	59	59	55	54	53	47	48	50	50	48

2020, Field component: F, Base: 48700.0, Unit: nT

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
Aug01	38	38	39	41	40	36	35	34	30	29	26	27	28	31	30	34	36	38	39	41	41	40	40	40	35
Aug02	40	39	38	40	41	41	41	39	36	29	27	26	28	29	36	33	35	38	43	42	43	40	40	42	37
Aug03	45	46	39	36	34	36	34	32	22	19	22	30	30	26	29	35	40	41	39	40	42	47	36	36	35
Aug04	37	38	38	38	39	34	30	28	29	28	25	24	26	28	31	39	42	42	42	41	40	40	38	37	35
Aug05	37	37	37	39	39	35	35	34	27	22	17	18	26	34	39	43	42	37	39	40	42	41	37	37	35
Aug06	37	38	38	41	42	40	38	35	32	27	26	24	29	31	39	45	44	45	42	41	41	42	38	37	37
Aug07	38	38	39	42	44	43	42	41	36	27	27	33	37	39	39	39	41	41	41	41	41	41	41	40	39
Aug08	39	39	39	40	43	42	42	36	30	27	26	28	28	30	35	39	41	38	39	41	41	40	40	40	37
Aug09	40	39	41	42	43	42	41	37	37	31	29	31	34	33	32	36	39	39	39	41	41	41	41	42	38
Aug10	41	40	42	44	45	42	42	40	30	26	29	32	34	33	36	35	37	38	39	42	41	42	40	40	38
Aug11	40	39	39	41	43	43	38	37	34	34	29	24	28	31	34	35	37	39	40	42	41	42	42	42	37

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
Aug12	42	41	42	43	45	43	41	36	34	34	32	28	27	30	30	32	37	37	39	42	42	42	42	41	38
Aug13	41	38	39	40	42	43	41	35	27	27	26	26	30	31	30	33	38	39	39	41	42	41	41	42	36
Aug14	41	40	41	41	43	41	42	41	38	36	34	36	35	38	36	37	38	39	40	40	41	41	41	40	39
Aug15	40	40	40	40	40	36	33	33	35	39	36	31	27	29	30	33	36	39	40	41	42	42	41	40	37
Aug16	40	38	38	40	42	43	43	40	38	28	29	28	27	28	30	34	37	39	41	43	44	44	42	42	38
Aug17	41	42	41	40	44	43	40	39	35	33	30	29	31	30	33	39	42	40	39	42	43	40	40	40	38
Aug18	41	39	38	40	43	38	34	28	25	27	30	28	30	31	34	35	37	37	38	39	38	42	42	46	36
Aug19	38	38	38	40	41	38	38	36	32	29	31	33	39	42	42	42	38	36	38	40	40	41	39	39	38
Aug20	40	40	40	43	44	44	42	38	37	32	31	27	37	41	43	43	43	40	40	42	43	43	43	41	40
Aug21	41	42	42	43	45	43	41	39	36	33	30	31	34	36	41	44	44	42	43	42	44	45	42	41	40
Aug22	41	42	42	44	46	43	41	35	31	30	29	29	27	30	35	41	43	40	43	42	43	42	43	45	39
Aug23	41	41	41	42	43	42	40	35	29	27	22	19	28	36	39	39	43	41	41	42	42	42	43	41	38
Aug24	40	42	42	42	42	42	42	38	32	26	23	25	28	31	30	33	37	38	40	42	44	44	42	41	37
Aug25	41	44	42	44	46	46	48	44	39	34	28	29	33	34	37	41	41	41	43	45	44	44	44	44	41
Aug26	44	44	44	41	43	45	46	42	41	39	28	28	34	37	37	39	42	40	41	42	43	42	43	43	40
Aug27	39	40	40	41	44	42	37	34	35	32	33	35	34	30	35	36	39	40	45	41	42	43	42	41	38
Aug28	41	41	41	42	44	44	41	37	33	34	33	33	34	36	38	40	44	44	45	45	44	44	43	40	40
Aug29	40	41	40	39	41	40	33	32	29	28	28	34	35	35	32	34	37	40	41	50	44	44	43	40	40
Aug30	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Aug31	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:

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.

2020, Field component: X, Base: 20900.0, Unit: nT

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
Sep01	113	105	104	95	102	106	91	89	83	82	85	80	79	87	94	88	78	95	101	91	96	102	120	106	95
Sep02	112	115	108	100	98	101	96	85	83	80	83	83	89	91	101	106	103	104	105	109	114	118	113	110	100
Sep03	108	107	107	108	107	103	96	90	83	80	86	93	102	106	109	109	111	112	114	115	115	114	114	117	104
Sep04	113	116	117	111	111	107	100	97	94	97	93	104	103	100	86	80	89	93	103	110	104	107	109	109	102
Sep05	111	116	110	105	102	102	98	89	86	93	96	93	102	113	114	112	111	111	110	110	113	110	:	:	:
Sep06	110	110	111	110	110	103	100	98	97	102	105	105	107	112	112	110	110	112	114	112	112	110	107	118	108
Sep07	111	111	110	113	112	110	105	98	97	102	102	100	102	102	101	99	97	104	110	110	110	111	111	112	106
Sep08	112	111	111	111	111	110	105	98	91	94	99	100	107	116	116	112	106	107	110	113	116	116	116	116	108
Sep09	115	115	114	113	111	106	103	98	94	98	101	104	111	116	120	120	117	115	115	115	115	114	114	116	111
Sep10	114	114	113	112	110	109	107	102	100	103	106	112	118	122	121	118	117	118	119	116	113	118	121	114	113
Sep11	120	119	117	117	115	115	114	110	107	104	107	108	114	118	117	117	118	115	117	114	110	111	113	115	114
Sep12	111	114	114	117	115	113	108	105	94	97	104	109	114	118	116	109	111	113	115	114	115	113	111	111	111
Sep13	113	111	109	111	112	111	105	94	91	96	102	103	108	115	117	115	113	124	121	121	125	122	128	140	113
Sep14	130	112	108	108	104	101	95	84	74	88	101	101	94	107	106	105	106	109	110	112	113	111	112	109	104
Sep15	122	109	107	104	109	115	111	108	98	95	97	104	111	112	108	101	99	104	107	108	110	108	108	106	107
Sep16	108	107	107	107	110	110	105	97	91	92	100	111	121	124	119	113	111	112	114	118	119	114	112	112	110
Sep17	113	113	117	118	118	117	113	102	98	94	100	108	117	119	119	115	111	112	114	115	117	114	115	119	112
Sep18	114	112	113	115	115	112	105	98	95	99	105	114	119	129	127	125	123	121	121	115	116	116	116	115	114
Sep19	114	114	113	112	113	109	104	101	101	107	113	114	114	113	111	111	109	110	111	112	113	113	112	113	111
Sep20	112	112	112	112	113	114	111	104	96	93	99	106	111	117	120	117	112	112	115	116	116	117	114	118	111
Sep21	122	122	121	121	120	119	115	109	104	101	105	113	120	123	124	124	123	126	129	129	126	122	121	119	119
Sep22	116	117	111	114	114	118	111	109	109	99	98	102	108	109	103	100	102	105	111	114	114	114	113	113	109
Sep23	120	113	111	112	114	109	119	112	101	97	101	103	89	96	97	90	101	106	101	101	99	91	99	110	104
Sep24	100	104	112	106	109	109	113	83	52	74	99	98	88	81	61	66	84	93	101	104	104	106	104	111	95
Sep25	114	104	107	106	108	103	104	102	86	88	84	97	100	99	94	75	73	98	101	100	106	120	104	95	99
Sep26	91	107	115	107	98	111	89	76	84	90	77	88	89	56	79	83	88	97	103	99	100	116	110	107	94
Sep27	97	98	100	98	118	106	98	86	80	81	84	93	93	94	91	79	72	75	88	105	99	76	84	106	92
Sep28	100	95	81	80	98	89	76	73	85	89	86	75	79	78	76	73	65	71	85	88	86	87	97	91	84
Sep29	97	104	99	94	95	97	82	78	79	76	80	85	94	96	83	77	85	97	105	109	95	109	102	104	93
Sep30	115	100	98	100	96	92	89	75	73	76	78	88	91	100	96	87	89	91	101	102	93	122	100	103	94

2020, Field component: Y, Base: 1600.0, Unit: nT

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
Sep01	75	80	74	71	75	83	92	91	88	75	67	57	60	60	79	78	87	93	96	89	87	76	73	82	79
Sep02	86	96	95	89	88	91	90	88	81	69	55	52	49	56	72	69	67	68	72	72	75	77	75	78	75
Sep03	79	80	79	79	81	83	87	89	88	78	64	52	48	53	62	67	69	67	68	69	72	74	75	84	73
Sep04	80	74	85	86	85	89	90	92	86	74	59	50	48	51	56	62	69	73	83	84	74	73	75	76	74

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	76	78	81	82	82	85	89	85	78	71	67	60	61	57	57	61	65	67	71	76	76	76	:	:	:
Sep06	77	72	79	81	85	86	89	89	85	77	66	60	58	59	63	69	71	70	72	73	79	83	82	77	75
Sep07	80	78	79	81	81	84	91	93	89	74	59	50	48	55	60	64	69	69	70	72	73	72	74	75	72
Sep08	77	77	77	79	82	87	93	96	93	84	71	63	57	57	61	68	72	67	69	71	73	75	77	77	75
Sep09	78	78	80	81	83	87	92	92	87	79	69	60	52	52	59	66	69	69	71	73	74	75	76	76	74
Sep10	75	76	77	80	81	80	83	85	81	74	65	55	49	52	58	61	62	66	69	71	73	72	74	76	71
Sep11	77	78	79	80	81	81	85	87	84	77	65	57	53	55	58	63	64	65	68	72	77	80	79	83	73
Sep12	81	78	76	74	78	82	86	89	85	69	62	55	53	56	61	66	67	70	72	73	82	87	84	79	73
Sep13	77	78	78	78	78	82	88	88	85	88	74	58	52	53	57	60	63	61	67	70	71	75	100	91	74
Sep14	83	98	89	86	92	93	97	101	99	89	69	47	45	50	55	61	66	68	72	74	76	78	82	81	77
Sep15	75	83	82	80	78	84	88	89	84	74	62	59	59	64	69	72	71	72	75	81	84	85	77	78	76
Sep16	78	79	80	79	81	86	93	95	88	76	60	47	46	54	65	72	73	72	77	77	79	76	76	76	74
Sep17	75	76	76	77	81	86	95	98	90	82	70	57	55	63	71	75	75	73	74	75	75	77	78	77	76
Sep18	77	78	77	80	81	84	91	96	91	77	65	49	46	48	57	61	63	65	64	74	73	76	76	77	72
Sep19	78	78	77	78	80	84	89	90	82	70	57	52	52	60	69	73	73	76	81	78	77	77	76	77	74
Sep20	77	77	78	78	80	83	88	91	86	74	53	41	39	47	60	69	70	66	69	72	74	84	81	79	72
Sep21	80	81	81	80	80	82	87	91	91	85	71	58	52	51	55	62	65	65	67	68	70	76	80	83	74
Sep22	84	88	91	90	80	76	83	92	90	83	75	64	56	54	59	62	68	74	77	76	76	77	77	78	76
Sep23	78	80	80	80	80	81	84	90	79	79	63	48	43	52	56	57	63	68	73	73	76	94	91	94	76
Sep24	89	78	83	86	90	81	86	91	60	66	70	59	55	55	75	77	73	75	77	78	79	79	81	88	76
Sep25	84	87	85	70	81	83	84	87	85	83	78	61	60	60	61	87	93	71	75	84	82	95	120	125	83
Sep26	105	102	100	93	71	70	76	82	86	82	69	60	46	48	58	60	66	76	84	82	88	93	91	94	78
Sep27	88	86	81	63	68	79	93	101	97	85	74	59	58	63	69	82	87	81	86	127	131	120	110	81	86
Sep28	93	98	98	72	67	88	78	75	84	77	67	66	61	80	86	108	110	83	103	94	105	106	78	85	86
Sep29	73	84	76	91	90	90	91	91	90	80	71	62	63	64	75	95	92	92	91	90	88	90	80	79	83
Sep30	66	91	89	84	81	76	86	88	85	78	69	66	70	74	78	83	85	82	93	87	91	74	85	84	81

2020, Field component: Z, Base: 43900.0, Unit: nT

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
Sep01	49	50	51	50	48	46	47	45	47	48	47	48	51	53	57	62	64	63	58	57	56	55	49	49	52
Sep02	48	46	46	48	50	51	50	49	51	51	47	47	50	54	56	56	55	54	53	53	53	51	51	51	51
Sep03	52	52	52	52	52	53	55	56	52	44	39	39	43	48	50	49	49	49	50	50	50	50	50	50	49
Sep04	49	49	46	48	49	50	51	50	45	40	38	42	45	50	56	58	57	57	56	54	53	53	52	52	50
Sep05	52	50	50	52	53	53	52	54	54	49	46	46	49	49	49	50	51	51	52	53	51	52	:	:	:
Sep06	51	51	50	51	51	53	53	52	52	50	44	43	44	47	48	49	49	49	50	51	51	51	51	50	49
Sep07	49	50	51	51	51	53	54	54	54	50	44	45	46	44	46	50	52	52	50	52	52	52	52	51	50
Sep08	51	51	52	51	52	54	55	57	56	52	46	43	44	44	47	50	52	52	53	52	52	51	51	51	51
Sep09	50	50	50	50	50	51	53	52	51	49	43	40	38	41	44	46	47	48	49	49	49	50	50	50	48

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	50	50	50	49	48	47	49	48	46	45	40	40	40	40	42	42	45	47	48	49	50	50	50	50	46
Sep11	49	49	49	48	48	47	47	45	46	46	41	42	41	44	47	46	46	47	49	50	51	52	52	51	47
Sep12	51	50	50	49	49	49	51	50	46	42	38	42	44	46	48	49	48	48	49	50	50	50	51	51	48
Sep13	51	51	51	50	49	49	51	55	56	49	42	40	41	42	42	44	46	48	48	49	49	50	49	46	48
Sep14	44	45	47	47	47	49	54	56	56	50	42	38	40	42	40	41	46	49	50	51	51	51	51	52	47
Sep15	48	48	50	50	50	50	54	56	54	52	48	47	47	47	48	48	50	51	52	52	52	52	52	52	50
Sep16	52	52	52	52	52	54	56	57	53	48	43	39	41	44	45	46	47	49	50	50	50	50	51	51	49
Sep17	51	51	51	50	51	53	56	55	52	50	47	47	48	50	49	48	48	49	50	50	50	51	50	50	50
Sep18	50	51	51	51	50	52	53	52	48	45	42	41	44	46	46	45	46	48	50	50	51	51	51	51	48
Sep19	51	51	51	51	51	51	54	53	48	46	47	48	49	47	48	49	49	50	52	51	51	51	51	51	50
Sep20	51	50	49	49	51	50	52	50	50	43	35	35	41	43	45	48	49	51	50	49	49	50	50	50	48
Sep21	50	49	49	49	49	47	51	52	48	46	40	36	37	39	42	45	47	47	48	49	49	51	52	52	47
Sep22	50	49	50	50	48	49	49	50	50	45	40	37	36	39	46	49	52	53	53	52	54	55	55	52	48
Sep23	50	50	52	50	50	52	50	52	52	41	34	37	43	47	49	51	52	54	55	54	56	56	56	54	49
Sep24	53	53	54	51	50	52	51	52	58	44	39	42	45	51	59	65	61	60	58	57	56	55	49	47	53
Sep25	53	53	52	52	50	49	55	57	57	54	51	46	44	47	51	57	64	59	58	57	57	56	55	51	53
Sep26	50	54	44	46	48	56	53	58	58	52	47	50	55	53	61	62	62	60	59	59	58	57	57	50	54
Sep27	52	47	53	54	51	59	56	57	57	53	48	51	52	66	71	61	64	64	64	60	64	60	54	54	56
Sep28	44	52	53	54	57	56	61	64	62	59	58	62	65	58	63	74	74	71	67	64	64	60	58	56	61
Sep29	57	52	53	54	57	59	61	62	60	56	54	55	56	58	63	65	65	63	61	58	59	58	58	58	58
Sep30	53	53	57	57	57	59	59	60	57	52	52	56	57	59	58	60	60	61	61	59	60	56	56	57	57

2020, Field component: F, Base: 48700.0, Unit: nT

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
Sep01	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Sep02	:	:	:	:	:	:	:	:	:	:	:	27	33	38	44	46	44	43	43	45	45	47	45	44	:
Sep03	43	43	43	43	43	43	41	40	33	25	22	24	32	39	42	41	42	42	44	44	44	44	44	45	39
Sep04	43	44	43	42	43	43	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Sep05	45	45	43	42	44	43	40	37	36	35	32	32	37	42	43	43	44	44	45	45	45	44	45	45	41
Sep06	44	44	43	43	44	45	41	39	39	39	35	33	35	40	41	41	42	42	44	44	44	43	43	46	41
Sep07	:	:	43	44	45	45	45	41	41	39	33	33	34	33	34	37	38	41	44	46	47	45	44	45	:
Sep08	44	44	44	44	43	47	46	44	41	38	34	32	35	39	42	43	42	43	44	46	47	46	46	46	43
Sep09	45	45	44	44	43	43	43	40	37	37	32	30	32	36	41	43	42	42	43	43	44	44	44	44	41
Sep10	44	44	44	43	40	40	40	37	35	35	32	33	35	38	39	39	41	43	44	44	44	46	47	47	41
Sep11	46	46	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Sep12	44	45	44	45	44	43	42	41	32	30	29	34	38	42	42	41	40	42	44	44	45	44	44	44	41
Sep13	44	43	43	43	43	43	42	40	40	36	31	30	33	37	38	38	40	46	45	46	48	48	50	52	42
Sep14	40	40	39	39	38	39	40	37	33	33	31	27	25	33	31	32	37	41	43	44	45	44	45	44	:

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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	46	41	41	40	42	45	47	47	41	38	34	36	40	41	39	36	37	41	43	43	45	44	43	43	41
Sep16	43	43	43	43	45	47	47	43	38	33	31	32	38	42	42	41	40	42	44	46	46	44	44	44	42
Sep17	44	45	46	46	47	49	50	44	40	36	35	39	43	46	46	44	42	42	44	44	45	45	45	46	44
Sep18	44	44	44	45	45	46	44	40	36	33	33	35	40	46	45	44	44	45	47	45	45	46	46	45	43
Sep19	45	45	45	45	45	44	44	42	38	37	40	42	42	40	41	42	41	43	45	45	45	45	44	44	43
Sep20	44	44	44	45	46	45	45	40	35	29	23	26	33	38	42	43	42	43	45	46	46	47	45	47	41
Sep21	..	..	47	47	46	47	46	44	40	35	31	31	35	37	41	44	45	46	49	50	49	48	47	47	..
Sep22	45	45	44	44	42	42	42	42	39	34	28	26	29	32	35	37	40	43	46	46	46	46	45	45	40
Sep23	47	44	43	44	44	45	47	46	39	29	24	27	26	..	..	..	..	..	..	..	..	..	..	..	..
Sep24	..	..	..	..	..	..	..	..	..	21	27	30	28	30	30	37	41	44	46	46	46	46	45	47	..
Sep25	47	43	45	43	41	41	45	46	40	37	32	33	32	34	36	34	40	46	45	45	47	48	41	35	41
Sep26	35	39	40	38	35	41	36	36	38	36	25	33	37	28	39	41	43	46	48	46	46	51	45	43	39
Sep27	39	42	43	41	45	43	43	39	36	33	30	36	37	38	41	39	39	40	46	51	43	36	38	41	40
Sep28	33	34	33	33	38	39	38	40	43	42	39	38	42	44	48	49	46	44	48	46	45	43	40	40	41
Sep29	44	43	40	40	43	45	41	40	39	33	33	36	40	43	42	42	46	50	51	50	44	50	46	47	43
Sep30	47	41	44	45	43	43	42	37	33	30	31	38	40	46	44	42	42	45	49	48	45	53	44	46	42

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.

2020, Field component: X, Base: 20900.0, Unit: nT

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
Oct01	97	99	101	100	100	100	96	97	96	90	72	60	79	86	93	89	99	92	108	105	99	103	99	100	94
Oct02	94	96	96	101	101	104	102	96	93	89	84	81	91	101	96	82	78	82	84	102	109	100	104	99	94
Oct03	100	107	103	104	106	110	107	105	102	92	90	90	100	103	104	99	97	100	104	105	103	105	101	100	101
Oct04	103	103	102	104	106	106	107	101	93	92	94	91	90	100	101	100	102	102	104	104	102	103	107	103	101
Oct05	103	104	105	106	108	108	105	102	100	97	90	95	91	90	91	77	77	87	88	92	72	81	87	95	94
Oct06	98	101	109	108	111	119	119	108	108	102	94	93	97	105	106	105	109	114	116	116	115	115	115	113	109
Oct07	112	111	114	115	114	115	119	119	117	115	110	106	112	116	113	110	112	113	115	114	112	105	107	108	113
Oct08	108	107	108	108	109	113	114	115	108	105	103	96	99	101	103	105	108	109	111	110	109	111	112	108	107
Oct09	108	105	106	108	110	113	115	116	116	110	104	101	102	105	107	109	112	114	114	113	114	114	114	112	110
Oct10	112	111	111	112	113	116	118	115	118	108	103	105	108	111	111	113	114	113	114	113	114	114	114	115	112
Oct11	115	116	115	116	117	119	120	117	117	115	116	114	113	113	114	113	115	117	117	117	113	116	115	115	116
Oct12	111	108	113	112	112	113	114	113	111	109	111	115	121	122	124	118	116	116	117	118	118	111	111	111	114
Oct13	115	115	113	115	114	114	114	111	111	109	113	118	123	125	121	119	118	117	117	118	117	116	116	114	116
Oct14	115	114	114	113	113	111	110	110	111	112	114	116	117	116	113	112	112	113	114	115	115	114	114	113	116
Oct15	112	112	112	114	116	118	118	115	109	105	103	107	112	117	116	114	114	120	123	122	120	120	114	111	113
Oct16	112	113	112	112	116	117	115	111	111	115	116	123	129	126	119	115	114	114	114	113	109	114	113	114	114
Oct17	110	111	114	116	116	114	107	106	106	103	105	109	117	117	116	112	113	115	117	118	115	110	110	111	115
Oct18	109	109	111	114	116	116	115	113	112	108	108	112	117	120	118	115	114	116	115	114	110	108	107	108	113
Oct19	109	110	111	111	110	117	115	113	111	108	105	100	95	107	113	118	115	117	105	98	102	102	107	112	109
Oct20	108	109	112	111	112	110	111	108	104	99	96	99	103	106	106	106	106	106	108	111	111	111	110	113	107
Oct21	111	110	124	123	121	127	130	112	101	103	100	104	108	110	108	104	104	102	102	104	106	106	107	107	110
Oct22	120	109	109	106	110	120	115	111	105	102	103	104	110	112	107	105	108	110	110	111	111	103	110	103	108
Oct23	104	106	105	105	111	115	116	115	107	104	104	107	111	118	125	126	128	136	120	120	115	113	93	121	114
Oct24	107	99	110	107	108	100	99	101	86	86	90	88	90	85	80	77	83	93	83	91	96	115	101	100	95
Oct25	104	106	106	105	109	112	112	106	91	81	77	77	71	70	81	76	84	103	86	86	118	90	100	102	94
Oct26	102	102	104	111	113	120	104	97	89	68	68	63	71	68	78	90	94	95	106	89	106	112	98	104	94
Oct27	97	97	99	97	100	103	101	90	76	63	76	88	93	97	98	99	100	102	102	99	104	103	107	111	96
Oct28	101	101	105	105	101	99	106	107	103	91	85	82	86	86	80	69	81	92	95	93	75	90	103	101	93
Oct29	99	99	101	102	108	108	105	107	96	75	71	58	87	94	87	78	67	82	86	98	103	103	110	116	93
Oct30	103	97	98	100	102	104	103	97	93	84	81	84	87	93	96	100	101	102	104	107	109	108	118	113	99
Oct31	106	105	104	107	109	100	110	100	88	70	67	76	86	83	83	82	96	100	106	107	107	107	104	102	97

2020, Field component: Y, Base: 1600.0, Unit: nT

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
Oct01	85	78	81	82	84	86	89	93	96	87	79	67	61	64	78	77	99	86	94	86	84	85	89	84	83
Oct02	84	88	86	86	86	88	92	95	90	81	72	58	59	52	64	75	81	82	86	84	79	86	87	87	80
Oct03	83	82	85	82	80	84	87	92	93	85	71	57	52	54	65	76	78	78	85	81	81	85	86	83	78

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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	83	81	80	76	79	82	86	91	94	84	71	60	56	59	67	76	74	77	81	81	83	85	88	87	78
Oct05	82	82	81	81	79	82	86	96	100	91	77	58	50	51	61	80	67	73	79	120	115	107	102	92	83
Oct06	89	78	76	74	64	71	78	84	89	88	81	68	59	54	58	67	70	72	73	74	77	78	80	80	74
Oct07	81	81	80	80	80	78	80	88	94	91	82	70	58	56	62	69	68	70	73	75	77	85	88	83	77
Oct08	84	84	82	83	81	80	84	91	95	92	79	69	61	60	65	71	75	77	81	78	79	80	81	83	79
Oct09	85	86	83	81	81	80	83	89	94	90	80	70	64	61	63	69	73	76	77	77	77	78	78	80	78
Oct10	81	82	82	81	80	78	79	86	94	96	87	72	63	60	62	67	72	73	75	76	77	79	80	80	78
Oct11	79	80	80	79	80	79	83	91	98	95	80	65	58	59	64	68	70	73	74	76	77	81	84	79	77
Oct12	81	83	85	85	84	82	88	93	91	90	76	64	58	60	63	71	71	74	75	76	78	88	90	86	79
Oct13	86	85	84	82	81	84	89	97	99	93	79	66	62	63	68	76	73	73	75	76	78	79	81	79	79
Oct14	79	78	78	78	80	83	89	95	94	84	71	61	60	65	69	75	76	75	75	77	79	78	79	79	77
Oct15	79	80	79	79	80	81	87	98	102	94	79	65	56	64	71	76	74	75	76	75	77	78	82	86	79
Oct16	80	83	85	83	81	80	84	91	94	85	67	56	56	64	71	75	71	72	77	78	78	83	84	85	78
Oct17	81	80	83	83	81	83	83	88	92	86	72	62	57	61	68	74	74	74	75	76	79	81	83	83	77
Oct18	83	81	80	79	78	80	84	92	99	94	77	66	61	65	71	74	72	75	76	76	79	84	87	84	79
Oct19	82	79	78	76	77	79	84	91	94	86	70	61	59	61	68	68	72	72	76	77	86	83	86	86	77
Oct20	82	80	77	84	84	83	87	93	98	90	81	68	62	64	72	77	79	82	82	85	83	83	82	81	81
Oct21	81	81	79	87	78	76	77	89	93	90	75	59	57	62	69	72	75	77	76	76	86	82	83	83	78
Oct22	74	88	85	82	78	80	82	95	95	84	67	59	57	62	68	74	76	79	81	82	92	90	90	85	80
Oct23	83	83	85	85	84	83	87	94	99	92	76	63	57	59	63	68	69	67	75	75	105	125	94	89	82
Oct24	88	90	85	79	66	80	86	92	95	98	91	80	71	76	82	98	83	99	93	93	89	80	87	83	86
Oct25	73	67	76	80	58	66	72	90	94	88	80	64	59	92	77	84	84	109	98	95	104	93	84	81	84
Oct26	82	81	82	64	81	81	72	92	96	94	77	69	70	76	83	75	81	84	103	95	104	88	96	82	82
Oct27	82	85	85	81	81	83	88	98	99	94	79	66	65	69	75	79	82	83	85	94	86	84	86	86	83
Oct28	83	82	79	79	74	76	85	91	99	97	81	69	60	65	80	86	86	83	104	114	101	91	84	84	85
Oct29	83	81	77	79	80	81	82	91	96	93	81	74	65	63	65	78	101	85	81	85	86	90	90	87	82
Oct30	89	82	80	79	81	84	90	100	102	97	83	71	65	64	70	76	79	82	84	84	85	88	86	85	83
Oct31	83	85	82	80	79	82	85	88	91	85	69	51	48	53	54	60	76	74	81	85	86	87	88	86	77

2020, Field component: Z, Base: 43900.0, Unit: nT

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
Oct01	58	58	57	58	58	58	60	59	57	51	51	52	54	55	60	62	62	63	59	58	59	59	59	58	58
Oct02	58	57	58	58	58	57	59	58	55	51	50	53	55	56	59	62	64	65	65	63	60	60	59	60	58
Oct03	59	58	58	58	59	59	63	65	63	57	53	53	52	54	57	58	59	60	60	59	59	59	59	59	58
Oct04	59	59	59	59	58	59	61	61	57	47	43	47	49	52	56	57	58	58	59	58	59	59	58	58	56
Oct05	59	59	58	58	58	59	61	60	55	47	44	45	48	52	57	63	65	65	65	64	66	65	64	63	58
Oct06	62	61	58	57	57	55	59	62	60	58	56	54	53	52	55	58	58	58	57	57	58	58	58	57	57
Oct07	57	57	57	56	55	54	56	60	59	54	51	49	49	52	57	59	57	57	57	57	57	59	59	58	56

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	58	57	57	57	57	58	62	63	62	58	53	52	53	53	55	57	57	58	57	57	58	57	57	57	57
Oct09	57	57	57	57	57	56	59	62	60	55	51	51	52	51	54	57	56	56	56	56	56	56	56	56	56
Oct10	56	56	56	56	55	55	58	60	57	53	49	44	44	47	52	55	56	56	56	56	56	56	56	56	54
Oct11	55	55	55	54	54	54	56	59	56	44	37	37	39	44	48	51	53	54	54	55	55	55	55	55	51
Oct12	55	55	55	55	55	55	57	58	55	48	43	40	42	46	48	50	51	53	53	53	54	56	56	56	52
Oct13	55	55	54	54	54	54	56	54	49	41	39	43	48	49	49	51	51	53	53	54	54	54	54	54	51
Oct14	54	54	54	54	54	55	56	54	50	43	38	41	46	48	48	52	53	54	54	54	55	55	55	55	52
Oct15	55	55	55	55	54	54	59	58	55	48	48	50	50	53	55	55	54	54	53	55	56	55	56	56	54
Oct16	56	55	55	55	54	54	56	59	55	47	46	47	50	51	53	53	55	55	55	55	55	56	56	54	54
Oct17	55	55	55	55	55	55	58	58	53	48	45	44	48	52	54	53	54	55	55	55	56	57	57	57	54
Oct18	56	56	56	56	55	56	57	56	51	44	42	50	52	51	53	53	55	55	55	56	60	60	58	57	55
Oct19	56	56	56	56	55	55	56	59	55	45	45	49	49	54	55	53	54	55	56	59	57	57	58	56	55
Oct20	57	57	56	55	56	57	58	57	55	51	49	47	51	51	54	57	57	58	57	57	60	60	57	59	55
Oct21	56	56	53	53	53	53	55	61	55	46	45	49	51	55	56	57	58	60	60	60	57	59	59	58	55
Oct22	55	54	56	57	57	57	58	60	55	46	45	49	53	54	56	56	57	57	52	54	55	58	58	49	55
Oct23	58	58	58	58	57	58	59	60	59	54	50	50	52	54	53	53	52	52	66	64	64	55	57	61	59
Oct24	48	51	52	50	52	55	58	54	62	58	57	54	56	54	53	53	65	64	64	65	62	60	61	49	59
Oct25	59	57	56	57	57	59	61	64	64	62	57	56	59	61	64	66	66	63	66	64	64	60	59	61	61
Oct26	61	61	60	60	58	61	60	60	58	57	58	57	61	66	68	67	65	64	62	64	62	62	61	61	61
Oct27	58	60	61	61	61	61	63	65	63	57	56	56	58	68	62	62	61	61	62	62	62	61	61	58	61
Oct28	60	60	61	60	61	61	61	63	62	56	55	55	57	62	67	62	61	67	65	65	67	66	64	63	62
Oct29	63	63	63	62	62	62	63	63	59	58	54	58	61	63	67	68	69	72	69	68	66	65	64	63	63
Oct30	60	62	63	62	62	63	65	67	65	58	56	53	53	58	62	63	63	63	63	63	62	61	60	58	61
Oct31	60	60	61	61	61	61	64	66	65	61	61	62	61	64	68	69	69	67	66	64	64	63	63	63	63

2020, Field component: F, Base: 48700.0, Unit: nT

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
Oct01	44	45	45	46	46	46	46	46	44	36	27	23	32	36	44	44	49	46	51	48	46	48	46	46	43
Oct02	43	43	44	46	46	47	47	44	40	35	31	32	38	43	44	42	42	44	45	51	51	47	49	47	43
Oct03	47	49	47	47	49	51	53	55	51	41	36	36	39	42	45	46	45	47	49	49	48	48	47	47	46
Oct04	48	48	47	48	48	49	51	49	42	32	29	31	32	40	43	45	46	47	48	48	47	48	49	47	44
Oct05	47	48	48	48	49	50	51	49	43	35	29	31	32	35	40	40	41	46	47	49	42	44	46	48	43
Oct06	48	49	49	48	49	50	55	56	51	46	41	39	39	42	44	47	49	51	52	52	52	52	52	51	48
Oct07	50	49	50	50	49	48	52	55	54	49	43	40	42	46	49	50	49	50	51	51	50	49	50	49	49
Oct08	49	48	48	48	48	51	55	57	53	48	42	38	40	41	44	46	48	49	51	49	49	50	50	48	48
Oct09	49	47	48	49	49	50	53	56	55	47	41	39	40	41	44	48	49	49	50	49	50	50	50	49	48
Oct10	49	49	49	49	49	49	53	55	52	45	39	35	36	40	44	48	49	49	49	49	50	50	50	50	47
Oct11	50	50	49	49	49	50	52	54	52	40	33	32	33	38	42	45	47	49	50	50	49	50	49	49	46

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	47	47	48	48	48	49	51	51	48	41	36	36	40	43	46	46	46	47	48	49	49	48	49	49	46
Oct13	49	49	48	48	47	48	50	47	42	35	34	39	46	48	46	47	47	48	48	49	49	49	49	48	46
Oct14	48	48	48	48	48	47	49	47	44	37	33	36	42	43	43	45	46	48	48	49	49	49	49	48	46
Oct15	48	48	48	49	49	50	54	54	47	39	38	41	43	47	49	48	48	50	51	51	50	50	49	48	48
Oct16	49	49	48	48	49	49	51	51	47	42	41	45	49	50	49	47	48	49	49	49	48	49	49	48	48
Oct17	47	48	49	50	50	49	49	49	45	38	36	39	45	47	48	46	48	49	50	51	49	50	48	48	47
Oct18	48	48	48	49	50	50	51	52	47	37	34	37	43	48	49	47	48	49	49	49	48	48	48	48	47
Oct19	48	48	49	49	50	51	50	50	45	37	36	38	43	48	49	49	48	50	49	49	48	48	49	50	46
Oct20	48	49	48	48	49	49	51	50	45	39	35	37	38	41	44	47	48	48	46	50	48	48	48	49	46
Oct21	48	48	52	51	50	52	56	50	44	37	33	37	42	46	47	46	47	48	48	49	50	49	50	49	47
Oct22	52	46	46	47	49	50	52	53	46	36	34	38	44	46	46	46	48	49	49	50	50	47	49	47	47
Oct23	47	48	48	48	50	52	53	54	50	45	40	41	45	49	51	51	52	55	49	50	50	54	42	47	49
Oct24	40	39	44	42	43	42	46	49	44	40	40	37	39	41	42	43	45	49	45	48	49	45	48	48	44
Oct25	48	47	46	47	49	52	54	54	48	41	35	33	33	41	47	43	46	52	45	46	54	45	49	50	46
Oct26	49	49	49	52	50	50	48	46	41	31	32	28	35	41	48	49	50	49	53	46	53	52	47	49	46
Oct27	44	46	48	47	48	50	51	48	40	29	33	38	42	47	48	48	49	49	50	50	51	50	51	51	46
Oct28	48	48	50	50	48	47	51	53	51	40	37	34	38	44	45	41	48	50	51	50	44	49	52	50	47
Oct29	49	49	50	50	52	52	52	53	46	32	30	27	42	47	47	45	43	50	50	53	54	53	55	55	47
Oct30	49	48	49	49	50	52	54	53	50	39	35	34	35	42	47	50	50	51	52	53	53	52	55	51	48
Oct31	50	50	50	51	52	54	55	53	47	36	33	38	41	43	46	47	53	53	55	54	54	53	52	51	49

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.

2020, Field component: X, Base: 20900.0, Unit: nT

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
Nov01	103	103	103	105	107	109	113	108	95	86	86	94	102	96	69	75	81	70	68	76	92	100	100	101	93
Nov02	101	101	102	104	107	110	111	105	100	93	88	89	98	103	107	108	109	108	106	105	105	102	101	103	103
Nov03	104	108	107	107	108	112	112	107	99	93	89	90	99	104	103	103	106	108	108	108	107	109	108	108	104
Nov04	107	107	107	108	109	110	112	110	101	96	91	96	102	105	106	108	110	114	113	114	112	110	109	109	107
Nov05	109	109	111	112	112	113	114	113	109	99	96	103	109	113	111	114	119	120	117	118	116	115	111	105	111
Nov06	108	107	109	112	116	114	123	118	111	104	92	95	104	102	101	99	86	91	104	107	105	108	114	109	106
Nov07	108	105	105	108	111	115	121	117	109	95	90	95	98	104	104	104	105	99	105	106	104	114	101	102	105
Nov08	104	106	106	108	110	113	110	104	104	96	91	96	98	100	105	108	107	106	106	110	111	111	109	109	105
Nov09	108	108	109	109	111	113	116	115	110	102	97	100	106	110	111	110	107	108	110	110	111	111	111	111	109
Nov10	111	111	112	113	114	116	118	116	112	109	112	119	123	122	119	115	114	114	114	113	112	110	103	109	114
Nov11	109	109	110	111	112	116	113	117	111	106	102	106	113	118	122	118	114	108	115	119	114	106	103	107	111
Nov12	104	106	109	113	114	116	119	117	109	104	102	108	110	114	113	113	110	112	111	110	110	106	109	108	110
Nov13	106	106	105	107	108	110	114	110	108	100	95	99	102	103	107	108	109	110	110	109	107	106	108	108	107
Nov14	109	108	109	111	112	114	116	114	109	105	102	105	109	110	110	112	110	111	107	106	104	106	106	106	109
Nov15	103	103	104	107	113	112	112	110	108	109	108	109	111	111	110	103	103	111	113	113	113	111	112	111	109
Nov16	111	111	111	111	110	110	111	112	111	111	112	113	114	116	114	112	112	112	113	116	116	115	111	115	113
Nov17	114	113	114	115	115	118	120	116	116	109	106	112	117	115	111	112	112	113	113	113	114	111	111	114	114
Nov18	118	113	114	115	116	117	114	110	108	106	105	107	108	110	111	111	113	112	113	115	115	110	110	109	111
Nov19	110	110	111	113	116	118	119	114	108	100	90	93	99	103	106	108	110	112	113	115	115	112	110	109	109
Nov20	105	111	108	111	112	106	111	106	96	89	85	98	105	106	105	104	102	103	100	100	102	105	105	107	104
Nov21	105	107	107	110	113	113	111	110	103	98	99	103	96	81	89	84	70	83	102	95	98	91	86	94	98
Nov22	94	91	92	99	100	107	104	99	79	65	82	78	41	66	61	67	57	77	93	88	99	86	94	90	83
Nov23	90	91	93	96	95	95	98	91	85	83	79	80	88	89	92	94	93	100	98	98	81	100	100		93
Nov24	98	98	101	102	102	104	99	99	93	88	89	95	98	99	99	100	97	100	103	104	108	106	103	108	100
Nov25	106	104	105	106	107	110	115	113	106	98	90	80	79	78	83	86	90	82	72	83	84	101	92	118	95
Nov26	103	101	103	105	109	111	110	108	103	94	86	83	84	88	92	100	105	101	92	98	104	109	113	105	100
Nov27	106	108	108	112	114	114	120	118	104	89	83	83	85	84	94	103	102	105	105	105	105	104	105	104	102
Nov28	105	109	111	101	111	113	102	104	98	93	85	81	90	86	90	97	95	94	94	94	88	97	102	105	98
Nov29	105	104	105	107	107	110	114	113	104	89	87	89	89	88	92	98	99	103	105	105	106	107	106	105	101
Nov30	104	105	107	107	115	110	117	123	121	110	100	92	92	95	94	97	99	102	102	101	104	104	106	104	101	104

2020, Field component: Y, Base: 1600.0, Unit: nT

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
Nov01	85	83	81	81	81	83	90	97	98	89	78	70	65	65	75	76	79	99	92	95	90	93	88	83	84
Nov02	83	82	82	82	84	85	89	97	101	91	75	64	62	68	75	79	80	82	82	83	87	92	85	83	82
Nov03	81	78	81	82	82	83	89	99	107	101	84	72	65	70	79	81	81	83	83	84	85	88	85	85	84
Nov04	84	83	81	81	81	83	86	94	104	101	86	69	62	66	74	77	79	80	81	82	83	84	84	83	82

80

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	82	81	80	79	79	81	86	95	103	98	75	57	58	64	70	71	75	78	80	81	83	84	91	86	80
Nov06	85	87	85	82	83	85	87	93	98	96	86	72	64	64	74	71	79	80	97	85	85	85	86	88	83
Nov07	87	87	84	84	84	84	86	95	103	98	83	68	63	70	75	79	77	79	94	82	93	103	92	86	85
Nov08	84	83	82	85	86	85	85	89	98	93	78	68	66	73	78	79	83	88	82	83	84	84	85	85	83
Nov09	84	84	83	83	84	84	86	92	98	95	81	66	64	68	76	80	80	82	82	83	83	83	82	83	82
Nov10	83	83	83	83	83	84	84	90	96	90	72	61	64	73	80	80	81	75	80	83	83	83	83	83	81
Nov11	82	82	82	82	84	86	88	92	93	86	73	66	65	70	76	76	76	81	80	80	83	90	91	95	81
Nov12	94	85	82	83	84	85	86	92	89	86	81	72	69	70	74	78	80	75	82	83	85	88	87	85	83
Nov13	85	86	85	84	86	86	89	95	96	90	77	67	66	72	77	80	82	84	85	86	87	87	87	84	83
Nov14	82	81	81	82	82	85	89	94	99	93	79	66	64	71	75	80	81	80	87	95	89	87	88	88	83
Nov15	91	87	86	83	80	85	88	93	96	94	85	74	72	74	76	77	81	83	84	84	86	87	86	85	84
Nov16	83	82	82	82	83	85	86	90	91	87	79	73	70	73	78	80	81	81	83	83	83	84	83	83	82
Nov17	82	81	79	79	80	83	85	90	92	87	78	72	69	74	76	78	79	81	82	84	84	84	84	85	81
Nov18	91	87	84	83	81	83	86	91	95	91	82	72	69	72	76	78	80	82	83	83	84	89	90	87	83
Nov19	84	82	81	80	79	80	84	91	95	92	83	71	64	67	74	78	79	81	82	82	83	83	93	99	82
Nov20	96	95	94	86	89	81	83	93	96	93	77	70	72	76	80	82	83	86	86	94	90	86	86	86	86
Nov21	85	80	84	82	85	87	87	92	95	88	75	67	70	69	76	77	81	84	85	87	113	129	128	123	89
Nov22	96	89	83	85	75	74	68	77	85	79	76	62	86	83	94	103	88	102	98	100	108	99	93	92	87
Nov23	90	88	86	86	85	90	88	97	98	93	82	78	75	77	84	85	89	87	86	93	95	94	89	88	87
Nov24	88	86	84	86	88	90	93	98	101	96	85	74	72	78	82	84	86	89	86	87	88	89	88	89	87
Nov25	89	89	86	84	86	86	85	90	93	92	81	71	70	69	70	78	80	88	91	99	100	105	100	99	86
Nov26	92	86	85	85	87	87	89	97	100	97	88	77	69	72	74	82	83	86	93	91	93	96	91	87	87
Nov27	81	79	79	81	83	79	83	90	94	90	87	78	72	81	76	81	83	86	87	89	90	89	88	88	84
Nov28	85	84	95	83	85	86	88	95	100	95	85	74	69	71	80	85	92	95	89	97	101	97	93	88	88
Nov29	87	86	85	84	86	86	91	94	98	97	88	76	68	64	69	80	84	85	88	88	88	88	88	87	85
Nov30	85	83	82	77	84	78	86	92	95	96	88	78	70	73	79	82	84	85	87	89	89	90	94	96	85

2020, Field component: Z, Base: 43900.0, Unit: nT

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
Nov01	63	63	63	63	63	63	63	63	59	56	52	52	55	61	65	68	68	69	73	73	70	67	66	65	63
Nov02	64	64	64	64	64	64	64	65	60	51	48	52	58	61	63	63	63	62	62	63	63	63	63	63	61
Nov03	63	62	62	62	62	62	65	66	64	58	53	54	56	60	61	62	63	63	62	62	62	62	61	61	61
Nov04	61	61	61	62	62	61	63	64	63	57	50	50	55	60	62	62	62	62	61	61	61	61	61	61	60
Nov05	61	61	61	61	61	59	59	63	58	49	42	43	52	58	59	59	59	59	59	59	59	59	59	61	58
Nov06	60	61	60	60	59	59	61	61	59	54	49	47	51	57	61	62	65	66	65	64	64	63	61	61	59
Nov07	61	61	61	61	61	60	61	64	61	55	49	49	55	59	63	63	65	64	65	64	64	62	63	63	61
Nov08	63	62	61	61	61	61	62	63	60	52	51	55	59	60	63	63	63	63	63	62	62	62	62	62	61
Nov09	62	61	61	61	61	61	60	61	60	54	48	45	50	57	60	60	61	61	61	61	61	61	61	61	59

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	60	60	60	60	60	59	59	61	57	47	39	43	52	56	58	59	59	60	60	60	61	61	61	61	57
Nov11	61	61	60	60	60	60	60	61	60	53	50	53	57	59	59	59	60	61	60	60	60	62	63	63	59
Nov12	63	62	62	61	61	60	60	62	61	57	50	48	52	57	58	59	60	60	60	61	62	61	62	62	59
Nov13	62	61	61	61	61	61	61	63	60	54	52	57	60	63	63	63	62	62	62	62	62	62	62	62	61
Nov14	61	61	61	61	61	60	60	61	59	53	48	48	53	57	60	60	60	61	62	62	63	62	63	63	59
Nov15	63	63	63	63	62	61	61	61	58	55	50	49	54	59	61	62	63	62	62	61	61	61	61	61	60
Nov16	61	61	61	61	61	61	60	61	58	56	52	49	55	59	60	60	61	62	62	61	61	61	60	60	59
Nov17	60	61	60	60	61	60	60	60	59	56	52	53	57	59	61	60	61	61	61	61	61	60	60	60	59
Nov18	59	59	59	60	60	60	61	63	60	57	54	54	57	60	61	61	61	61	61	61	61	61	61	61	60
Nov19	61	60	60	60	61	61	61	62	61	56	52	51	56	62	64	62	62	62	64	64	65	64	60	60	60
Nov20	61	59	60	60	60	62	62	63	62	56	52	54	56	60	62	62	64	64	69	68	66	65	63	63	61
Nov21	63	63	61	61	61	64	64	63	62	58	54	56	61	67	67	68	70	71	72	71	70	69	67	59	63
Nov22	59	61	63	63	64	67	67	68	64	63	61	60	70	76	75	78	79	76	68	68	67	66	67	68	67
Nov23	68	68	68	67	67	66	67	67	66	62	61	61	65	69	70	70	69	69	67	67	67	67	66	66	67
Nov24	66	66	66	66	66	65	65	66	64	63	61	62	65	67	67	67	68	68	76	75	75	71	70	65	68
Nov25	65	65	65	65	65	66	66	66	64	61	59	64	69	73	70	72	68	73	68	69	68	66	65	66	66
Nov26	66	65	66	66	64	66	65	68	65	62	60	62	67	70	70	69	68	68	67	67	71	67	66	66	66
Nov27	65	65	63	64	65	65	67	68	68	67	64	64	63	68	71	70	69	70	70	69	71	71	69	68	67
Nov28	66	65	66	65	64	65	65	67	66	65	64	61	66	70	69	70	69	69	68	68	68	67	67	68	67
Nov29	67	67	66	66	66	65	65	67	66	65	64	63	66	68	69	70	69	68	68	68	68	67	67	67	67
Nov30	67	67	66	66	65	65	64	66	64	63	64	63	63	65	66	68	68	68	68	68	68	68	68	68	66
2020, Field component: F, Base: 48700.0, Unit: nT																									
Nov01	52	51	51	52	53	54	56	54	45	38	34	37	43	46	39	44	46	43	45	49	53	54	53	52	48
Nov02	52	52	52	53	54	55	56	54	48	37	31	35	44	49	53	53	53	53	52	52	52	51	50	51	50
Nov03	52	52	53	52	53	55	57	57	51	43	36	37	43	48	49	50	52	53	53	53	52	53	52	52	50
Nov04	52	52	52	52	53	54	55	56	51	44	35	36	43	49	52	53	54	55	54	55	54	53	52	52	51
Nov05	52	52	53	53	53	54	55	56	50	37	29	33	43	51	51	53	55	55	54	55	54	53	52	50	50
Nov06	51	50	52	52	53	52	56	56	52	44	34	33	40	45	48	49	46	49	54	54	53	56	54	52	49
Nov07	52	51	51	52	53	54	57	58	52	41	34	35	41	48	51	51	52	51	54	54	53	54	51	51	50
Nov08	52	52	51	52	53	54	54	52	50	39	35	40	45	48	52	53	52	53	53	53	54	53	53	53	50
Nov09	52	52	52	52	53	54	54	55	52	43	35	33	40	49	52	51	51	52	53	53	53	53	53	53	50
Nov10	52	52	52	53	53	53	54	55	51	40	33	40	49	53	54	52	53	53	53	53	54	52	52	52	51
Nov11	52	52	53	53	53	54	56	54	52	44	39	43	49	54	56	54	53	53	54	55	53	52	53	50	52
Nov12	52	52	52	54	54	54	57	57	52	46	39	40	44	50	51	52	54	51	53	53	53	52	53	53	51
Nov13	52	51	51	52	52	53	54	55	51	42	38	44	47	51	53	54	54	54	52	53	52	53	53	53	51
Nov14	52	52	52	53	53	54	55	54	50	43	38	38	44	49	52	52	53	53	52	53	52	53	53	52	51

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	52	51	52	53	55	54	54	53	50	47	42	41	46	51	52	50	51	54	55	54	54	53	53	53	51
Nov16	53	53	53	53	53	52	52	52	51	49	45	43	49	53	54	53	54	54	55	55	55	54	54	54	52
Nov17	53	53	53	54	55	56	56	56	54	47	42	46	52	54	52	52	54	54	54	54	54	54	53	54	53
Nov18	54	52	53	53	54	55	55	54	52	48	44	45	48	51	53	53	54	54	54	54	53	53	53	52	52
Nov19	52	52	53	53	55	56	56	56	52	44	36	36	43	50	53	53	53	54	54	55	55	54	53	53	51
Nov20	51	52	51	52	53	52	54	54	48	40	34	41	46	50	51	51	52	53	52	52	53	53	53	53	50
Nov21	52	53	53	52	54	53	54	55	51	45	42	44	46	45	49	47	44	50	56	52	53	50	46	45	50
Nov22	45	44	46	50	51	53	52	49	40	35	40	37	31	47	45	50	46	53	56	52	49	56	51	50	47
Nov23	51	51	52	52	52	53	53	50	46	42	39	40	46	50	53	54	53	56	54	54	57	55	53	53	51
Nov24	52	52	54	53	54	54	55	54	50	46	44	46	51	53	54	54	53	55	55	56	56	55	55	56	53
Nov25	55	53	54	55	55	56	58	59	54	48	44	42	46	49	51	52	53	51	50	54	55	58	54	60	53
Nov26	54	53	54	55	57	58	58	57	53	46	41	42	46	51	53	55	57	55	52	55	56	57	58	55	53
Nov27	55	55	55	56	58	58	60	61	54	45	40	41	43	48	54	57	56	57	56	56	52	55	55	55	54
Nov28	55	56	55	52	56	57	54	57	54	52	45	43	49	50	53	55	54	54	54	54	57	56	57	57	53
Nov29	56	55	55	56	56	57	58	59	55	48	45	44	48	49	51	55	55	57	57	57	57	57	56	56	54
Nov30	55	55	56	57	59	59	61	62	56	50	48	46	48	49	51	54	55	55	55	56	56	58	56	55	55

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.

2020, Field component: X, Base: 20900.0, Unit: nT

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
Dec01	100	104	100	100	102	103	104	104	103	96	90	89	91	98	103	105	106	107	108	108	108	108	107	107	102
Dec02	107	104	105	106	109	110	104	99	93	91	94	99	101	105	109	112	114	115	115	115	113	112	109	106	106
Dec03	106	107	107	107	110	110	109	107	107	92	90	90	95	101	103	99	95	103	105	107	108	107	107	108	103
Dec04	107	106	106	107	106	107	109	110	106	99	94	94	98	104	109	111	111	110	110	111	110	108	108	108	106
Dec05	110	110	109	110	108	108	110	111	105	96	92	98	100	111	112	113	111	112	115	110	108	108	107	109	108
Dec06	112	108	107	106	108	111	113	110	104	100	95	95	97	103	114	111	111	115	114	111	110	106	106	104	107
Dec07	...	...	...	...	...	...	114	106	99	96	100	102	104	105	108	106	105	105	105	107	108	108	109	108	...
Dec08	110	111	110	108	107	110	111	110	102	96	94	94	101	108	114	113	112	110	108	109	106	106	102	100	106
Dec09	104	107	106	111	110	112	111	116	111	105	107	110	112	108	114	113	113	97	93	97	101	101	103	102	107
Dec10	101	104	121	119	115	115	119	118	111	105	107	110	112	113	116	114	111	109	108	103	100	106	113	106	111
Dec11	105	108	113	112	113	110	108	106	104	101	105	108	107	108	106	105	104	107	107	105	104	105	106	105	107
Dec12	103	105	107	106	107	107	108	104	102	105	106	108	112	115	113	109	113	114	113	112	110	108	103	102	108
Dec13	109	109	113	105	103	105	106	105	103	103	104	106	106	107	103	105	105	108	108	107	104	103	103	102	106
Dec14	103	104	105	106	108	111	113	111	103	97	98	101	104	107	111	112	110	109	107	109	106	106	106	106	106
Dec15	111	108	108	110	112	113	113	110	103	95	94	98	104	110	113	114	114	113	112	111	109	109	113	112	109
Dec16	110	107	107	107	110	112	114	112	106	102	100	103	105	109	110	109	107	107	107	111	106	107	107	112	108
Dec17	113	113	113	115	115	117	116	111	106	105	106	109	111	117	119	118	115	112	112	111	111	111	111	112	112
Dec18	111	110	111	115	116	118	118	116	113	108	108	114	120	120	117	110	106	109	112	112	111	110	109	111	113
Dec19	112	115	113	116	117	118	118	115	108	114	116	119	119	111	114	112	108	106	99	102	101	105	109	109	111
Dec20	105	107	106	107	109	110	108	103	99	94	96	103	103	101	106	106	109	113	112	113	111	105	106	106	106
Dec21	111	112	113	116	117	113	108	107	105	108	109	114	116	116	118	113	114	112	110	107	105	107	89	119	110
Dec22	94	98	97	95	104	104	105	105	98	94	90	105	109	101	103	104	109	107	101	97	103	97	102	113	101
Dec23	104	103	101	101	106	114	107	97	93	88	84	87	90	100	103	105	101	95	96	97	102	111	113	103	101
Dec24	105	104	105	109	112	115	117	113	106	100	103	104	94	95	88	88	95	96	100	99	102	101	101	105	102
Dec25	102	100	102	103	104	107	109	113	110	110	113	116	106	96	101	103	105	105	106	106	106	105	104	104	106
Dec26	104	105	106	107	108	108	110	112	109	108	112	117	115	113	110	106	102	102	104	101	106	108	109	112	108
Dec27	110	110	104	103	105	112	114	116	115	115	119	122	120	117	113	114	113	107	108	104	104	109	104	107	111
Dec28	102	98	103	106	109	109	113	114	107	99	105	109	111	111	101	107	109	108	110	108	104	104	102	104	106
Dec29	104	104	104	106	106	112	114	118	113	107	111	113	109	107	108	106	106	105	108	106	106	106	100	101	107
Dec30	104	110	110	117	111	108	111	111	112	106	109	113	110	106	99	101	104	105	105	105	101	101	115	110	107
Dec31	102	100	100	100	105	105	107	111	108	108	111	111	108	106	106	107	108	105	108	109	109	108	108	106	107

2020, Field component: Y, Base: 1600.0, Unit: nT

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
Dec01	91	88	89	87	88	89	91	96	100	98	90	79	71	74	78	82	84	86	86	87	88	88	88	91	87
Dec02	88	86	86	85	86	89	89	97	99	93	83	76	74	74	77	80	82	84	85	86	87	88	88	89	86
Dec03	87	87	85	85	85	86	88	94	98	94	83	74	68	70	76	76	79	85	88	89	89	90	90	90	85

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	89	89	88	88	88	89	91	96	101	99	91	81	75	74	79	83	83	85	86	87	88	89	89	87	87
Dec05	87	86	87	87	87	87	89	93	96	89	81	75	75	78	82	83	84	85	85	87	100	90	91	87	86
Dec06	87	85	88	87	83	84	88	93	95	91	82	74	73	73	77	78	82	83	85	85	95	100	99	89	86
Dec07	..	..	..	..	..	..	89	94	94	87	81	75	75	77	81	84	86	87	89	88	88	88	87	86	..
Dec08	85	85	87	89	86	88	90	95	97	93	92	82	74	77	80	83	83	86	89	89	90	91	94	96	88
Dec09	89	82	84	86	84	79	86	89	92	86	77	71	71	74	78	82	81	80	93	105	91	95	95	95	85
Dec10	90	86	82	86	82	83	85	91	94	87	80	72	71	76	82	84	85	85	87	91	89	96	93	89	86
Dec11	92	92	92	89	88	89	88	90	88	89	86	78	78	82	85	86	88	90	88	88	100	96	98	91	89
Dec12	90	89	91	89	89	89	91	92	91	87	82	76	76	81	83	84	85	86	87	86	89	98	93	91	88
Dec13	92	87	98	93	89	90	92	96	97	92	84	79	75	78	84	86	88	88	92	90	96	101	93	93	89
Dec14	90	88	88	87	88	89	92	96	96	90	83	74	72	79	83	84	87	89	87	88	90	90	91	92	88
Dec15	92	87	86	86	86	87	91	95	97	93	83	77	75	78	84	85	85	85	87	90	90	91	91	90	87
Dec16	87	88	86	85	86	87	89	93	95	92	85	78	78	78	83	84	87	86	87	88	92	91	89	87	87
Dec17	86	84	84	84	83	86	89	93	92	88	84	78	78	83	87	88	88	89	88	89	89	91	91	88	87
Dec18	87	86	85	83	84	84	87	91	91	89	84	77	76	80	85	84	84	85	86	85	87	88	89	88	85
Dec19	86	87	83	83	86	85	88	94	93	86	78	70	71	77	82	84	86	86	87	89	91	95	92	90	85
Dec20	89	87	87	84	86	89	92	95	92	88	81	76	74	82	85	87	90	87	88	88	91	98	92	88	87
Dec21	86	83	81	75	85	91	93	96	91	81	81	76	74	76	79	87	87	89	89	91	104	110	112	104	88
Dec22	96	97	97	86	90	85	91	94	94	92	87	81	79	82	94	95	91	89	91	102	111	93	92	89	91
Dec23	88	91	84	64	85	88	91	95	89	83	82	77	78	86	92	93	90	92	94	96	94	94	91	88	88
Dec24	89	87	85	81	79	84	88	91	91	86	83	82	92	93	89	104	99	91	92	94	95	94	96	97	90
Dec25	95	89	90	89	88	89	90	92	90	87	83	78	77	81	85	88	87	88	90	92	92	92	91	91	88
Dec26	89	87	87	88	87	90	91	96	95	90	85	80	81	86	89	87	88	89	90	91	101	103	91	90	90
Dec27	88	90	91	91	91	89	90	94	94	89	84	80	78	82	87	87	85	83	86	88	92	98	96	97	89
Dec28	100	94	89	89	83	86	87	90	89	86	76	82	80	82	84	86	86	87	87	89	98	91	95	92	88
Dec29	95	95	89	91	85	86	86	87	87	90	92	85	80	80	83	84	82	82	83	87	90	98	101	94	88
Dec30	94	95	94	97	93	85	87	90	90	92	94	89	83	87	86	87	86	88	90	91	93	95	100	103	91
Dec31	101	92	92	87	89	91	91	88	90	95	92	85	83	85	84	85	87	90	88	90	91	91	91	90	90

2020, Field component: Z, Base: 43900.0, Unit: nT

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
Dec01	68	68	67	67	68	68	67	66	64	60	61	61	64	68	69	68	68	67	67	67	67	67	67	67	66
Dec02	66	67	67	67	67	67	68	68	66	63	60	61	63	67	68	66	66	66	65	65	65	65	65	66	66
Dec03	66	65	66	65	65	65	65	66	65	63	59	59	63	67	69	68	69	69	69	68	68	67	67	67	66
Dec04	67	67	67	66	66	66	65	66	65	63	64	63	64	66	69	67	67	67	67	67	67	67	67	67	66
Dec05	66	67	66	66	66	66	65	65	64	65	68	71	73	72	71	69	67	66	66	66	66	66	66	66	67
Dec06	65	65	65	66	66	66	66	67	66	63	64	67	69	70	69	68	67	67	66	66	66	66	66	66	67
Dec07	..	..	..	..	..	..	66	66	64	66	65	65	67	68	69	68	68	68	68	67	67	67	66	66	..

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	66	65	65	65	66	66	67	68	68	69	67	65	68	69	69	67	66	67	67	67	68	68	68	68	67
Dec09	68	66	66	66	65	65	64	63	61	59	58	58	62	65	66	67	66	68	69	71	70	69	68	68	65
Dec10	67	67	64	62	63	63	63	63	61	60	59	60	63	67	67	66	66	67	67	68	70	69	68	68	65
Dec11	67	67	64	65	64	65	65	64	60	62	63	62	67	69	69	68	68	68	68	68	68	69	68	68	66
Dec12	68	67	67	67	67	67	66	67	67	67	67	68	72	71	69	68	67	67	66	66	66	66	67	67	67
Dec13	67	67	64	66	67	67	67	67	64	63	63	63	67	70	70	69	69	69	68	68	68	68	69	68	67
Dec14	68	67	68	67	67	67	66	66	64	65	67	67	67	69	69	68	67	68	68	68	67	67	67	67	67
Dec15	66	67	67	67	67	67	65	64	64	64	65	66	67	69	70	68	67	68	68	68	67	67	66	66	66
Dec16	66	66	66	67	67	67	67	66	66	67	67	67	69	72	71	68	68	68	68	68	67	67	67	66	67
Dec17	65	65	66	66	66	66	66	65	64	62	60	63	69	68	67	66	66	66	66	67	66	66	66	65	66
Dec18	65	65	65	65	66	66	66	66	65	65	62	62	65	66	65	66	66	66	66	66	66	66	66	66	65
Dec19	65	64	64	64	64	65	66	64	60	58	55	57	62	66	66	65	66	67	68	69	69	68	67	67	64
Dec20	67	67	67	67	67	68	68	66	66	68	67	66	69	70	69	68	68	68	68	67	67	68	68	66	67
Dec21	66	66	66	64	63	65	65	66	65	65	66	66	68	68	68	67	67	69	69	69	69	71	72	68	67
Dec22	69	69	69	70	68	69	68	67	65	67	69	67	67	69	70	69	71	72	72	70	71	71	69	68	69
Dec23	68	67	68	67	66	68	69	69	69	70	67	70	73	74	73	72	74	73	72	72	71	70	68	67	70
Dec24	67	68	68	68	68	67	66	65	63	65	64	67	68	70	72	73	71	71	70	72	71	70	71	70	69
Dec25	69	69	69	69	69	69	68	66	65	65	65	63	64	70	71	70	70	70	70	71	70	70	72	70	68
Dec26	69	69	69	69	69	69	69	67	66	66	65	63	67	71	70	69	69	70	70	71	70	70	69	68	69
Dec27	68	67	68	68	68	68	67	65	59	60	64	65	67	68	67	71	70	69	70	71	72	71	71	70	68
Dec28	70	70	69	69	69	68	68	67	66	71	72	68	68	69	70	70	70	70	71	71	70	71	71	71	70
Dec29	70	70	70	69	69	67	67	65	65	68	66	61	64	69	70	72	72	71	71	71	71	71	72	72	69
Dec30	71	71	69	66	66	67	67	66	68	70	70	67	68	70	71	72	72	71	70	71	70	71	69	68	69
Dec31	69	70	70	70	70	70	69	72	72	71	68	66	69	71	72	72	71	71	71	71	71	70	70	70	70

2020, Field component: F, Base: 48700.0, Unit: nT

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
Dec01	55	56	54	54	55	56	56	55	52	47	44	43	47	54	57	57	57	57	57	57	57	57	57	57	54
Dec02	56	55	55	56	57	57	56	55	51	47	45	48	50	55	58	58	58	59	59	59	58	57	56	55	55
Dec03	56	55	55	56	57	57	56	56	53	47	42	42	48	54	56	54	53	57	58	58	58	57	57	57	54
Dec04	57	56	56	56	56	56	57	58	55	50	49	48	49	54	59	59	58	58	58	58	58	57	57	57	56
Dec05	57	57	57	57	57	56	57	57	54	51	51	56	59	63	62	61	59	60	60	58	58	57	57	57	57
Dec06	57	56	55	55	57	58	59	58	55	51	49	51	54	57	61	59	58	60	59	58	58	56	56	55	56
Dec07	:	:	:	:	:	:	:	56	51	51	52	53	55	57	58	57	57	57	57	57	57	57	57	57	:
Dec08	57	57	57	56	56	58	59	59	56	54	52	50	54	59	61	59	59	58	57	58	57	57	56	55	57
Dec09	56	56	56	57	57	57	60	57	53	49	49	52	55	59	61	59	59	54	53	57	56	56	61	56	56
Dec10	55	60	60	57	56	56	58	58	53	50	49	53	57	59	58	57	58	57	58	57	57	58	57	57	56
Dec11	56	57	57	57	57	55	55	53	50	50	52	53	57	59	58	57	57	58	58	57	57	58	57	57	56

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	56	56	57	57	57	57	57	55	55	56	56	58	64	64	61	59	60	60	59	59	58	57	56	55	58
Dec13	57	58	58	56	55	56	57	56	53	52	52	53	56	60	58	58	58	59	59	58	57	59	57	56	56
Dec14	56	57	57	57	58	59	59	58	53	51	53	54	55	58	60	60	58	58	58	59	58	57	57	56	57
Dec15	58	57	57	58	59	59	58	56	53	49	49	51	56	60	62	60	60	59	58	58	58	57	59	58	57
Dec16	57	56	56	56	58	59	60	59	56	55	54	55	58	61	61	59	58	58	57	59	57	57	57	58	57
Dec17	58	58	58	59	59	61	60	57	54	51	50	54	60	62	62	61	59	58	59	58	58	58	57	57	58
Dec18	57	56	57	58	59	60	61	60	58	55	53	55	60	61	59	57	56	57	58	58	58	57	57	57	58
Dec19	57	57	57	58	59	60	61	58	51	52	50	52	57	57	58	57	59	57	58	56	59	57	57	58	56
Dec20	56	57	56	57	58	59	58	55	52	53	51	54	56	57	58	57	59	56	55	59	56	57	54	63	57
Dec21	57	58	58	58	58	57	56	56	55	55	56	58	61	62	62	60	60	60	60	59	59	56	57	58	58
Dec22	53	55	55	54	57	56	57	56	52	51	51	56	58	56	58	58	60	59	57	56	59	56	57	58	56
Dec23	56	55	55	54	56	61	59	55	53	51	47	51	54	60	61	61	58	58	57	59	60	62	61	59	57
Dec24	56	56	57	59	59	60	61	57	53	52	53	55	52	55	53	55	58	58	59	58	59	58	58	59	57
Dec25	57	56	57	57	57	59	58	58	56	56	57	56	54	55	58	59	60	59	60	60	60	59	58	58	58
Dec26	58	58	58	59	59	60	60	60	57	56	57	58	60	63	61	59	58	58	58	58	59	60	60	60	59
Dec27	59	58	56	56	57	60	60	59	53	54	59	62	62	62	60	61	61	59	58	58	60	62	60	60	59
Dec28	58	56	57	58	60	59	60	60	56	57	61	59	59	60	57	61	61	60	58	59	61	59	58	59	59
Dec29	59	58	58	58	58	58	58	60	58	58	58	54	55	59	60	59	59	59	60	60	58	61	59	59	59
Dec30	59	58	60	61	59	58	58	60	60	60	60	60	59	59	57	59	60	60	60	61	58	58	63	60	59
Dec31	57	57	57	58	59	59	59	61	64	62	59	58	59	60	61	61	61	60	61	61	61	60	60	59	60

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