ZAMG

Conrad Observatory Magnetic Results 2015

GMO Bulletin 2

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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 printed version comes along with a DVD containing the electronic appendix which includes all data products. 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: 3 Fluxgate sensors, 3 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 instruments used in determination of the 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.

Table 2.1. Instruments 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	$60pT/\sqrt{Hz}$		<2mrad	100 pT	HEZ	2012-09
GP20S3	Potassium	012201									2015-07
GP20S3	Potassium	911005									2015-07
GSM90	Overhauzer	14245	100000nT			$22pT/\sqrt{Hz}$	0.2nT		10 pT		2014-12
GSM90	Overhauzer	31968									2015-04
LEMI025	Fluxgate	22	3000nT	<10ms	3.5Hz	$<10pT/\sqrt{Hz}$		<30min of arc	1 pT	HEZ	2015-08
LEMI036	Fluxgate	1	4000nT	<10ms	3.5Hz	$<10pT/\sqrt{Hz}$		<30min of arc	1 pT	HEZ	2015-12
POS1	Overhauzer	N432	80000nT				0.5nT		1 pT		2013-06

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

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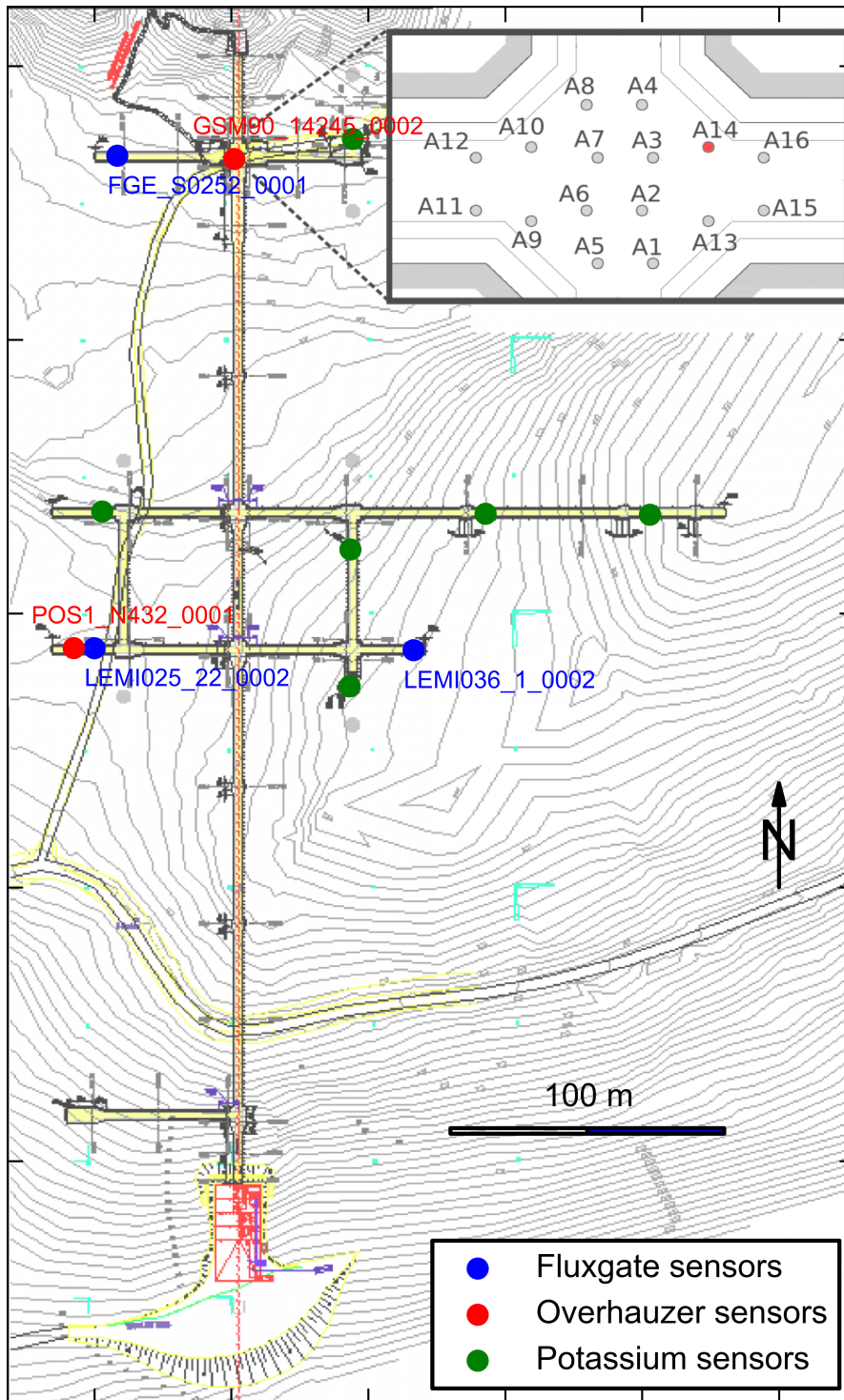
Figure 2.1 Location map of the Conrad Observatory with instrumentation

Chapter 3

Methods

3.1 Acquisition and data transmission

Variations in directional components of the Earth's magnetic field at the Conrad Observatory for year 2015 are mainly based on measurements from a FGE sensor. This instrument is installed in hdz orientation within the tunnel system of the geomagnetic observatory (Figure 2.1). It partially satisfies the current 1 second INTERMAGNET minimum requirements. The FGE vector magnetometer samples the magnetic field and its data is digitally filtered to 1Hz. 1 second and 1 minute values are produced using the standard INTERMAGNET Gaussian filter [*St-Louis*, 2012]. A GSM90 scalar magnetometer, which samples the field at 0.2 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 on a WebSocket port. 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. Preliminary 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 v0.3.0 is available at *https://github.com/geomagpy/magpy*.

Table 3.1.   Fluxgate theodolites and serial numbers

Theodolite (SN)	Fluxgate (SN)
MinGeo-6814-5255	DTU-DI0146
WILD-231067	MAG01H-562-1024H

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 0.59 nT per year for 2015), 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 two types of fluxgate theodolites. The primary instrument is a MinGeo (-SN:6814-5255) equipped with a DTU-DI0146 fluxgate magnetometer. In addition, we also perform frequent measurements with other fluxgate theodolites as listed in table 3.1. All 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. Magnetic field differences between all absolute piers are regularly measured by an additional scalar magnetometer, which is moved every two weeks on another of the 16 piers. The primary, permanently recording F instrument, located on pier A14, is 2.65 m distant from the main absolute pier A2 and shows a total constant F difference of 0.26 nT. 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 0.06 nT/m (maximum: 0.26 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 [*Lauridson*, 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 available in the electronic appendix.

Table 3.2. Delta values for all piers with respect to A2

Pier	Distance to A2 [m]	δF [nT]	Epoch (F)	δD [ArcSec]	δI [ArcSec]	Epoch (Dir)
A1	1.75	-0.13	2015			2015
A10	4.38					
A11	7.38					
A12	7.47	-0.89	2015			2015
A13	2.38	-0.43	2015			2015
A14	2.65	0.258	2015			2015
A15	5.56	-0.11	2015			2015
A16	5.73	0.07	2015	50.1	-24.6	2014
A3	2.2	-0.37	2015			2015
A4	3.96					
A5	2.41	-0.63	2015			2015
A6	1.75					
A7	2.69	-0.07	2015	11.1	-5.9	2014
A8	4.39	0.05	2015			2015
A9	4.22					
H1	353.89		2015	-9.6	-4.4	2014

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: preliminary data, quasi-definitive data and definitive data. Preliminary data sets are calculated and published in real-time, which means that the time delay is only affected by calculation time (seconds) and type of data provision (FTP: minutes, WebSocket: seconds). Preliminary data is already baseline corrected by applying a median value of baseline parameters from the past 100 days. As the baseline is very stable at the Conrad Observatory, this is a very good approximation of the definitive values (Figure 4.1. An automated outlier identification method based on median absolute deviations provided by MagPy is applied to this data in order to mark prominent outliers. Some outliers and artificial disturbances are, however, eventually still present in this data set. Quasi-definitive data sets are determined approximately once a week. For this purpose, the raw data set is subjected to a flagging procedure. All data sets are visually inspected by an observer and suspicious, disturbed and biased records are marked using MagPy's flagging routine. For quasi-definitive submission, flagged data is removed and the remaining data is baseline corrected using the same function as for definitive data. The baseline is calculated always for one year going backwards from the last measurement. If extrapolation towards the current date is required, then the last measurement is duplicated one day ahead before fitting the basevalues. Definitive data is almost determined in an almost identical manner as the quasi-definitive data with one difference: the angular difference between the current sensor orientation and the true magnetic coordinate system is analysed and corrected for. Such quasi-definitive data has been available since December 2015. 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 ($30\text{min} + m + n$) 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 on the ZAMG data distribution server (ftp://www.zamg.ac.at) within 5 minutes. Quasi-definitive data are usually provided within one week 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 the website of the Conrad Observatory, Zentralanstalt fuer Meteorologie und Geodynamik (http://www.conrad-observatory.at).

Chapter 4

Accuracy and Recovery

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. 100 absolute measurements were conducted on pier A2 in 2015 by the WIC observers (each one represented by a coloured point). On average, DI measurements were performed with a period of 7 days. The baseline was determined using MagPy's fitting function with a spline fit (knot parameter = 0.3, which is the normalized distance between spline knots). 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 0.46 nT for H, 0.27 nT for Z and 4.4 arcsec for D, which are well within INTERMAGNET requirements. Calculated baseline curves have a maximum amplitude of 1.07 nT in the X and Z components, and 9.4 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 2015. Due to magnetic disturbances induced by a radio communication system, which was activated during absolute measurements between February and June, several absolute measurements could not be analysed. The missing data, however, do not affect the validity of the obtained baseline, simply because the sampling resolution is still sufficient to obtain the long periodic trend of the baseline variation. This conclusion is supported by DI measurements on other piers at time at which variation data has not been affected by these disturbances (Figure 4.3). The A2 baseline as shown in Figure 4.1 was taken as reference as the resulting δF (see section 4.2) is virtually zero.
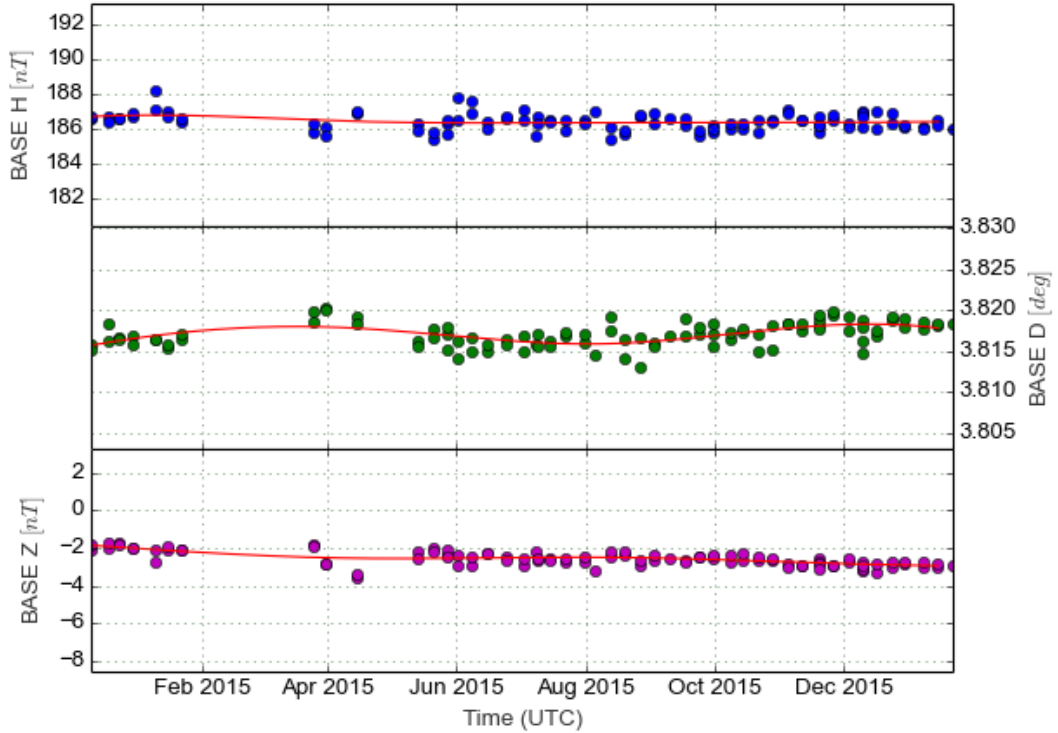
Figure 4.1 Baseline for the primary vectorial system FGE

4.1.2 Consistency between measurement piers

Beside manual DI determination, an automatic DI measurement system (AutoDIF) [*Rasson and Gonsette*, 2011] is in operation at Conrad Observatory. The system is located on pier A16 (Figure 2.1). This automatic unit is configured to measure base values every 30 minutes. For analysis of this data, the site differences between A16 and the main pier A2, as listed in Table 3.2, are accounted for. As done for the manual measurements at pier A2 we also calculated the standard deviation of the residuals as a measure of quality. The obtained standard deviations are 0.32 nT for H, 0.16 nT for Z and 12.4 arcsec for D. A maximum amplitude of 1.91 nT in the X and Z components, and 30.9 arcsec in the declination is obtained. In 2015 DI measurements have been performed on three piers. Beside the main pier A2, where most manual measurements were done, we do monthly manual determinations on pier H1 and automatic AutoDIF measurements on pier A16. As can be seen in Figure 4.3, which shows the average daily basevalues of all piers analysed for the main variometer together. All baselines exhibit very similar almost linear trends. AutoDIF data is unfortunately no fully available for 2015 as we had problems with sensor and laser cables. A few measurements in November and December, after a quick repair, are slightly off from all other measurements and are considered unreliable. Of particular importance are the measurements until May 2015 for which the analyses of determinations on A2 are biased due to the radio communication system. These measurements support the adopted baseline shown as red line in Figure 4.3. In summary all tests support the high quality of the baseline of the

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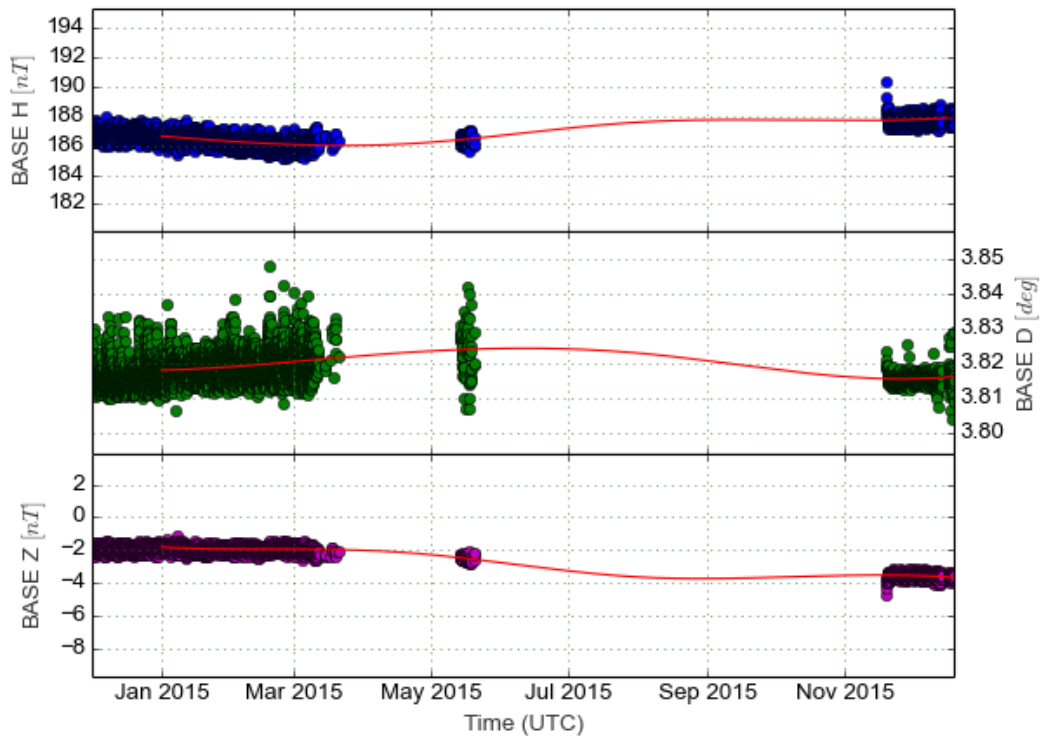
Figure 4.2 Baseline for the primary vectorial system FGE based on AutoDIF measurements. Please note that AutoDIF measurements refer to pier A16.

Conrad Observatory.

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 4.4, the scalar residual of minute mean values corresponds to an average of -0.04 nT with a standard deviation of 0.13 nT. The maximum amplitude remains below 2.12 nT for the year 2015. 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 $\pm$ 0.59 nT for all components in 2015. This is well within INTERMAGNET's requirement of a 5 nT accuracy for definitive data [*St-Louis*, 2012].

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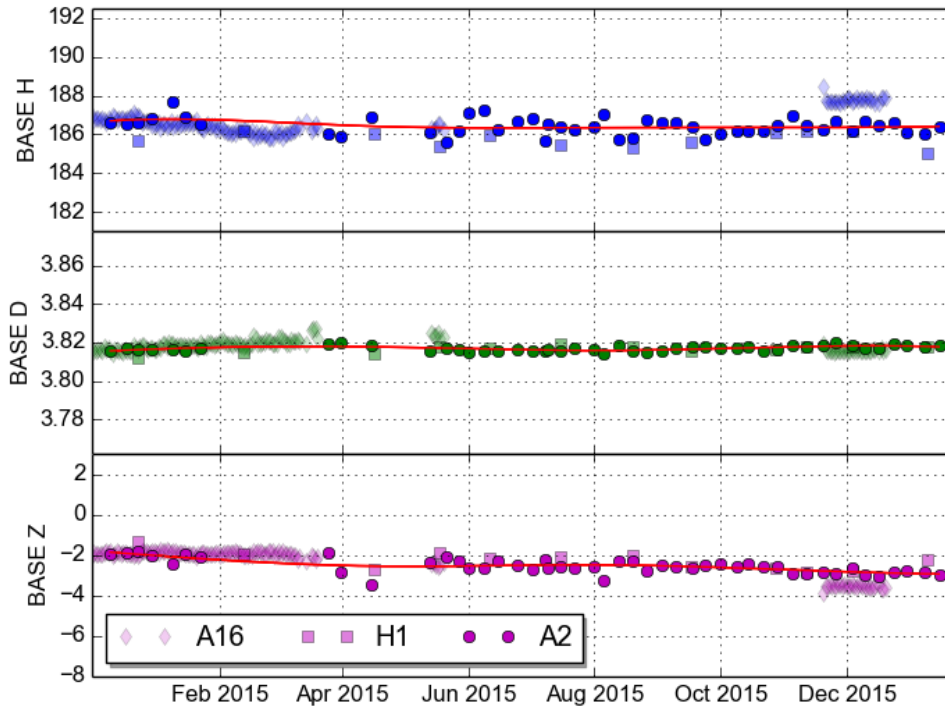
Figure 4.3 Combined plot of all basevalues for the FGE variometer as determined on the piers given in the legend. Average pier differences as listed in Table 3.2 have been regarded for.

4.3 Variometer differences

A third measure of quality comes from the comparison of records from different nearby variometer after baseline correction. Additionally this test also provides an independent check of correctness of adopted baseline algorithms, especially if the 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 2015, variometer data from 2 independent systems is compared. In Figure 4.5, we depict these differences for each component and for each variometer relative to the primary variometer FGE. The scale of the figure is again 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 -0.07±0.21 nT. For the Y and Z component values of -0.06±0.12 nT and 0.03±0.10 nT are obtained. Variation data of the LEMI025 instrument is available only after August 2015, therefore the comparison covers less than half a year. This limited time range leads to inherent differences in baseline adoption when using similar spline parameters, as the complexity of the resulting fit is dependent on the covered range. Thus slightly larger variations are to be expected and observed, particularly in the beginning of the new LEMI025 record. Both variometers were set up in HDZ orientation. As the LEMI025 was installed 3 years after the FGE, both systems have a small

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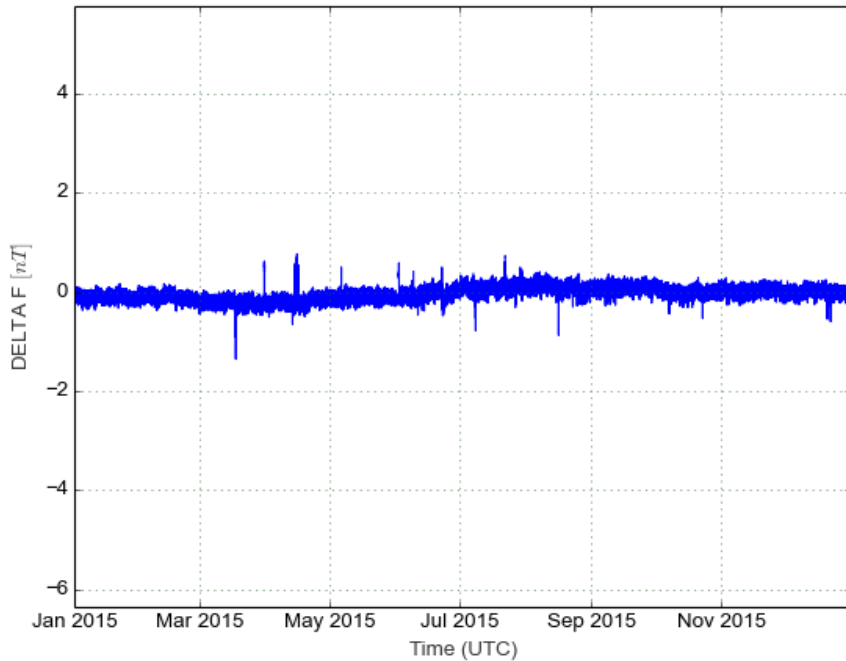
Figure 4.4 Delta F values between the scalar magnetometer and the field strength calculated from the baseline corrected vectorial data set. The scale of the figure is related to the INTERMAGNET 5 nT criteria.

angular difference of about 0.4 deg in the horizontal components. After baseline adoption, the differences of both instruments are 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) both instruments record an identical geomagnetic field at periods of one minute and above; and 3) the combination of all accuracy tests underlines the very high quality of the geomagnetic field record.

4.4   Recovery

A recovery of 98.8 % of vectorial data in minute resolution was established for 2015. Please note that for filtering we use a very conservative approach: minute means are only calculated if 100 % of 1 second data is available within the filtering window, therefore the relative recovery rate for one second data is usually higher. For scalar minute data, a recovery of 98.7 % was obtained. One second definitive data provided within the electronic appendix consists solely of variation data from FGE and scalar data from GSM90 (see table 2.1). For minute data, gaps within the variation sequence were filled using secondary variometers. The scalar one minute record corresponds to an average value of all available scalar data. For 2015 the composite minute data set consists of contributions from all instruments shown in figure 4.6. Yellow shaded regions indicate variation data used from respective instruments, green shaded regions indicate scalar data used to calculate average intensity. The lowermost plot indicates average differences between the contributing

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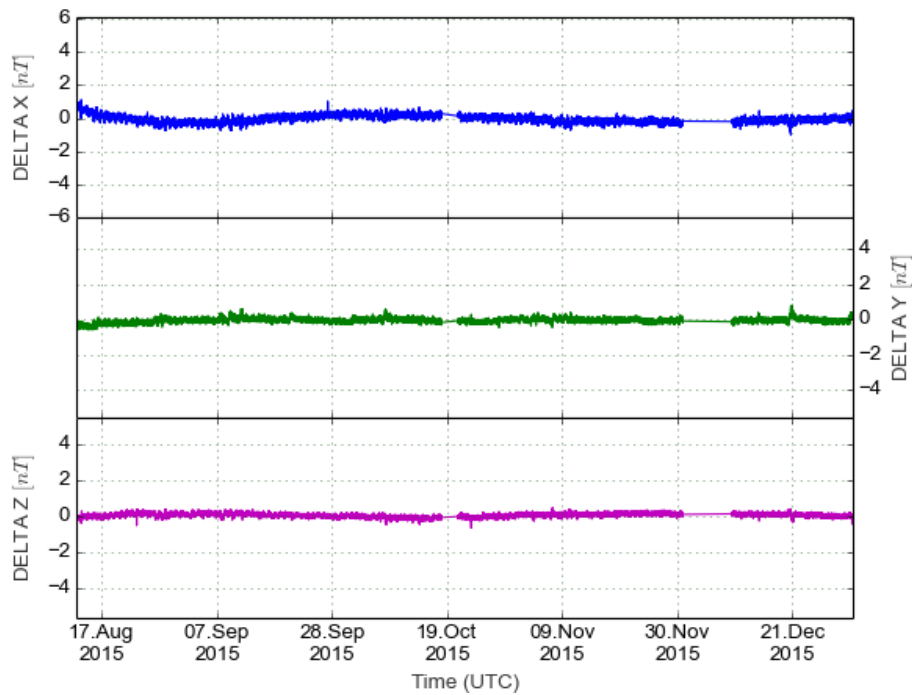
Figure 4.5 Delta values of vectorial components of baseline corrected variometer data.

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 for 2015. Minor gaps are mainly related to disturbances due to the fire protection radio communication system, and some construction work in summer 2015 in the forest above the sensor. Scalar data was recorded with two instruments in 2015. Due to the averaging procedure any individual gaps could be filled. The differences of both scalar instruments are very small, supporting the validity of the averaging process. Larger data gaps of the individual instruments are related to a magnetic cover stored near POS1 and a data logger upgrade of GSM90. Minor gaps have the same reasons as listed for the variometer.
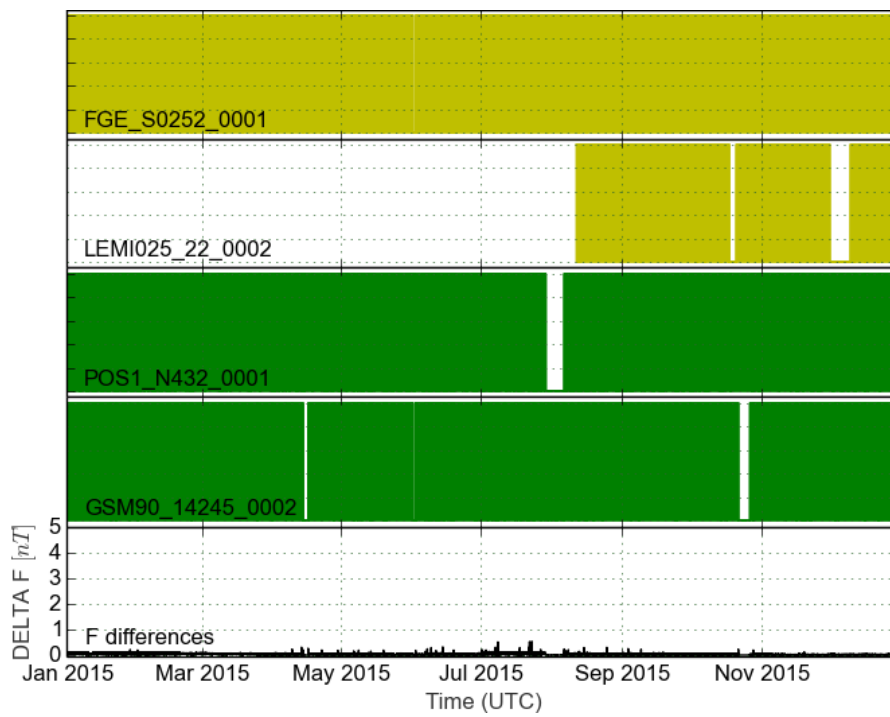
Figure 4.6 Contributions of each sensor for the analysis of 2015. Yellow shaded regions indicate time ranges of respective variometer data, green shaded regions mark scalar data which has been averaged for the composite one minute record. The lowermost plot depicts the average difference between all scalar data.

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 $5.91 \pm 0.09 \, ^\circ C$. 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 show very similar characteristics. For definitive data preparation, variation data is analysed slightly differently in comparison to quasi-definitive values. 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 growing deviations from a perfect HEZ orientation for all variometers, however the baseline correction technique of *Lauridson* [1985] 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 FGE variometer was set up in September 2012. Since then, the east component has moved by an angle of -0.38 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. This transformation is not used for quasi-definitive data (see section 5.2 for differences). Three major magnetic events are clearly visible in 2015 (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 a west-ward trend in 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

Preliminary and quasi-definitive data is available from December 2015 onwards. These data sets will, as well as future definitive data, be primarily based on LEMI025 (and LEMI036) data as these instruments are characterized by a smaller noise level. A first quantitative difference analysis will be added to GMO Bulletin 3.
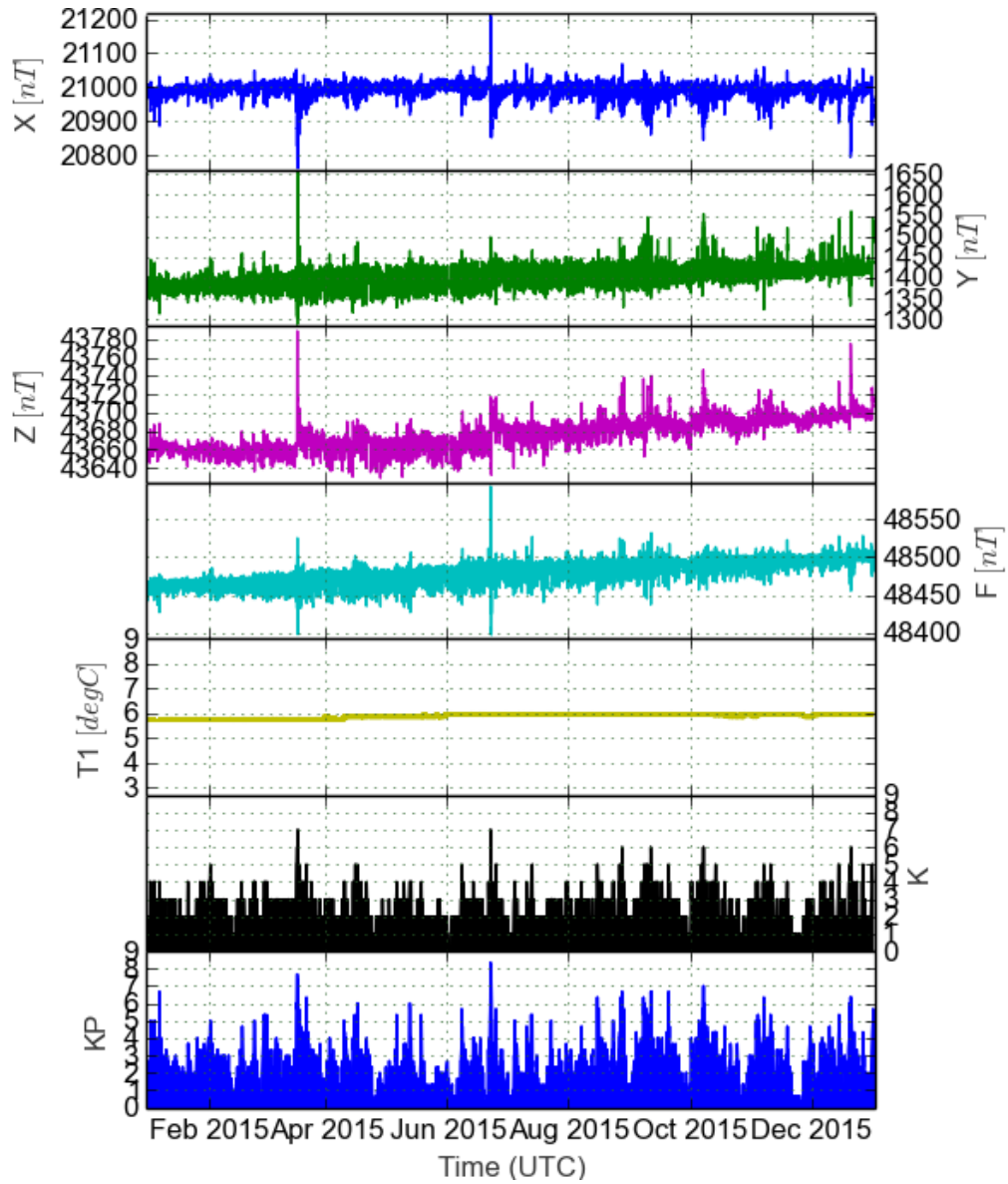
Figure 5.1 Definitive 1 minute data of WIC. Shown are the three baseline corrected vectorial components, the independently determined F value and the temperature variation at the sensor position, as well as local K and global K_p indices.

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. Declination has been monotonously moving westwards and the magnetic meridian (Declination = 0 deg) 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 = -7.0 nT/year, dY = 47.0 nT/year and dZ = 46.0 nT/year is obtained. Fitting and extrapolating an average annual derivative curve using cubic splines results in the following predicted average field values for 2016: H = 21023 nT, D = 3.95 deg, Z = 43732 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]	F [nT]
2015-01	20987.652	1379.500	43660.962	48463.059
2015-02	20994.548	1382.944	43658.746	48464.101
2015-03	20987.035	1389.338	43665.788	48467.461
2015-04	20996.124	1390.712	43665.898	48471.292
2015-05	21000.431	1394.083	43666.576	48474.105
2015-06	20995.392	1399.577	43674.052	48478.624
2015-07	20995.161	1403.881	43678.745	48482.891
2015-08	20989.378	1407.387	43684.290	48485.506
2015-09	20989.328	1412.103	43687.672	48488.573
2015-10	20985.760	1417.152	43692.334	48491.535
2015-11	20988.867	1420.167	43695.022	48495.391
2015-12	20986.032	1425.873	43699.917	48498.782

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

Date	x [nT]	y [nT]	z [nT]	f [nT]
2014	20995.000	1353.000	43633.000	48440.000
2015	20991.000	1402.000	43678.000	48480.000
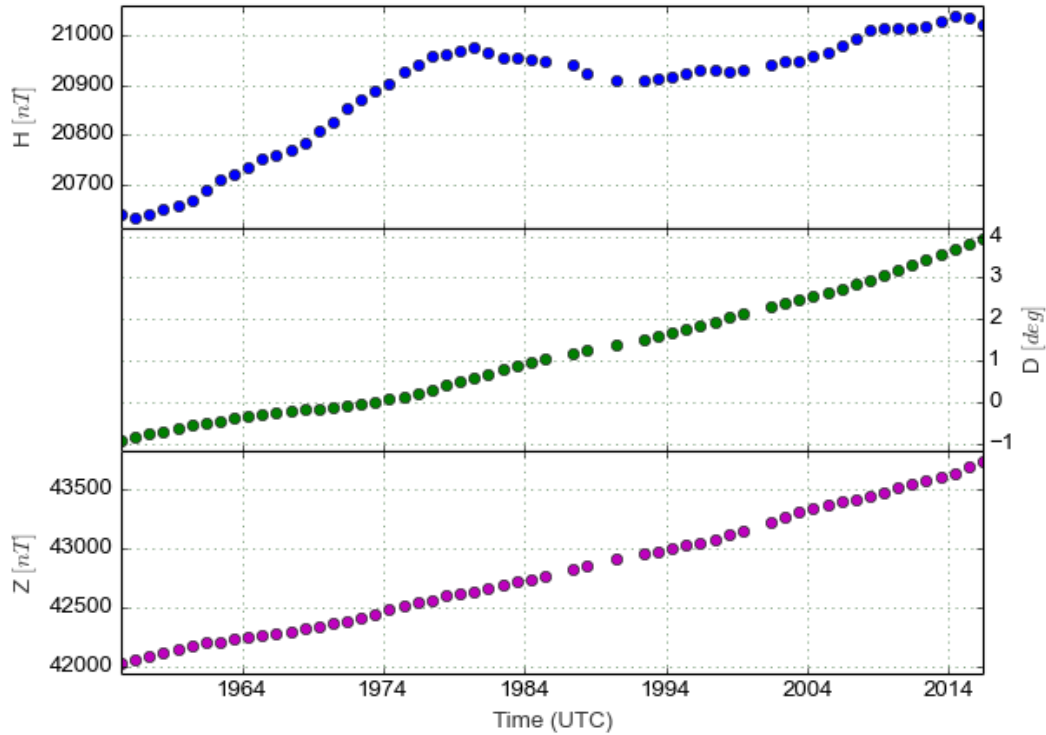
Figure 6.1 Yearly means since 1955. Data from 1955 until 2015 was obtained at the Cobenzl Observatory and corrected for the average offset of years 2014 and 2015 to the Conrad Observatory. Shown is also a predicted value for 2016.

ionospheric radio signal disturbances, and visible aurorae. The average local K for 2015 at Conrad Observatory corresponds to 1.9, which is in perfect agreement with the yearly average K_p of 2.0 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. A table with all K values can be found in the electronic appendix (file: /IAF/WIC15K.DKA).

6.2.2 Quiet and disturbed days

Quiet and disturbed days can be identified throughout the year using the average daily K indices. 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 39 days: 2015-02-02, 2015-03-02, 2015-03-17, 2015-03-18, 2015-03-19, 2015-03-20, 2015-04-10, 2015-04-15, 2015-04-16, 2015-04-17, 2015-05-13, 2015-06-08, 2015-06-22, 2015-06-23, 2015-06-25, 2015-07-13, 2015-08-15, 2015-08-16, 2015-08-23, 2015-08-26, 2015-08-27, 2015-08-28, 2015-09-07, 2015-09-08, 2015-09-09, 2015-09-11, 2015-09-20, 2015-10-07, 2015-10-08, 2015-10-09, 2015-10-13, 2015-11-03, 2015-11-07, 2015-11-10, 2015-12-10, 2015-12-11, 2015-12-20, 2015-12-21, 2015-12-31.
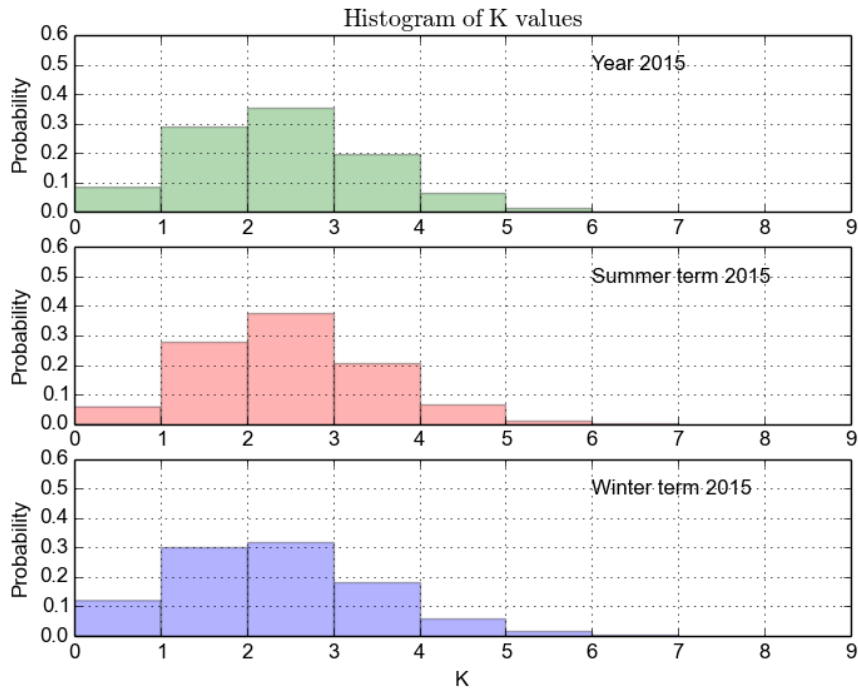
Figure 6.2 Distribution of K values.

For quiet days the average daily K index needs to be below 0.5, and this was found for 9 days: 2015-02-13, 2015-09-30, 2015-10-26, 2015-10-28, 2015-10-29, 2015-11-23, 2015-11-24, 2015-11-25, 2015-11-26.

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, 15 storm alerts were issued in the year 2015. All detections have been published on the Conrad Observatory website (). The technique makes use of ACE satellite data [*Stone et al.*, 1990] and geomagnetic recordings from the Observatory. An example of an automated storm detection using both sets of data is shown in Figure 6.3.
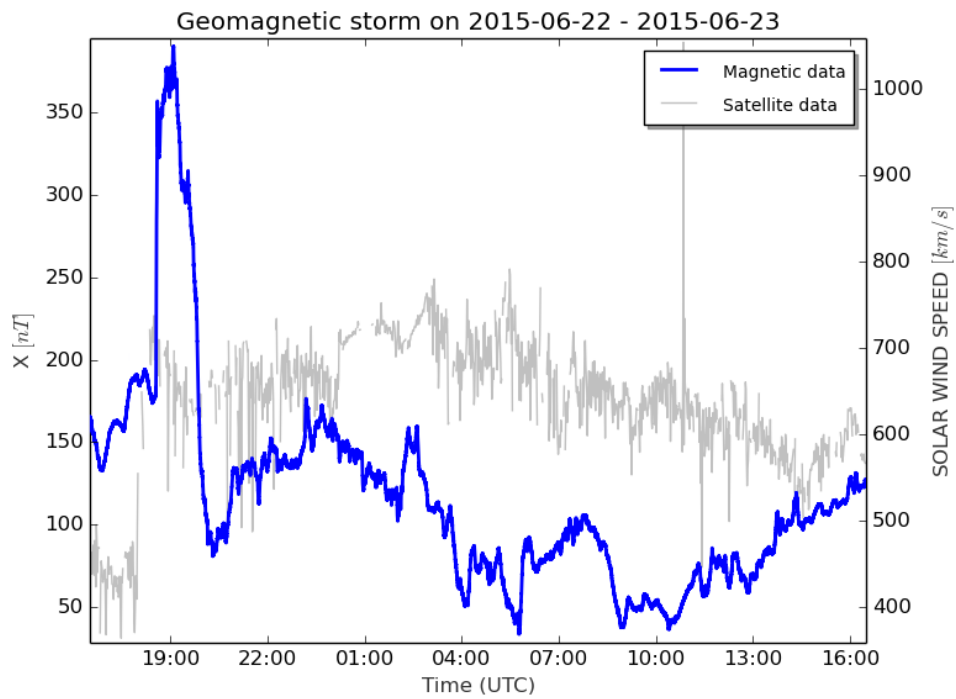
Figure 6.3 Most prominent geomagnetic storm in 2015. Shown are solar wind speed as determined by the ACE satellite and the horizontal component (H) of the geomagnetic field. Denoted are the times when shock front of the coronal mass ejection (CME) passed the satellite and initiated the sudden storm commencement (SSC) on earth.

Chapter 7

Publications and Presentations

In 2015 the geomagnetism group contributed to the following presentations and publications:

- Arneitz, P. and Leonhardt, R. and Fabian, K., *A global geomagnetic model based on historical and paleomagnetic data*, AGU Fall Meeting, *2015*

- Arneitz, P. and Mayrhofer, F. and Leonhardt, R. and Schnepp, E. and Fleps, G., *Archaeomagnetic study of different materials at an excavation in Augsburg, Germany*, 26th General Assembly of the International Union of Geodesy and Geophysics, *2015*

- Bailey, R. and Leonhardt, R., *Automated geomagnetic storm detection: a comparison of methods at the Conrad Observatory*, 26th General Assembly of the International Union of Geodesy and Geophysics, *2015*

- Nurcan Kaya and Niyazi Baydemir and Mualla Cengiz Cinku and Z.Mümtaz Hisarli and Mehmet Keskin and Roman Leonhardt, *Intensity of the Earth's Magnetic Field over the past 6 million years; A case study from Basaltic Rocks in East Anatolian*, EGU General Assembly, *2015*

- Kompein, N. and Egli, R. and Leichter, B. and Leonhardt, R., *Anthropogenic disturbances on geomagnetic observatories: A comparison between Vienna Cobenzl and the new Conrad Observatory*, 26th General Assembly of the International Union of Geodesy and Geophysics, *2015*

- Leonhardt R., and Arneitz, P., *Historical magnetic records and the past geomagnetic field evolution*, Magnete, *2015*

- Leonhardt, R. and Bailey, R., *Geomagnetic Data at the Conrad Observatory in Austria: Applying the MagPy Package For RealTime Acquisition, Database Organization and Analysis*, 26th General Assembly of the International Union of Geodesy and Geophysics, *2015*

- Schnepp, E. and Arneitz, P. and Leonhardt, R. and Lanos, P., *Paleointensity variation in Central Europe during the past 3400 years*, 26 th General Assembly of the International Union of Geodesy and Geophysics, *2015*

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Chapter 8

Appendix

Table 8.1. 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.

2015, 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
Jan01	91	92	93	95	95	97	95	92	83	75	70	73	78	85	91	92	95	96	98	97	91	93	102	98	90
Jan02	84	85	89	96	97	99	100	102	102	104	101	98	90	77	77	89	94	89	64	49	33	49	63	68	83
Jan03	62	82	94	83	88	97	93	87	89	86	84	75	80	82	83	82	83	87	89	92	93	92	90	89	86
Jan04	88	88	91	92	92	94	96	91	85	83	81	69	60	49	42	42	8	32	19	28	21	29	55	73	63
Jan05	59	64	85	77	75	77	76	77	73	75	72	74	75	79	75	83	82	80	74	72	62	68	79	75	74
Jan06	73	72	74	77	83	81	92	84	74	56	72	80	84	85	88	85	79	77	84	91	91	88	88	90	81
Jan07	92	95	90	89	93	97	110	122	85	13	2	9	11	6	11	27	46	58	64	70	72	59	59	57	60
Jan08	66	57	61	62	63	84	96	100	88	81	82	83	74	79	74	59	68	74	78	79	76	75	85	80	76
Jan09	73	75	78	82	82	86	92	91	83	77	77	80	85	75	78	77	73	75	78	88	88	88	87	90	82
Jan10	88	80	82	86	93	97	99	93	87	79	85	81	82	84	83	81	63	82	80	88	89	90	90	89	86
Jan11	91	89	94	90	90	94	92	86	72	71	65	66	77	79	80	79	79	81	83	83	85	89	90	90	83
Jan12	91	93	93	93	95	100	97	96	88	85	91	93	77	75	81	80	77	82	84	85	79	85	86	90	87
Jan13	92	92	94	98	96	95	97	94	90	88	92	94	89	84	83	93	87	76	82	80	78	78	85	89	88
Jan14	89	90	90	94	95	94	93	88	75	70	69	75	79	75	82	96	96	94	93	91	87	92	96	97	87
Jan15	98	98	98	100	102	103	102	90	73	63	63	68	75	79	71	89	93	94	94	96	97	98	98	101	89
Jan16	101	103	104	101	98	106	105	95	92	84	80	71	72	74	85	88	93	90	89	82	87	93	96	94	91
Jan17	94	94	93	103	107	105	103	104	96	91	84	88	92	96	96	97	89	98	98	96	96	97	98	100	97
Jan18	97	96	96	97	98	104	108	105	98	92	87	92	94	93	92	89	89	94	95	93	86	79	84	88	94
Jan19	92	95	106	102	103	107	110	108	98	93	88	86	87	88	92	96	101	101	95	92	89	89	87	83	95
Jan20	87	93	96	98	101	103	105	107	101	97	90	96	98	96	96	98	103	106	107	108	107	108	111	116	101
Jan21	117	114	119	122	122	127	125	124	105	98	97	106	113	114	108	95	85	70	65	80	90	89	89	94	103
Jan22	95	90	90	90	93	103	100	102	101	98	94	:	:	:	:	:	92	93	91	83	89	88	88	88	:
Jan23	89	95	95	91	90	92	100	98	92	92	92	92	95	90	105	101	92	90	88	96	96	95	95	95	95
Jan24	95	95	96	95	94	96	99	92	86	86	78	79	87	90	93	91	86	90	93	97	95	99	97	92	92
Jan25	94	96	96	94	101	101	99	94	93	93	94	100	104	105	105	100	93	87	95	101	101	99	98	110	98
Jan26	103	89	89	87	94	101	99	92	92	67	67	81	91	82	74	77	79	76	71	73	83	84	75	85	84
Jan27	79	83	91	98	87	88	105	107	95	89	85	82	85	92	100	99	93	95	98	102	95	75	101	103	90
Jan28	102	86	87	94	96	98	105	107	:	96	93	100	100	101	97	94	93	101	99	100	96	99	101	103	:
Jan29	100	94	94	94	99	102	102	107	103	83	82	87	93	97	97	94	95	101	82	97	69	86	90	89	95
Jan30	90	87	88	89	92	98	98	100	89	82	74	61	56	52	56	64	94	81	71	66	89	62	81	86	87
Jan31	86	87	89	93	98	102	106	107	107	92	92	95	97	91	90	87	85	80	78	88	98	101	84	95	92

2015, Field component: Y, Base: 1300.0, 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	75	76	72	74	74	78	83	89	93	88	81	68	64	63	64	67	70	77	75	74	78	80	89	96	77
Jan02	92	79	77	75	75	75	80	81	82	83	74	61	56	52	56	64	65	60	73	82	94	99	105	114	77
Jan03	101	81	92	82	78	75	77	82	82	82	72	69	64	70	72	73	74	76	76	79	79	80	81	81	78

Table 8.1 (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	81	81	80	81	82	84	86	87	80	76	66	56	58	60	52	79	67	105	81	103	117	113	111	113	83
Jan05	121	73	80	85	93	88	83	79	82	80	73	68	69	76	75	75	76	75	76	91	92	91	92	97	83
Jan06	87	84	85	85	91	88	84	86	82	72	61	57	65	68	74	65	65	71	78	78	80	81	83	83	77
Jan07	82	84	81	81	82	82	84	84	91	89	76	50	69	83	96	101	96	91	86	83	84	86	92	101	85
Jan08	92	91	84	82	82	80	81	81	88	88	78	75	83	82	79	75	79	82	81	80	84	85	85	95	83
Jan09	87	89	87	85	83	84	85	88	89	89	77	65	63	73	80	77	80	84	84	85	79	80	85	91	82
Jan10	91	85	79	80	79	84	83	83	81	79	67	66	70	69	76	75	98	78	78	80	80	80	80	79	79
Jan11	83	80	79	84	83	84	85	82	84	80	71	65	59	68	81	83	82	79	79	81	86	93	83	81	80
Jan12	80	79	78	76	78	79	83	86	77	77	66	62	65	70	78	78	89	86	82	85	86	87	86	79	79
Jan13	78	79	76	77	80	82	83	82	94	75	69	63	60	68	80	77	72	80	84	83	91	80	83	85	78
Jan14	86	80	80	80	80	82	88	95	94	83	74	61	55	60	65	72	74	75	78	81	92	79	79	77	78
Jan15	76	75	74	74	75	77	84	93	94	88	74	66	60	59	74	70	72	74	77	78	79	80	78	76	76
Jan16	74	71	73	73	71	80	87	96	95	93	85	73	66	61	68	72	70	77	81	87	85	81	80	77	78
Jan17	77	79	70	74	82	82	83	88	89	85	83	73	67	70	74	72	69	73	75	77	79	81	83	79	77
Jan18	79	77	76	75	76	79	84	90	88	86	81	73	67	68	71	70	69	73	76	79	87	97	89	83	79
Jan19	78	72	74	76	76	77	82	90	91	88	85	73	62	66	73	69	71	72	75	79	78	84	100	92	78
Jan20	86	80	76	74	75	77	82	89	92	89	86	77	73	74	73	70	71	72	73	76	86	86	76	74	78
Jan21	72	73	71	69	75	69	72	81	84	81	78	62	73	57	59	52	49	62	73	76	80	91	88	92	72
Jan22	99	98	79	89	84	82	85	86	84	79	74	⋮	⋮	⋮	⋮	⋮	⋮	74	77	93	86	91	91	85	⋮
Jan23	86	92	78	88	87	83	86	89	81	75	72	66	68	67	73	73	76	74	76	80	83	85	84	83	80
Jan24	81	79	78	81	80	81	86	91	86	77	69	63	62	63	69	74	68	75	81	82	91	92	87	87	78
Jan25	82	79	83	83	88	85	84	86	81	72	72	67	64	64	66	68	69	72	78	80	81	82	83	86	77
Jan26	103	92	90	88	94	83	86	88	84	78	71	60	63	60	68	65	67	85	95	96	88	109	94	97	83
Jan27	93	93	85	94	93	94	91	90	85	76	67	64	64	68	74	69	74	73	73	76	79	86	112	94	83
Jan28	91	87	80	84	82	87	87	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	77	77	79	85	88	85	87	⋮
Jan29	92	91	86	83	81	79	81	85	85	80	76	61	58	61	61	61	63	65	65	85	97	88	88	97	78
Jan30	95	83	86	82	79	86	85	93	94	88	77	72	66	65	69	70	69	69	71	78	112	96	89	84	82
Jan31	83	84	87	82	85	83	84	89	89	80	74	71	72	66	69	69	71	73	74	78	83	87	105	120	81

2015, Field component: Z, Base: 43600.0, 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	59	58	58	57	57	58	59	60	56	51	48	51	57	58	58	59	59	59	59	59	60	60	58	56	57
Jan02	58	59	59	57	57	58	57	55	55	54	50	46	50	54	56	57	59	61	65	72	79	78	73	69	60
Jan03	69	64	56	59	60	58	61	60	60	59	56	55	59	60	61	62	63	63	63	62	61	61	60	60	61
Jan04	60	60	59	59	59	59	58	56	53	54	55	59	64	67	71	76	81	84	83	82	81	81	78	70	67
Jan05	64	65	60	63	63	64	66	65	65	63	61	61	63	64	64	65	65	66	67	68	70	71	67	67	65
Jan06	67	67	67	66	64	63	60	56	53	53	49	52	55	57	59	61	65	68	67	64	63	63	67	62	61
Jan07	62	61	60	60	60	60	57	55	56	64	68	81	85	85	83	83	80	76	74	72	71	70	71	70	69

Table 8.1 (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	69	68	68	67	68	67	65	65	68	67	57	57	60	66	66	68	69	70	69	68	68	68	65	64	66
Jan09	66	66	66	66	66	65	64	64	65	63	58	58	63	64	62	64	66	68	68	66	65	65	64	63	64
Jan10	62	64	64	63	62	62	62	63	63	63	61	60	62	65	65	64	66	68	66	65	64	63	63	63	64
Jan11	62	62	61	61	62	62	62	60	63	66	63	56	56	57	58	60	63	65	65	64	64	62	63	62	62
Jan12	62	62	62	61	61	62	62	58	56	54	52	53	59	64	63	63	65	66	66	65	65	64	64	62	61
Jan13	62	61	61	60	60	60	61	61	64	65	65	65	66	67	65	63	63	65	66	66	66	67	65	63	64
Jan14	62	62	62	62	62	63	65	64	60	56	53	55	58	62	65	63	61	62	62	62	63	63	61	61	61
Jan15	60	60	60	59	59	60	63	64	62	64	63	64	66	68	68	65	62	63	63	62	62	61	60	59	62
Jan16	59	59	58	58	60	58	58	61	59	63	60	57	60	63	62	62	62	62	63	63	64	59	59	58	61
Jan17	60	60	61	58	57	58	58	60	59	59	56	55	58	60	58	57	58	58	59	59	60	59	62	61	59
Jan18	58	58	59	59	59	59	59	59	60	63	61	57	58	61	59	60	61	60	61	61	61	63	60	61	60
Jan19	60	61	57	58	58	58	59	60	61	60	55	50	52	57	56	58	58	57	59	59	59	60	56	61	58
Jan20	61	61	60	59	59	59	58	58	58	56	55	53	55	55	57	57	58	58	57	57	56	56	56	55	57
Jan21	53	53	53	52	51	51	51	53	56	57	51	44	45	52	54	54	59	66	68	67	65	63	63	62	56
Jan22	60	60	61	59	59	57	58	58	57	57	55	57	57	58	⋮	⋮	59	60	61	63	63	63	63	62	⋮
Jan23	61	61	59	59	59	59	59	57	58	54	56	57	57	58	58	59	59	61	62	62	61	60	60	60	59
Jan24	59	59	59	59	59	59	60	61	58	57	59	57	56	58	59	59	60	61	61	62	62	61	60	59	59
Jan25	59	59	59	59	60	58	59	57	52	50	52	53	55	56	57	58	60	62	61	61	60	60	59	57	57
Jan26	57	57	58	59	60	60	60	58	60	60	61	62	59	58	61	66	66	67	70	70	68	66	65	66	62
Jan27	65	64	63	59	60	60	60	55	51	49	48	49	53	56	57	57	60	62	61	61	63	63	65	65	59
Jan28	59	60	61	60	59	58	58	60	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	60	60	61	61	61	60	59	59	⋮
Jan29	58	58	58	58	59	58	57	55	51	48	48	48	49	54	55	57	58	58	60	63	66	67	64	63	57
Jan30	62	61	60	60	60	58	58	58	53	55	56	56	56	59	59	59	59	62	65	68	66	68	67	65	60
Jan31	64	63	62	61	59	58	58	60	57	55	57	58	57	59	61	63	63	65	66	66	66	64	66	63	61

2015, Field component: F, Base: 48400.0, 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	63	62	63	62	62	64	65	64	57	49	44	47	55	59	62	62	64	65	66	65	63	65	67	64	61
Jan02	59	60	62	63	63	65	65	64	64	64	58	54	53	52	54	60	63	63	56	56	56	62	64	63	60
Jan03	60	63	61	59	63	66	65	62	62	60	57	52	57	59	61	62	63	65	66	66	66	65	64	63	62
Jan04	62	62	63	63	62	64	64	61	55	55	55	53	54	51	52	57	47	61	53	57	54	57	65	66	58
Jan05	55	56	61	60	63	62	62	62	60	59	56	57	59	62	60	64	64	64	63	63	61	64	66	63	61
Jan06	63	62	62	63	64	62	64	58	50	42	46	51	56	58	62	62	62	65	66	68	67	65	65	66	60
Jan07	66	66	64	63	65	66	70	73	57	34	32	47	52	47	50	57	63	64	65	66	64	64	60	59	59
Jan08	62	57	58	58	59	67	70	73	70	66	57	57	57	64	62	57	62	64	65	68	64	64	66	63	63
Jan09	61	63	64	66	65	66	69	67	65	61	56	57	63	61	60	62	61	67	65	68	67	66	66	66	64
Jan10	65	63	63	64	66	69	68	68	65	61	61	59	61	65	64	63	58	67	65	67	67	66	66	66	65
Jan11	66	65	66	65	65	67	66	61	58	61	55	49	53	55	57	60	62	64	64	64	64	65	66	65	62

Table 8.1 (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	65	66	66	66	66	69	68	64	59	56	56	58	57	60	62	62	62	65	66	66	63	65	65	65	63
Jan13	64	65	66	67	66	66	67	66	66	67	69	69	67	66	65	67	65	62	65	64	63	65	66	66	66
Jan14	65	66	65	67	67	68	69	67	57	51	47	52	56	58	63	68	67	66	66	65	65	67	67	67	63
Jan15	67	67	66	67	68	69	71	68	61	55	54	57	62	65	62	67	66	67	67	67	67	67	67	67	65
Jan16	67	68	67	66	65	68	70	67	66	64	59	52	55	58	63	64	64	65	66	63	66	67	67	66	64
Jan17	65	65	67	67	68	68	68	68	66	63	57	58	62	66	64	63	64	65	66	66	65	66	66	66	65
Jan18	65	65	65	65	65	68	71	70	67	67	63	58	63	65	63	63	63	65	66	65	63	61	63	63	64
Jan19	64	65	65	67	67	69	71	71	68	65	58	52	55	59	60	63	66	65	64	64	63	62	62	61	65
Jan20	63	65	66	66	67	68	69	70	66	62	58	60	62	61	61	60	67	67	68	68	67	63	68	69	65
Jan21	69	67	69	69	69	70	70	72	66	63	58	55	59	66	65	61	59	59	60	66	67	66	66	67	65
Jan22	66	64	64	63	64	66	66	67	65	64	60	60	58	57	59	66	63	64	65	63	66	65	65	65	63
Jan23	64	66	65	63	63	64	67	64	58	58	60	61	63	67	68	63	64	64	64	67	67	66	66	65	64
Jan24	65	64	64	64	64	65	67	67	63	59	57	56	58	61	63	66	63	65	66	68	67	69	67	65	64
Jan25	64	65	65	64	66	66	66	63	58	55	57	61	64	66	67	66	64	63	66	65	68	67	66	70	64
Jan26	63	61	61	61	65	65	67	67	61	53	54	61	62	58	57	62	63	64	64	64	68	67	66	63	62
Jan27	64	64	67	67	63	62	62	63	58	53	50	50	54	61	65	65	63	66	68	65	68	67	62	61	62
Jan28	68	62	63	65	65	65	66	69	65	61	56	52	53	57	61	66	65	66	66	69	66	67	68	69	64
Jan29	66	64	64	64	66	67	67	67	61	55	54	57	57	62	62	62	63	66	67	68	60	68	68	66	63
Jan30	66	64	63	63	64	65	66	66	57	56	56	58	61	65	65	65	64	61	59	60	59	59	66	66	63
Jan31	65	65	64	65	65	67	68	70	65	59	61	64	63	63	64	65	64	63	63	68	72	72	67	69	65

Table 8.2. 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.

2015, 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	109	93	102	98	94	95	112	113	113	108	105	104	99	96	92	94	94	90	86	94	102	103	68	70	97
Feb02	85	87	99	89	101	98	90	85	88	89	84	78	80	76	73	54	45	67	92	100	82	80	89	96	83
Feb03	104	97	96	93	89	94	97	100	96	89	84	89	94	88	77	77	88	93	92	95	108	100	100	97	93
Feb04	94	99	98	94	92	95	101	101	⋮	89	77	84	83	90	73	67	70	79	87	92	85	86	94	98	⋮
Feb05	97	97	93	100	107	109	109	104	99	89	77	84	86	90	87	67	70	79	87	85	85	86	94	96	91
Feb06	97	97	97	98	100	100	107	109	99	90	86	83	86	87	93	92	95	97	97	99	100	102	94	101	96
Feb07	101	104	105	106	108	111	118	115	107	94	82	89	96	90	75	67	71	65	80	85	93	95	94	93	93
Feb08	99	97	95	97	99	100	109	101	91	87	85	82	85	87	86	87	80	72	73	85	97	99	92	93	91
Feb09	98	100	97	94	97	101	106	110	107	102	93	89	90	88	78	86	95	96	95	91	96	85	81	95	94
Feb10	97	97	97	97	103	103	106	111	109	104	98	95	97	95	91	90	90	95	95	91	92	102	102	96	98
Feb11	99	100	100	103	104	106	114	116	110	107	102	102	95	89	88	95	96	95	96	98	100	101	102	96	101
Feb12	100	99	100	101	102	108	115	110	107	⋮	107	103	102	97	89	80	79	80	84	89	90	90	95	100	⋮
Feb13	100	100	100	101	104	107	112	110	⋮	107	⋮	⋮	⋮	101	101	103	102	100	99	89	91	101	101	102	⋮
Feb14	107	107	107	103	109	114	116	113	106	106	99	98	99	104	109	108	106	106	106	109	109	111	111	114	108
Feb15	114	113	112	108	114	115	118	109	104	96	90	94	97	95	81	85	93	98	95	91	97	102	107	107	101
Feb16	108	109	107	108	111	110	111	116	118	110	102	102	109	110	106	105	105	106	108	114	111	98	88	91	107
Feb17	85	95	95	88	92	97	100	88	102	88	81	77	80	83	86	87	84	73	50	52	84	58	49	55	81
Feb18	56	49	62	85	71	76	82	92	93	80	73	71	72	73	76	78	69	67	69	80	94	94	93	88	77
Feb19	87	95	99	92	91	90	97	92	⋮	⋮	⋮	78	78	81	82	80	86	91	94	94	84	81	87	92	⋮
Feb20	93	92	93	92	96	104	108	105	100	92	84	87	90	89	93	92	92	96	99	99	94	84	82	77	93
Feb21	81	82	82	87	93	99	104	109	104	97	93	93	96	99	100	103	100	100	100	96	94	96	101	108	97
Feb22	102	93	90	93	95	97	102	102	102	104	96	97	98	94	96	99	97	99	99	102	102	103	102	97	98
Feb23	88	105	103	104	106	103	105	100	106	101	94	96	84	71	80	80	60	50	80	96	85	84	81	102	90
Feb24	94	91	114	142	119	101	95	88	88	87	65	60	⋮	71	82	84	84	86	88	88	85	88	98	86	⋮
Feb25	89	90	92	94	97	102	109	108	95	95	89	81	87	95	85	90	87	79	82	94	95	98	97	98	93
Feb26	95	97	97	96	97	99	100	⋮	⋮	⋮	84	83	83	88	94	94	95	95	98	98	99	102	101	101	⋮
Feb27	101	104	105	106	109	113	115	115	112	108	102	100	104	108	107	106	107	108	107	107	103	108	104	102	107
Feb28	103	104	104	110	111	111	115	120	114	103	97	93	91	91	91	99	75	75	69	84	65	71	87	83	94

2015, Field component: Y, Base: 1300.0, 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	94	100	90	97	82	82	82	86	89	83	78	74	71	64	62	62	66	80	92	77	94	120	111	99	85
Feb02	89	88	96	112	90	86	83	88	91	87	83	78	75	72	71	85	100	75	97	114	85	88	90	88	88
Feb03	75	94	100	88	90	83	83	88	93	86	82	76	68	64	64	75	72	84	83	87	87	95	90	88	83
Feb04	91	89	88	91	86	84	85	94	⋮	⋮	⋮	⋮	61	65	66	64	79	79	75	80	84	85	86	86	⋮
Feb05	87	92	91	89	80	83	85	92	92	83	76	59	53	60	53	78	73	72	77	81	86	94	95	86	80
Feb06	84	82	81	81	82	82	87	98	103	100	83	72	61	60	63	69	72	74	78	81	80	82	82	82	80

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Table 8.2 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Feb07	81	79	79	79	80	80	81	86	84	82	81	79	68	64	64	72	71	69	80	80	93	87	85	86	79
Feb08	90	83	81	81	79	75	84	97	102	95	82	71	64	66	69	73	78	88	87	85	99	92	89	90	83
Feb09	83	79	83	83	84	86	88	95	97	91	83	73	65	59	64	71	71	75	77	84	87	103	96	88	82
Feb10	83	81	81	80	74	82	89	93	95	93	85	74	68	65	66	72	75	75	76	83	86	106	98	90	82
Feb11	83	82	81	75	83	82	84	93	103	97	85	70	64	69	69	74	75	78	78	79	81	82	83	84	81
Feb12	87	86	83	84	82	82	79	93	...	...	87	74	61	60	62	69	70	75	77	86	87	89	85	83	...
Feb13	82	81	82	83	83	84	85	92	96	93	82	70	64	67	69	72	73	77	74	79	82	84	83	83	...
Feb14	81	78	79	79	78	84	84	93	97	93	79	62	57	53	62	67	71	73	74	75	77	79	80	79	78
Feb15	78	78	79	78	80	84	86	95	92	90	81	66	59	62	58	60	71	72	73	74	75	82	85	82	77
Feb16	82	81	83	82	82	84	83	87	92	90	81	73	68	64	68	73	75	69	75	77	82	110	103	97	81
Feb17	106	107	112	113	102	95	89	99	100	101	87	73	68	64	69	70	68	69	63	93	92	100	139	125	92
Feb18	139	113	101	111	102	100	84	91	109	99	81	73	66	64	67	70	80	87	91	87	106	99	110	94	92
Feb19	95	82	93	95	94	90	91	102	...	...	...	72	62	64	67	75	82	81	82	82	95	92	90	86	...
Feb20	86	86	85	88	84	84	88	99	102	94	77	64	58	60	72	76	77	80	82	82	84	93	106	109	84
Feb21	108	107	99	91	86	85	88	98	101	99	95	81	71	65	67	71	72	76	75	78	83	88	89	104	86
Feb22	110	106	101	93	91	89	87	94	98	91	85	70	57	54	58	67	70	76	77	78	81	83	89	98	84
Feb23	104	99	96	89	91	85	88	96	97	94	73	63	54	49	58	63	63	77	92	97	89	106	116	127	86
Feb24	98	97	79	83	112	90	87	91	104	96	90	77	75	67	69	77	78	99	79	81	87	88	106	90	...
Feb25	86	87	86	85	86	86	86	88	98	94	83	77	75	70	80	82	80	79	90	83	86	90	84	84	85
Feb26	87	84	85	86	88	88	94	...	...	...	82	67	64	65	65	72	75	79	81	83	86	90	85	83	...
Feb27	83	83	83	84	83	84	89	100	109	105	86	69	60	59	65	73	75	76	78	80	82	92	90	87	82
Feb28	85	85	84	80	86	89	91	99	109	106	82	60	49	45	50	57	71	75	71	86	101	98	103	101	82

2015, Field component: Z, Base: 43600.0, 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	59	58	56	56	58	58	57	55	51	48	48	47	47	51	56	59	60	61	63	63	61	57	62	63	56
Feb02	60	60	52	52	54	58	54	57	53	52	50	52	53	57	64	67	71	71	68	66	65	64	63	62	59
Feb03	58	54	56	58	58	59	59	60	59	56	53	54	54	58	63	64	63	62	63	62	63	60	58	58	59
Feb04	60	58	58	59	60	60	60	62	...	...	...	...	50	56	66	64	64	64	63	62	62	61	60	60	...
Feb05	60	59	60	59	58	57	57	58	56	51	47	45	49	56	60	64	59	66	65	65	60	64	63	62	59
Feb06	61	61	61	61	61	60	59	61	58	52	46	46	48	53	61	58	59	59	60	60	64	59	59	58	57
Feb07	58	58	58	58	58	57	57	60	55	53	54	51	50	54	61	63	65	68	67	67	64	64	59	61	59
Feb08	60	59	60	60	61	60	59	60	55	52	50	48	51	57	61	61	62	64	66	65	62	61	62	60	59
Feb09	60	58	58	59	60	59	59	61	56	53	52	51	52	56	59	62	61	60	60	62	62	62	59	62	59
Feb10	61	60	60	61	60	58	56	55	51	49	47	47	45	48	54	58	60	60	59	61	62	60	64	59	56
Feb11	59	59	59	58	57	57	56	58	54	45	43	46	50	55	58	61	58	59	59	60	60	59	59	59	56
Feb12	59	59	59	58	58	57	55	...	...	...	...	49	50	53	57	61	63	64	59	64	59	63	62	61	...
Feb13	60	60	59	59	59	58	59	60	55	...	...	...	...	54	56	55	57	58	59	59	59	59	59	59	...

Table 8.2 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Feb14	58	58	57	57	58	56	56	57	55	50	47	46	49	52	55	55	55	56	56	57	57	57	57	56	55
Feb15	55	55	55	55	55	54	54	58	57	47	44	48	53	58	59	61	60	61	61	62	62	61	60	59	56
Feb16	58	57	57	56	56	55	54	56	54	52	46	42	45	50	53	55	56	57	56	56	57	57	60	59	54
Feb17	59	59	58	57	58	56	56	55	57	53	50	51	52	56	61	62	63	68	75	78	73	74	73	73	62
Feb18	64	69	68	62	63	64	62	55	53	50	50	50	56	59	63	66	67	69	70	69	66	65	63	64	62
Feb19	64	63	59	60	60	61	63	63	:	:	50	58	57	60	64	67	67	65	64	64	65	66	65	64	:
Feb20	63	63	63	63	62	60	61	62	57	53	50	51	55	59	63	62	63	62	61	62	63	65	62	67	61
Feb21	66	65	65	64	63	60	62	59	54	52	48	46	48	51	54	56	60	60	61	63	63	63	62	60	59
Feb22	60	60	61	61	61	60	61	60	55	51	48	48	48	49	57	57	60	61	62	62	62	61	61	61	58
Feb23	62	59	59	58	57	58	58	59	58	51	49	50	53	54	65	64	71	75	75	69	69	67	67	60	61
Feb24	60	60	58	44	43	50	56	59	62	60	58	59	:	64	62	65	65	65	65	65	65	66	62	64	:
Feb25	63	63	63	63	63	62	63	63	62	60	59	58	59	60	62	62	62	65	67	65	65	64	63	62	62
Feb26	62	61	61	61	61	62	64	:	:	:	47	51	54	56	59	60	58	62	62	62	62	62	61	61	:
Feb27	60	60	60	60	59	59	63	65	60	51	42	43	46	48	55	58	58	58	59	59	61	60	60	60	57
Feb28	59	59	59	58	56	55	57	58	56	47	40	41	43	47	54	60	65	68	72	73	77	78	74	70	59

2015, Field component: F, Base: 48400.0, 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	71	63	65	63	63	64	70	69	65	61	59	58	55	58	60	64	64	64	65	68	70	68	56	58	63
Feb02	62	62	61	57	62	60	58	58	57	56	52	51	52	55	59	54	54	63	67	74	65	63	66	68	60
Feb03	68	61	63	63	61	64	65	68	66	59	55	57	59	60	60	61	65	67	67	68	66	72	66	65	64
Feb04	65	66	65	63	64	65	68	70	64	54	45	47	51	53	61	61	65	69	67	66	67	68	68	67	63
Feb05	67	66	65	64	69	69	68	68	64	55	46	47	51	59	61	57	62	64	67	66	66	65	68	67	63
Feb06	67	67	67	67	67	68	70	72	66	57	49	48	50	55	60	62	64	65	66	67	67	69	67	67	64
Feb07	67	68	68	68	69	70	73	74	64	59	54	55	57	58	57	56	59	59	66	67	69	69	67	66	64
Feb08	67	66	65	66	67	67	71	69	60	55	52	49	52	59	62	62	60	60	62	66	69	68	65	65	63
Feb09	67	66	65	65	67	68	70	73	64	62	58	55	55	58	57	62	66	66	65	65	68	64	63	67	64
Feb10	67	67	67	67	69	67	67	68	64	60	55	53	56	55	58	61	63	65	65	65	66	69	69	66	64
Feb11	66	67	67	67	66	67	70	73	67	57	53	56	59	58	60	63	64	65	65	65	68	68	68	68	64
Feb12	66	66	66	66	67	68	70	75	73	68	63	59	59	60	60	60	61	62	66	66	67	66	68	68	65
Feb13	68	68	67	68	68	69	72	72	66	61	55	53	57	62	64	64	65	66	67	67	67	67	68	67	65
Feb14	69	69	68	68	69	71	71	71	68	61	55	54	56	62	66	66	66	67	68	68	69	69	70	70	66
Feb15	69	69	68	66	69	69	70	69	67	55	49	54	59	62	58	62	65	67	66	67	68	69	71	70	65
Feb16	69	69	68	68	68	63	64	68	66	65	57	52	57	63	63	65	66	63	67	66	69	65	63	63	65
Feb17	61	61	65	61	63	61	62	62	58	57	50	50	51	57	62	63	61	62	59	63	72	63	59	61	61
Feb18	54	55	59	64	58	61	64	62	58	51	47	46	51	55	60	63	68	68	59	67	71	70	68	66	60
Feb19	66	69	66	64	66	69	69	67	64	60	56	56	55	59	63	65	68	68	69	69	68	66	67	68	64
Feb20	68	67	68	67	68	69	72	72	66	58	51	54	58	62	67	66	66	68	69	69	68	66	65	65	65

Table 8.2 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Feb21	66	66	65	66	68	69	71	71	64	60	54	52	55	59	62	65	68	68	69	69	68	69	70	72	65
Feb22	69	65	65	66	67	67	69	69	64	62	55	56	55	54	60	64	66	68	69	69	70	70	70	68	65
Feb23	65	70	68	68	68	67	69	68	69	60	55	56	53	49	56	62	59	59	72	75	69	68	67	70	64
Feb24	65	65	72	71	62	59	62	62	65	62	51	49	53	59	64	65	65	66	67	67	68	68	70	65	63
Feb25	66	66	67	68	69	70	74	74	68	66	62	57	61	65	63	65	64	64	67	70	70	70	69	69	67
Feb26	67	68	67	67	68	69	72	71	64	56	49	52	55	59	63	64	67	68	69	69	70	70	70	69	65
Feb27	69	69	70	70	71	73	77	79	74	64	53	52	56	60	66	68	69	69	70	70	70	71	70	68	68
Feb28	69	69	69	70	69	68	72	75	71	58	48	47	47	52	57	66	62	64	65	72	68	72	75	70	65

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.

2015, Field component: X, Base: 20800.0, 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	182	155	177	195	211	197	185	190	197	189	177	179	182	184	182	180	181	187	195	192	196	193	178	185	186
Mar02	197	199	205	189	195	212	207	169	158	164	168	157	155	170	164	167	177	176	185	201	194	199	189	191	182
Mar03	195	201	197	189	196	205	194	188	186	183	181	174	177	186	189	186	185	188	195	205	193	192	191	191	190
Mar04	187	189	191	194	198	203	206	211	213	209	192	195	190	196	198	190	189	194	201	202	198	201	204	205	198
Mar05	199	196	198	201	206	212	215	217	:	:	:	195	184	183	188	184	186	198	202	203	204	206	206	202	:.
Mar06	203	204	208	214	219	220	203	201	190	192	186	180	174	176	185	193	195	198	203	201	195	193	199	203	198
Mar07	201	195	202	205	205	210	206	202	199	200	177	179	180	179	179	186	185	192	186	191	205	201	187	192	193
Mar08	200	195	196	200	204	208	209	213	209	200	195	188	176	179	179	176	180	178	190	197	199	201	200	199	195
Mar09	198	206	216	196	198	200	202	200	193	190	183	182	186	189	192	192	195	199	205	206	206	204	203	203	198
Mar10	204	201	206	205	207	211	212	213	210	201	194	190	189	:	:	192	195	199	203	205	207	207	206	203	:.
Mar11	206	205	204	206	206	216	220	226	:	:	:	:	:	:	:	:	:	184	173	182	195	201	202	206	:.
Mar12	200	199	200	214	218	216	208	207	195	:	190	185	189	190	191	188	190	197	201	203	204	203	203	204	200
Mar13	204	203	203	205	209	213	218	213	:	209	200	211	198	169	169	186	193	194	196	198	201	206	206	206	201
Mar14	208	205	203	205	212	218	223	216	209	200	:	193	191	192	201	204	204	204	207	207	205	208	217	206	206
Mar15	211	204	207	207	211	213	217	216	217	212	199	188	184	186	194	196	194	197	201	205	207	214	212	209	204
Mar16	212	213	217	216	216	234	221	210	208	204	204	206	201	206	211	215	214	215	216	219	215	214	212	211	213
Mar17	210	209	209	217	216	244	206	192	166	138	170	183	153	101	74	81	29	66	64	25	22	39	19	75	129
Mar18	88	77	111	113	114	121	123	132	133	138	137	134	147	149	130	107	126	:	:	160	154	158	179	190	:.
Mar19	165	154	144	149	159	158	167	149	153	122	139	141	121	142	135	151	154	160	163	163	161	181	185	176	154
Mar20	181	180	165	165	163	167	149	163	165	151	143	154	160	160	156	160	158	155	162	194	177	172	211	195	167
Mar21	177	183	175	167	172	177	174	169	159	163	166	178	181	181	178	175	175	175	179	181	179	187	183	188	176
Mar22	187	185	191	194	188	185	176	142	179	166	161	175	158	159	161	167	169	170	175	182	179	187	184	185	175
Mar23	190	189	202	210	189	192	190	181	181	166	154	151	167	168	163	164	178	184	183	184	184	197	184	183	179
Mar24	184	185	186	185	189	191	187	181	171	166	163	160	155	164	178	184	167	181	182	185	190	193	191	197	180
Mar25	196	196	191	191	192	197	192	183	179	176	168	175	188	195	200	195	187	195	201	190	187	189	195	195	190
Mar26	196	200	194	194	196	192	183	177	178	181	184	191	195	195	192	194	193	194	197	196	190	188	192	207	192
Mar27	213	197	195	194	194	189	178	170	165	162	178	180	192	191	186	181	186	191	195	195	197	200	200	198	189
Mar28	196	198	200	204	209	209	196	181	182	179	187	193	191	194	195	200	202	207	203	204	203	195	200	210	197
Mar29	191	188	190	201	190	190	190	189	185	183	184	185	189	194	191	194	189	189	198	191	184	191	193	191	190
Mar30	186	189	190	191	196	199	192	183	175	178	178	180	183	186	187	191	192	195	198	196	195	192	196	195	189
Mar31	194	195	195	195	198	202	202	199	195	195	194	197	187	197	203	207	205	214	212	205	204	204	205	206	200

2015, Field component: Y, Base: 1300.0, 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	133	130	99	101	95	97	103	98	94	91	85	72	75	73	76	79	85	89	89	85	93	112	105	105	94
Mar02	100	102	112	110	107	94	88	105	112	115	82	69	70	71	67	113	90	85	97	93	90	93	90	92	94
Mar03	88	82	89	96	90	89	98	107	108	98	88	66	63	57	65	74	77	75	84	91	88	103	116	109	88

Table 8.3 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Mar04	88	82	85	86	88	88	93	107	115	100	89	75	60	62	68	76	78	78	80	82	84	90	91	96	85
Mar05	88	85	86	86	85	85	92	104	:.	:.	:.	75	62	63	62	70	85	91	84	84	89	87	84	84	:.
Mar06	83	80	79	79	82	80	82	95	103	96	80	65	55	52	58	72	78	77	79	80	88	113	88	86	80
Mar07	89	90	74	94	75	79	89	105	115	108	98	80	66	58	68	69	89	112	89	85	103	106	92	87	88
Mar08	80	81	86	86	84	83	98	101	105	103	80	68	69	61	84	83	82	85	91	84	85	85	86	86	85
Mar09	85	79	81	84	85	87	90	111	113	102	86	71	60	56	62	76	79	79	79	81	82	85	88	86	83
Mar10	86	85	82	85	85	84	85	103	108	100	84	71	61	:.	:.	:.	:.	:.	:.	82	83	84	84	85	:.
Mar11	86	85	88	86	74	86	92	98	101	106	85	74	66	62	63	78	76	80	101	91	81	83	85	84	83
Mar12	86	88	88	81	74	86	91	105	112	108	94	79	60	61	59	67	82	79	80	83	86	81	85	86	84
Mar13	88	86	87	87	74	86	91	105	113	104	85	65	54	55	61	70	71	76	78	79	83	86	87	85	81
Mar14	87	87	86	85	79	79	89	105	113	108	89	68	58	57	62	63	74	75	78	94	84	81	82	94	84
Mar15	96	90	93	95	91	88	94	95	102	100	80	67	62	62	65	70	72	76	94	84	75	83	84	84	81
Mar16	85	87	85	88	80	82	95	102	109	100	80	67	62	62	65	70	72	72	74	75	77	80	83	85	84
Mar17	85	87	88	88	85	85	110	110	109	108	101	80	62	37	41	25	66	109	165	161	211	217	189	265	112
Mar18	185	152	156	137	142	137	127	132	128	107	95	83	83	73	66	106	94	:.	:.	155	129	124	119	112	:.
Mar19	136	112	104	103	106	104	101	111	96	84	68	66	44	53	67	90	87	90	92	103	111	102	97	109	93
Mar20	120	113	104	107	102	107	112	111	106	102	91	81	66	65	80	83	90	99	98	117	105	96	100	119	99
Mar21	106	94	106	99	97	103	114	123	106	108	91	72	61	64	75	77	83	85	85	86	90	91	91	91	92
Mar22	92	93	92	93	90	89	109	87	95	97	84	53	47	59	69	84	90	93	88	95	88	105	90	91	86
Mar23	91	98	75	87	85	88	113	126	114	102	88	60	47	56	80	92	89	88	88	89	97	130	105	96	93
Mar24	89	88	90	93	92	98	108	117	117	112	79	58	48	38	61	69	101	88	87	86	90	88	90	88	86
Mar25	91	89	92	93	94	99	112	125	128	112	85	64	62	46	52	67	81	76	90	100	91	97	93	96	88
Mar26	93	95	95	93	95	99	105	110	109	98	80	67	62	62	63	71	78	86	85	88	98	97	103	94	89
Mar27	108	101	103	100	89	108	110	116	109	89	65	50	41	58	63	69	79	81	82	75	85	90	93	93	86
Mar28	92	92	90	89	100	101	108	109	112	99	76	63	57	54	58	68	82	77	75	84	89	86	97	108	86
Mar29	114	120	113	121	119	108	115	115	110	94	68	56	54	72	71	85	87	83	84	87	88	91	95	105	93
Mar30	100	98	99	97	98	98	119	121	118	102	86	74	69	58	80	91	95	89	87	89	89	92	100	94	94
Mar31	92	95	95	95	95	103	115	124	121	106	87	57	55	45	58	74	81	77	79	88	88	91	91	92	88

2015, Field component: Z, Base: 43600.0, 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	66	69	66	63	61	57	59	61	53	53	54	56	57	62	65	66	65	66	66	66	66	65	69	68	62
Mar02	65	61	55	57	59	59	61	68	70	66	60	58	63	64	69	74	73	70	69	67	65	64	65	65	64
Mar03	64	61	57	59	62	63	68	69	62	54	54	53	57	61	65	65	65	66	66	64	66	66	66	65	62
Mar04	64	65	65	64	63	63	65	65	59	51	46	44	44	52	59	62	63	64	63	63	64	64	63	60	60
Mar05	60	61	62	62	63	61	63	63	:.	:.	:.	42	46	53	60	63	64	65	64	62	62	62	61	61	:.
Mar06	61	62	61	59	58	58	64	65	60	52	47	50	54	58	61	64	65	64	63	64	66	66	65	63	60
Mar07	62	62	60	57	59	57	61	62	58	54	54	52	51	57	63	64	65	70	68	67	66	64	66	65	61

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
Mar08	64	62	62	62	62	62	65	64	59	51	49	48	51	60	70	70	69	70	69	67	66	65	65	64	62
Mar09	64	63	56	59	60	64	68	65	62	57	55	52	53	56	61	64	63	63	62	62	62	62	62	62	61
Mar10	62	61	61	61	60	61	65	65	59	53	49	47	48	:	:	:	:	:	:	61	61	61	60	60	:
Mar11	60	60	61	60	60	59	59	57	56	53	52	47	44	:	:	:	:	:	:	69	67	65	64	63	:
Mar12	63	62	62	63	59	58	60	61	56	53	52	47	44	50	56	60	64	67	70	62	62	62	62	62	59
Mar13	61	61	61	61	60	60	62	62	57	48	46	45	51	53	55	58	62	63	63	63	64	64	63	62	57
Mar14	61	61	61	61	61	62	62	61	57	52	47	45	45	46	51	55	61	63	63	60	60	61	61	59	57
Mar15	57	59	58	58	58	58	62	62	56	52	46	45	47	48	53	58	57	59	60	62	60	61	61	59	55
Mar16	60	59	58	58	57	54	58	63	61	48	44	42	46	49	52	53	60	61	62	57	58	59	59	59	59
Mar17	59	59	58	58	57	57	57	63	61	64	61	56	61	91	115	138	174	154	121	123	112	94	88	74	:
Mar18	72	85	87	86	85	89	91	88	81	81	82	82	79	81	88	102	96	81	82	88	86	83	77	68	85
Mar19	67	71	74	76	74	76	76	73	68	64	62	65	73	76	82	85	82	83	83	82	82	80	74	73	75
Mar20	71	69	69	73	75	77	79	77	68	67	65	61	61	68	74	80	82	75	75	78	77	78	72	66	73
Mar21	69	68	69	72	73	74	77	76	70	66	56	53	56	66	72	74	75	77	77	75	76	75	74	74	70
Mar22	73	73	72	72	73	75	76	78	68	60	53	54	63	69	71	75	77	76	75	76	75	74	74	74	71
Mar23	74	73	72	65	67	71	78	78	76	69	66	67	71	76	83	89	81	81	77	75	75	72	72	72	74
Mar24	72	72	72	72	73	75	75	69	61	54	51	54	58	63	73	79	84	69	71	76	74	74	73	72	70
Mar25	71	68	69	69	70	73	77	74	65	59	55	55	51	58	62	68	70	70	71	72	73	73	70	70	67
Mar26	71	65	66	67	68	72	75	75	69	57	52	57	56	60	65	66	69	71	67	71	71	71	74	70	68
Mar27	64	70	69	68	68	70	73	74	71	63	55	57	63	70	79	77	73	65	74	71	70	73	74	71	69
Mar28	70	70	71	66	66	67	67	67	61	50	46	50	56	58	62	73	65	71	70	69	70	75	71	72	67
Mar29	70	72	71	72	74	78	81	79	71	62	60	63	58	66	69	77	72	69	72	75	75	72	74	70	67
Mar30	72	70	70	70	70	72	75	74	66	55	51	51	69	75	79	77	72	69	70	71	72	71	71	71	72
Mar31	70	70	70	70	70	74	75	77	67	58	51	51	51	55	56	60	62	64	66	71	72	73	72	68	65

2015, Field component: F, Base: 48400.0, 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	67	58	64	69	74	69	72	65	61	57	53	55	57	62	65	64	64	68	71	70	72	71	67	69	64
Mar02	71	69	66	61	65	69	72	62	60	59	54	47	51	58	60	67	70	66	70	75	70	71	67	69	65
Mar03	69	69	64	63	64	69	73	71	64	55	54	50	54	62	67	66	66	68	71	74	70	72	71	70	66
Mar04	66	67	68	69	70	72	75	78	73	64	52	51	49	58	65	65	65	69	71	71	70	72	72	70	67
Mar05	68	67	69	70	72	74	78	78	73	67	57	50	48	53	62	64	66	72	72	71	72	71	72	70	67
Mar06	70	71	72	73	74	75	73	74	68	57	50	49	50	54	61	68	70	70	71	70	69	71	72	72	67
Mar07	71	68	69	67	69	70	72	71	67	59	53	52	50	55	61	65	66	74	69	71	75	73	68	69	66
Mar08	71	67	68	70	71	73	76	73	71	61	56	52	49	58	68	67	68	68	72	73	73	73	72	71	68
Mar09	71	72	72	65	67	72	76	73	67	62	56	53	54	59	65	67	68	70	72	70	72	71	71	71	67
Mar10	71	70	71	70	71	74	78	78	72	63	55	51	52	56	63	67	68	69	72	70	72	71	71	71	68
Mar11	70	70	70	70	70	74	75	77	67	58	54	51	47	49	55	60	63	67	66	69	72	73	72	71	65

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
Mar12	70	70	70	70	73	74	75	72	68	60	56	49	49	54	60	62	65	69	71	71	71	71	71	71	66
Mar13	71	70	70	71	70	72	75	77	71	63	60	60	59	48	49	60	65	68	69	69	70	72	73	73	67
Mar14	72	71	70	70	71	73	78	79	73	65	56	51	49	51	60	65	67	68	70	71	70	71	72	74	67
Mar15	70	68	69	70	71	72	77	77	74	66	55	49	49	50	59	64	65	67	70	72	72	71	71	72	67
Mar16	73	72	73	73	72	77	75	75	68	59	55	54	55	60	65	68	68	70	71	73	72	73	72	72	69
Mar17	71	70	70	70	73	81	68	68	55	46	56	56	48	52	62	85	97	95	67	52	42	34	18	32	61
Mar18	33	39	56	56	55	61	63	65	54	59	61	59	62	64	62	66	69	71	70	78	73	71	75	72	62
Mar19	61	58	57	60	63	65	65	58	55	38	43	47	44	56	59	70	68	70	72	73	72	78	74	70	62
Mar20	70	68	61	65	65	69	64	68	60	53	48	49	51	57	61	68	70	69	72	83	74	72	84	72	66
Mar21	67	68	66	65	68	71	73	70	67	59	50	52	55	64	69	69	71	71	72	74	73	76	74	75	67
Mar22	74	74	75	76	74	75	73	60	60	54	44	51	52	58	61	67	70	71	73	75	74	73	74	74	67
Mar23	76	75	79	77	70	78	80	77	67	57	48	53	63	67	73	78	78	75	74	74	75	79	72	72	71
Mar24	72	72	72	73	75	81	76	69	68	48	44	45	46	54	70	77	76	79	75	75	77	77	76	77	68
Mar25	76	76	73	73	75	75	81	74	57	53	42	42	53	63	69	72	71	73	77	77	74	75	77	75	69
Mar26	76	76	73	74	75	77	75	71	64	60	56	59	62	65	72	72	72	74	76	76	75	76	77	81	72
Mar27	78	72	72	72	73	75	73	70	67	49	51	56	65	72	78	75	74	74	76	77	77	78	78	77	71
Mar28	76	76	76	77	80	82	78	73	70	62	57	61	60	63	68	73	73	76	75	78	79	78	81	83	73
Mar29	74	73	74	75	79	71	71	79	63	52	48	52	60	70	72	77	74	73	76	76	75	78	78	76	70
Mar30	73	74	74	75	79	84	84	79	68	60	59	62	68	75	80	80	75	74	76	76	76	76	78	75	74
Mar31	74	75	75	75	76	80	83	81	72	61	57	58	54	61	65	71	72	77	78	77	77	77	77	77	72

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

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
2015, Field component: X, Base: 20900.0, Unit: nT																									
Apr01	104	105	106	109	112	114	113	101	89	80	77	81	82	88	91	100	98	98	107	114	112	115	114	114	101
Apr02	115	114	115	119	117	120	116	108	92	..	..	..	88	80	73	86	92	90	104	101	111	102	86	96	..
Apr03	95	98	95	92	103	104	107	105	96	86	86	87	89	101	92	92	96	100	103	104	102	103	103	107	98
Apr04	109	101	94	96	102	104	103	94	85	82	81	90	88	104	107	97	98	95	99	106	113	108	105	102	98
Apr05	101	98	102	102	101	101	98	88	76	75	82	91	98	101	101	97	101	102	101	107	107	108	107	112	98
Apr06	103	102	100	102	107	109	105	90	79	76	81	90	94	92	95	98	98	98	107	103	102	102	102	102	97
Apr07	105	106	104	105	106	106	98	87	78	83	90	93	98	104	107	107	105	105	107	106	107	108	107	107	101
Apr08	108	103	103	106	109	108	102	94	86	82	83	90	100	107	111	110	107	101	103	105	100	104	106	104	101
Apr09	103	104	108	106	110	105	..	..	86	88	99	101	104	..	99	106	105	102	98	109	116	118	120	119	..
Apr10	105	93	87	120	105	92	93	81	75	77	70	78	87	81	85	86	81	83	79	78	84	81	88	88	86
Apr11	88	101	93	110	126	123	107	93	71	59	56	49	54	59	59	54	44	67	75	75	83	88	91	94	80
Apr12	93	91	91	93	95	98	100	97	92	87	85	85	86	90	96	103	106	105	105	101	98	95	95	96	95
Apr13	100	99	102	101	100	108	114	104	95	90	91	94	95	93	96	98	102	105	108	110	109	109	110	110	102
Apr14	107	106	107	110	113	115	118	113	113	110	108	102	..	..	97	87	94	68	68	83	95	111	88	84	..
Apr15	87	89	89	96	96	97	106	108	103	101	84	59	80	73	67	82	84	87	84	88	64	87	95	82	87
Apr16	82	98	95	87	91	76	72	69	56	49	59	55	..	..	71	74	85	80	77	80	92	68	70	73	..
Apr17	84	71	65	62	82	87	72	65	54	45	52	61	62	61	72	84	89	89	74	78	82	87	89	89	73
Apr18	89	88	88	86	85	86	85	80	70	73	85	93	98	95	93	85	81	84	100	88	108	87	83	87	87
Apr19	96	97	94	90	89	84	79	72	71	73	76	87	93	93	90	86	88	91	96	96	100	91	92	101	89
Apr20	99	100	93	100	95	106	108	94	82	80	86	95	104	107	112	114	112	116	113	114	107	117	105	105	103
Apr21	109	100	107	108	103	104	91	74	..	73	..	80	79	93	93	86	74	85	90	95	103	105	109	95	91
Apr22	91	95	98	100	104	105	..	95	..	83	92	100	104	105	102	103	102	98	104	95	103	101	111	104	..
Apr23	97	97	99	96	99	100	105	85	82	81	86	92	97	102	103	106	102	99	99	101	99	102	99	101	99
Apr24	102	98	99	100	106	107	105	98	92	93	97	102	103	105	109	110	108	107	99	101	100	110	111	104	97
Apr25	102	103	105	106	109	107	112	103	92	93	97	102	103	105	109	110	108	107	106	109	109	110	111	110	105
Apr26	109	110	110	113	116	115	112	89	89	85	87	93	96	94	101	106	109	111	112	113	112	112	108	110	105
Apr27	109	109	109	109	109	109	101	94	89	89	89	97	97	95	91	92	101	100	96	92	90	94	92	92	98
Apr28	92	91	96	96	98	97	93	84	83	83	85	94	106	102	94	99	100	100	105	112	113	109	107	108	98
Apr29	105	105	105	104	105	104	103	..	103	..	111	118	118	115	117	110	102	105	110	109	106	101	101	104	..
Apr30	108	118	119	113	114	110	113	..	98	92	97	107	111	115	116	115	111	111	113	108	106	109	109	109	108
2015, Field component: Y, Base: 1300.0, Unit: nT																									
Apr01	91	91	90	89	90	96	111	125	128	121	98	66	53	45	49	58	70	77	81	81	84	84	98	89	86
Apr02	90	89	91	90	90	99	115	127	124	..	..	..	63	60	64	72	79	86	102	93	104	141	113	95	..
Apr03	97	95	99	86	87	98	112	128	127	111	85	56	50	55	66	78	84	82	82	84	87	94	92	92	89
Apr04	92	89	97	95	94	100	113	126	122	98	73	49	49	63	74	95	100	84	86	91	98	88	85	87	90

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
Apr05	91	90	92	92	95	103	113	117	108	85	60	49	53	65	78	89	88	82	82	85	83	85	89	78	86
Apr06	84	91	89	86	92	101	111	121	114	95	75	60	54	60	69	78	83	82	85	86	89	90	90	90	86
Apr07	88	87	87	88	90	101	118	127	115	97	80	66	57	58	66	76	82	83	88	93	87	86	86	87	87
Apr08	91	90	89	90	93	103	117	124	119	101	78	60	50	54	63	76	86	92	93	92	91	89	88	91	88
Apr09	90	89	93	94	91	98	...	...	96	70	51	47	...	69	76	85	87	97	88	83	86	87	90	...	...
Apr10	103	134	126	122	130	122	138	142	120	113	93	76	64	69	76	83	93	88	87	99	109	111	111	106	105
Apr11	102	110	117	102	95	104	103	112	121	113	98	80	62	64	64	67	77	87	95	101	98	95	98	97	94
Apr12	97	98	99	98	100	104	108	128	126	124	109	86	65	56	63	72	79	80	82	87	90	97	96	96	94
Apr13	96	98	97	101	100	103	115	124	126	115	99	76	54	48	52	63	71	72	81	84	87	89	91	91	89
Apr14	92	93	92	91	90	94	105	115	117	108	90	64	...	...	26	44	59	74	76	83	95	108	123	106	...
Apr15	99	97	100	101	104	114	122	128	126	108	83	69	47	55	74	75	78	93	159	136	112	104	99	98	99
Apr16	85	76	97	99	98	106	87	92	106	95	81	57	...	...	57	73	93	110	111	119	113	117	156	109	...
Apr17	96	102	107	105	99	108	122	131	130	114	92	64	54	59	73	91	103	98	95	102	96	96	96	95	97
Apr18	90	88	95	98	99	104	117	126	122	105	84	68	53	55	62	76	84	95	111	99	112	105	98	92	93
Apr19	83	85	94	101	102	111	120	131	122	101	79	53	35	38	55	71	85	90	95	106	117	106	100	96	91
Apr20	91	94	87	95	98	105	121	131	132	115	90	63	48	46	49	59	72	76	82	84	88	85	92	92	87
Apr21	90	91	82	94	99	109	122	127	123	94	64	42	47	49	49	70	93	93	88	89	103	107	113	106	89
Apr22	100	92	94	96	105	116	...	...	...	...	...	54	46	53	65	...	90	90	93	92	90	89	101	105	...
Apr23	95	96	94	95	94	111	120	114	97	97	75	54	46	53	65	77	86	91	89	92	89	91	92	90	89
Apr24	90	93	95	90	98	114	121	119	101	101	71	49	41	48	63	77	88	91	89	92	93	90	90	95	88
Apr25	90	90	91	92	97	107	118	125	120	101	78	59	54	58	67	79	87	89	87	87	88	88	89	90	89
Apr26	91	90	90	91	103	116	130	138	132	112	84	62	50	52	62	75	84	89	85	98	100	97	103	104	91
Apr27	94	94	95	98	105	117	129	132	118	92	71	52	49	53	61	73	84	91	94	85	87	90	91	92	92
Apr28	116	108	106	109	115	123	126	121	102	77	58	55	52	56	65	76	84	87	85	85	87	90	91	92	90
Apr29	95	97	100	102	105	108	112	...	...	...	61	45	41	57	70	80	88	88	88	91	91	97	100	100	...
Apr30	97	92	100	103	107	106	...	107	100	77	61	49	47	54	65	78	88	89	91	94	96	89	88	91	87

2015, Field component: Z, Base: 43600.0, 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	67	67	66	66	66	68	69	67	59	53	46	43	43	47	55	62	65	67	67	66	66	66	65	66	61
Apr02	65	65	64	64	64	68	70	67	61	...	...	...	46	53	60	65	68	70	69	69	68	66	71	71	...
Apr03	70	69	67	68	71	72	68	58	49	40	39	47	53	61	66	67	66	67	67	68	68	66	66	63
Apr04	65	63	65	67	69	72	72	67	58	47	39	40	48	57	68	73	73	71	69	68	66	66	67	67	63
Apr05	67	68	67	68	69	73	74	70	62	54	50	50	57	65	69	70	68	66	67	67	67	67	66	66	65
Apr06	65	65	67	66	67	70	70	66	60	56	51	51	56	61	64	66	65	64	65	66	67	67	65	67	64
Apr07	67	67	66	65	68	72	74	71	67	65	62	58	58	61	64	65	66	66	67	67	67	67	66	66	66
Apr08	65	65	66	66	68	71	69	65	59	53	49	48	49	53	59	64	66	66	67	68	67	66	66	66	62
Apr09	65	65	64	65	67	69	...	...	52	43	38	44	49	56	62	64	65	68	68	65	65	65	63	...	...

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
Apr10	61	55	61	58	53	65	70	70	71	64	53	51	54	58	65	69	72	74	74	75	76	73	72	71	65
Apr11	70	61	61	61	60	64	71	74	74	74	68	68	70	74	80	87	88	82	80	81	79	77	76	74	73
Apr12	73	73	72	71	72	73	73	69	62	57	48	37	38	49	57	62	65	65	66	68	70	71	71	70	64
Apr13	69	69	67	64	65	67	68	69	68	60	47	38	37	40	48	58	62	64	65	66	67	67	67	66	61
Apr14	66	66	65	64	64	64	64	63	58	48	37	31	⋮	⋮	58	70	80	89	85	83	80	72	72	74	⋮
Apr15	73	73	73	72	72	74	75	70	62	58	55	55	65	78	78	75	80	76	82	80	80	74	71	72	72
Apr16	74	63	59	61	60	64	76	77	78	77	69	66	⋮	⋮	81	80	83	88	90	87	76	77	73	68	⋮
Apr17	64	67	73	74	73	72	77	84	78	68	60	58	64	72	78	80	82	79	80	80	80	78	77	77	74
Apr18	76	74	74	75	76	80	84	85	76	67	55	49	55	60	68	74	77	77	78	78	74	74	75	75	72
Apr19	74	70	69	70	75	76	85	85	80	60	50	50	55	63	70	72	75	78	74	76	76	75	73	73	71
Apr20	72	70	71	70	72	76	81	81	73	69	58	54	51	57	66	69	71	73	70	72	73	74	69	72	70
Apr21	71	72	69	69	74	76	81	81	73	57	45	43	50	54	65	73	80	69	70	76	74	72	70	70	68
Apr22	71	72	72	72	74	76	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	77	71	73	73	72	70	70	⋮
Apr23	70	71	71	72	73	72	73	69	63	56	47	37	39	49	55	60	65	71	67	69	70	70	69	69	63
Apr24	69	69	70	71	71	72	72	69	64	55	47	40	44	51	59	67	70	66	69	70	70	70	69	69	64
Apr25	69	69	69	70	72	73	76	76	70	57	48	45	50	55	60	65	67	69	67	68	68	69	68	68	65
Apr26	68	68	68	69	71	72	74	72	64	50	39	37	45	52	58	63	65	66	65	66	67	67	68	68	62
Apr27	67	67	67	68	69	73	71	67	56	49	51	50	52	60	64	66	68	71	72	74	68	68	74	73	66
Apr28	71	71	70	70	72	73	72	64	54	45	36	31	40	50	58	62	66	69	69	69	69	71	68	68	62
Apr29	69	69	68	68	67	67	67	⋮	⋮	⋮	40	37	40	47	54	64	66	64	65	68	68	67	71	71	⋮
Apr30	70	68	64	65	66	66	67	65	60	54	46	42	43	50	56	59	62	62	64	67	68	67	66	67	61

2015, Field component: F, Base: 48400.0, 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	76	76	76	77	78	81	82	76	64	54	46	43	44	50	58	69	72	73	77	79	78	80	79	79	70
Apr02	80	79	78	79	79	84	85	79	66	54	50	47	50	52	55	65	71	73	78	77	80	76	72	76	70
Apr03	75	75	73	72	77	81	83	78	66	52	44	42	50	61	65	70	72	73	76	76	76	76	76	77	70
Apr04	76	72	70	72	77	80	81	73	61	49	40	45	51	67	77	76	79	75	76	78	80	77	75	75	70
Apr05	75	74	75	76	77	80	80	73	60	52	50	54	63	73	76	76	76	74	75	77	77	78	77	78	72
Apr06	74	74	74	74	77	81	80	70	60	54	51	54	61	64	69	72	72	72	74	76	75	75	75	75	70
Apr07	76	76	75	75	77	81	81	73	66	65	65	62	65	70	74	75	75	74	75	76	77	76	76	76	73
Apr08	76	74	74	76	79	81	78	71	62	54	51	52	57	64	71	76	77	74	75	76	74	75	76	75	71
Apr09	74	75	75	75	79	79	79	74	64	56	52	48	54	61	63	72	74	74	74	79	80	80	81	79	71
Apr10	71	62	65	76	65	70	76	70	68	62	49	50	57	58	66	70	71	73	71	72	76	73	71	73	67
Apr11	72	70	67	74	80	82	81	78	69	63	57	53	56	63	68	72	69	73	75	77	78	78	78	78	71
Apr12	77	76	75	75	77	80	81	76	68	61	51	41	42	53	63	71	75	75	76	76	77	76	76	76	70
Apr13	77	76	75	72	72	79	82	79	74	64	53	45	44	46	54	65	71	73	76	78	77	76	78	78	69
Apr14	77	76	76	76	77	78	80	78	73	62	51	42	46	54	62	70	82	80	76	81	84	84	74	74	71

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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
Apr15	75	75	75	77	77	80	85	81	72	67	56	45	62	71	69	72	74	76	82	82	71	76	76	71	73
Apr16	73	70	65	63	65	62	70	69	65	61	57	52	64	72	74	74	82	85	86	85	79	70	69	64	70
Apr17	65	63	65	64	72	74	73	72	64	52	47	48	54	61	72	79	83	81	75	77	78	79	79	78	69
Apr18	78	75	75	75	76	80	84	82	72	64	57	54	62	65	71	73	75	77	85	80	85	75	74	76	74
Apr19	78	75	73	73	77	79	82	79	70	57	49	52	59	67	71	72	76	76	79	81	83	78	78	80	73
Apr20	78	77	75	77	77	85	91	89	80	68	60	60	61	67	77	81	82	83	82	85	83	88	81	81	78
Apr21	82	79	79	79	80	85	84	76	64	54	41	43	49	58	68	73	74	77	78	80	82	82	81	75	78
Apr22	75	77	78	79	83	86	81	70	64	60	54	54	53	61	65	69	74	77	80	80	80	80	82	79	72
Apr23	76	77	77	77	79	83	82	75	64	57	52	47	49	59	63	69	73	74	77	77	78	77	78	78	72
Apr24	77	76	76	78	80	79	77	70	63	56	49	45	51	59	68	77	78	76	76	77	76	76	76	77	71
Apr25	77	77	78	80	83	83	85	83	74	62	55	55	59	64	71	76	77	76	77	79	79	80	80	79	71
Apr26	79	79	79	82	85	86	87	81	68	53	44	43	51	57	66	72	76	77	78	79	79	79	78	79	75
Apr27	79	78	78	79	80	82	80	73	61	53	54	57	58	65	67	69	75	78	77	77	77	78	77	77	72
Apr28	75	74	76	76	79	79	77	65	56	47	39	38	52	59	62	69	75	76	76	81	81	79	79	79	72
Apr29	78	77	78	77	77	76	76	70	60	53	54	54	56	62	70	75	74	74	76	79	79	78	79	79	69
Apr30	81	83	80	79	80	78	77	70	62	59	53	53	57	64	70	73	74	74	77	78	78	78	78	78	71

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

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
2015, Field component: X, Base: 20900.0, Unit: nT																									
May01	107	108	107	102	105	109	105	97	82	77	79	85	96	102	108	113	115	114	114	116	119	117	115	110	104
May02	110	112	112	107	111	109	105	99	87	86	88	97	99	102	100	107	106	108	114	103	111	105	111	117	104
May03	105	100	100	102	102	100	94	84	90	90	99	102	109	104	98	93	97	103	106	108	110	108	107	109	100
May04	108	107	104	105	106	104	97	92	87	95	106	112	101	107	97	93	103	106	106	110	106	104	106	104	103
May05	106	107	107	109	109	105	101	95	89	84	85	85	96	100	107	111	112	110	112	113	108	109	110	110	103
May06	113	109	126	126	129	126	⋮	⋮	76	90	73	84	102	110	72	61	68	88	⋮	104	105	113	108	104	⋮
May07	112	111	109	106	102	96	91	83	76	76	80	91	102	105	111	107	111	102	101	108	112	113	108	104	101
May08	106	101	98	102	117	121	120	108	94	92	94	98	103	105	⋮	⋮	⋮	108	⋮	108	108	105	104	106	⋮
May09	103	101	103	104	103	101	99	91	86	87	104	111	119	116	109	105	108	120	122	113	120	117	113	110	107
May10	108	110	111	111	111	107	105	92	83	85	77	59	79	81	81	90	95	101	107	108	107	104	100	93	96
May11	105	111	103	105	87	90	87	75	75	72	68	66	69	82	88	89	84	75	81	88	87	88	96	111	87
May12	98	98	98	95	89	100	101	95	85	79	74	61	69	78	79	86	87	84	82	88	96	110	92	105	89
May13	107	96	103	89	89	49	53	67	58	66	54	62	52	47	66	62	77	88	101	80	74	79	92	87	75
May14	79	80	81	79	81	70	62	63	64	79	89	97	99	98	90	92	92	95	96	97	102	95	89	94	86
May15	94	96	94	94	95	83	69	60	66	70	76	78	83	83	87	91	99	100	99	103	100	97	100	103	88
May16	101	99	103	102	101	94	88	84	92	92	99	105	109	107	104	101	102	105	105	108	105	106	107	111	101
May17	113	110	108	110	108	103	89	76	84	84	98	109	113	110	109	112	112	110	104	107	108	108	118	108	104
May18	107	108	111	114	120	117	106	100	99	99	121	122	105	95	104	112	112	100	103	108	116	117	110	100	108
May19	91	108	122	94	97	94	90	83	73	70	70	89	96	97	96	97	99	99	98	100	101	99	103	102	95
May20	102	105	104	99	102	87	87	82	81	88	100	102	106	100	97	104	102	98	96	100	99	98	96	95	97
May21	95	95	99	105	107	100	88	74	67	70	77	87	92	92	92	97	97	99	100	106	99	104	104	95	94
May22	102	104	103	106	109	104	93	80	72	75	83	93	100	98	102	103	103	104	104	107	106	104	106	104	99
May23	107	107	108	111	110	111	95	83	75	74	74	85	93	99	101	106	111	111	118	119	117	118	107	115	103
May24	112	108	106	111	112	101	88	80	78	83	89	98	105	108	106	109	113	113	114	109	111	109	105	100	103
May25	106	107	107	111	112	105	96	89	82	83	92	99	108	109	107	107	109	111	115	114	116	113	113	115	105
May26	112	113	113	118	114	109	103	96	102	102	111	111	110	108	111	114	112	114	106	107	114	115	109	113	110
May27	113	112	114	116	115	107	99	94	98	105	111	110	117	123	113	102	102	105	109	114	117	108	109	107	108
May28	102	101	104	118	117	111	103	101	96	96	106	106	101	90	97	96	103	106	114	107	121	120	118	114	107
May29	115	114	114	115	117	113	109	104	100	104	113	119	107	109	107	102	111	109	119	116	116	118	118	115	112
May30	115	111	114	117	115	104	95	93	94	99	106	108	112	115	111	108	110	113	117	117	117	116	115	117	110
May31	114	111	112	116	108	108	98	90	86	93	105	111	116	113	108	113	114	116	115	118	118	119	120	115	110
2015, Field component: Y, Base: 1300.0, Unit: nT																									
May01	90	92	91	100	98	107	121	130	126	107	85	68	56	63	73	80	85	88	86	87	86	87	89	90	91
May02	93	94	93	96	103	112	122	127	122	105	85	66	58	64	70	77	85	88	95	99	95	102	93	97	93
May03	101	94	93	91	108	120	126	126	117	103	87	76	69	70	74	80	88	93	96	94	91	90	90	89	94

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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
May0494	92	100	106	111	115	119	120	110	98	84	65	61	58	69	78	86	92	89	90	93	94	92	92	92	92
May0598	98	97	99	104	112	121	123	116	102	81	66	60	63	74	81	88	93	91	91	94	97	93	96	96	93
May06108	105	101	105	104	104	112	115	⋮	99	75	45	⋮	37	35	55	98	106	83	86	88	90	⋮	90	⋮
May0793	95	97	102	108	112	115	117	111	95	78	59	51	59	72	83	90	92	91	89	88	94	90	96	91	⋮
May08105	102	101	100	110	119	123	121	119	107	86	63	53	56	54	62	⋮	76	⋮	91	93	94	97	91	⋮	⋮
May0999	100	102	104	109	115	121	124	120	100	72	50	39	45	66	72	85	⋮	78	86	85	91	99	95	88	88
May1095	95	97	102	106	112	115	114	110	101	83	69	67	60	78	84	79	87	87	94	104	99	103	99	92	92
May1197	110	108	103	115	117	126	126	132	101	92	74	56	58	64	78	84	90	93	92	104	103	100	107	98	98
May12100	100	108	105	115	124	116	121	108	94	79	68	52	53	93	77	90	93	97	101	93	91	100	103	93	93
May13110	131	134	136	108	146	148	132	124	116	94	72	62	65	82	87	92	125	115	119	111	114	107	95	106	106
May14101	106	105	108	116	117	132	138	129	104	90	78	73	72	79	87	91	93	91	93	105	103	98	100	100	100
May1597	98	105	109	117	127	130	125	116	101	80	62	54	60	68	80	93	93	94	98	91	90	92	94	95	95
May1698	99	102	110	122	131	132	127	114	97	81	61	52	60	72	82	90	93	97	96	91	92	92	95	95	95
May1796	102	98	109	121	125	129	118	110	99	82	64	51	55	65	74	85	90	92	90	91	91	94	96	92	92
May1897	102	103	110	120	129	132	125	111	94	76	59	53	63	74	87	87	96	96	96	88	99	104	129	97	97
May19105	70	85	116	127	141	146	145	129	111	93	77	64	60	65	79	87	94	99	99	93	96	98	100	99	99
May2098	94	99	108	113	125	123	124	117	103	87	71	59	60	75	87	99	94	96	92	99	94	93	94	96	96
May2195	96	97	97	106	114	128	125	118	97	77	63	54	50	59	72	89	99	99	85	97	97	96	91	92	92
May2292	92	93	99	114	128	133	130	101	79	61	54	61	71	83	89	99	89	94	93	96	94	93	94	95	95
May2394	94	96	101	111	121	126	124	115	98	89	75	61	67	74	81	94	88	89	88	91	93	95	94	94	94
May2497	97	96	105	117	126	128	128	114	100	88	75	73	61	66	84	84	90	94	93	91	92	98	97	95	95
May2598	100	103	107	118	127	128	120	108	87	64	73	63	58	70	85	91	90	91	92	85	91	92	92	96	96
May2696	102	106	113	130	139	129	119	104	81	66	49	47	58	67	81	89	83	93	90	85	86	87	89	90	90
May2793	96	99	108	122	130	128	119	101	84	66	73	59	77	81	93	93	92	94	89	93	85	98	97	95	95
May28107	106	108	103	113	122	121	119	97	86	69	58	62	69	81	88	96	89	92	89	94	89	87	91	93	93
May2994	97	101	107	117	122	119	115	103	94	76	67	62	65	67	77	87	89	93	90	89	94	95	94	92	92
May3095	98	101	107	118	128	127	123	111	94	79	69	62	62	55	68	75	84	89	90	90	91	91	90	96	93
May3195	99	103	106	113	122	124	117	108	97	77	65	59	59	67	77	81	87	101	92	88	85	86	87	87	93

2015, Field component: Z, Base: 43600.0, 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
May0167	67	68	69	71	70	69	63	56	52	48	45	46	50	58	63	64	64	65	66	66	66	67	67	67	62
May0267	67	67	68	70	69	65	60	57	52	47	48	48	53	60	63	66	66	67	69	68	68	64	64	64	62
May0365	66	68	69	71	73	70	61	52	47	43	46	52	58	64	66	68	70	69	68	68	68	68	68	68	63
May0467	68	68	70	71	69	65	59	54	51	52	51	56	63	65	66	67	68	69	68	68	68	68	68	68	64
May0568	68	68	69	71	72	68	61	55	53	54	53	55	58	69	69	69	67	68	68	68	68	68	72	71	64
May0665	66	66	66	65	⋮	⋮	⋮	61	54	49	48	⋮	73	77	85	86	79	76	73	72	71	70	⋮	65	⋮
May0770	70	70	71	71	73	73	66	56	55	53	50	55	63	65	68	67	68	69	69	70	70	69	70	70	65

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
May08	69	68	69	71	72	68	66	66	63	58	50	49	53	59	:.	:.	:.	:.	:.	71	71	70	70	70	:.
May09	69	69	69	70	70	68	66	64	61	51	41	33	33	37	45	52	59	63	64	65	67	67	66	66	59
May10	67	67	67	68	71	74	73	68	65	63	59	50	50	57	59	63	68	70	70	71	72	72	71	71	66
May11	68	62	60	60	61	65	69	70	65	58	51	49	53	59	74	81	84	80	79	81	80	80	78	73	68
May12	73	74	74	72	71	69	68	66	59	53	45	44	49	58	67	70	76	85	87	87	84	81	77	75	69
May13	71	69	64	66	69	73	75	67	57	48	49	58	66	75	86	81	80	86	90	85	83	79	76	73	72
May14	76	78	79	79	80	76	75	69	62	54	48	46	48	57	66	71	71	71	71	73	74	74	76	76	69
May15	75	74	72	76	78	77	74	69	66	58	55	54	58	63	68	72	73	73	73	73	73	73	72	72	70
May16	74	74	71	73	72	73	72	68	66	60	51	51	55	64	70	70	72	74	73	72	72	71	72	72	68
May17	71	71	71	71	74	72	72	73	66	61	58	53	53	60	65	71	73	73	72	72	71	73	72	71	68
May18	72	73	72	73	73	73	72	68	66	65	56	57	62	61	63	67	73	78	78	76	75	73	75	75	68
May19	68	73	62	66	74	78	80	78	74	70	65	65	67	72	75	78	79	76	75	75	74	74	74	74	73
May20	75	74	72	73	74	73	73	72	67	59	55	56	63	68	72	75	77	77	74	74	74	74	74	72	71
May21	73	74	75	77	79	80	79	74	69	62	59	60	65	67	69	73	76	77	74	75	74	73	72	72	72
May22	72	72	73	75	78	80	79	72	65	57	49	46	49	55	61	67	69	70	70	70	71	71	70	70	67
May23	70	71	72	74	77	76	73	71	68	66	55	52	56	60	64	69	70	68	69	72	72	70	69	69	68
May24	69	70	71	72	74	73	70	66	59	54	46	43	50	58	63	65	65	67	70	72	75	73	71	72	65
May25	71	68	69	73	71	69	63	61	53	48	47	45	48	55	61	67	70	70	69	69	69	68	68	68	63
May26	68	68	69	72	73	68	64	61	55	54	52	50	51	58	60	66	66	71	72	74	74	73	72	71	63
May27	69	69	71	73	73	69	64	59	54	48	48	52	58	60	66	73	74	66	67	68	69	69	69	69	66
May28	70	69	70	72	72	72	68	63	54	48	48	52	58	49	64	68	68	70	71	71	68	70	70	69	65
May29	70	70	72	73	72	72	68	63	62	52	43	43	42	49	56	63	68	70	71	71	69	69	70	70	64
May30	69	69	71	74	76	72	69	65	64	59	57	58	57	57	63	67	67	69	68	68	68	68	69	69	66
May31	69	69	70	72	73	74	72	70	69	66	58	51	48	55	62	69	68	72	72	70	70	69	69	69	67
2015, Field component: F, Base: 48400.0, Unit: nT																									
May01	77	78	78	77	80	80	79	70	57	51	48	47	52	59	69	76	77	77	78	79	81	80	80	78	71
May02	79	80	79	78	82	81	78	68	60	55	51	55	56	61	67	73	75	76	80	77	80	78	80	79	72
May03	74	75	75	77	78	79	78	71	61	57	56	54	59	62	65	68	73	77	79	80	80	78	78	79	71
May04	78	78	77	79	81	80	76	70	62	60	63	65	59	66	68	69	75	77	77	79	78	77	78	77	73
May05	78	78	79	81	82	81	77	68	59	56	55	52	61	64	68	76	81	80	80	81	79	79	79	79	73
May06	78	84	84	85	86	84	82	80	71	59	46	49	47	57	67	65	76	79	87	87	84	82	81	82	74
May07	82	81	81	81	79	77	76	67	59	54	55	57	59	67	75	75	80	75	79	79	81	82	80	78	73
May08	79	76	76	79	86	85	83	78	69	63	56	56	62	68	72	75	79	82	75	81	81	79	79	79	75
May09	78	77	78	79	79	77	73	78	63	55	52	47	50	53	57	62	70	79	81	78	82	81	79	78	70
May10	77	79	79	81	83	84	82	72	66	64	57	41	50	56	58	65	72	77	80	82	82	80	78	75	72
May11	78	75	70	70	64	69	71	67	63	55	46	43	47	58	75	82	83	75	77	81	81	81	82	84	70

Table 8.5 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
May12	79	80	80	77	74	77	77	72	61	52	43	36	44	55	65	71	76	83	84	87	88	91	88	84	72
May13	82	75	74	70	73	60	62	60	47	42	38	49	52	58	76	71	76	87	96	83	78	77	79	74	68
May14	74	76	77	77	79	71	66	61	55	53	52	54	56	64	69	74	75	76	76	78	81	79	78	80	70
May15	79	79	79	80	83	77	69	63	59	53	53	53	58	63	69	74	79	80	80	82	80	79	80	82	72
May16	81	80	81	81	83	78	73	69	68	65	59	61	66	73	78	77	78	79	80	83	81	82	82	83	76
May17	84	83	82	82	83	81	75	70	64	63	65	65	66	71	76	83	84	85	81	82	82	81	82	82	77
May18	82	82	84	87	90	88	82	76	71	72	73	74	71	66	71	79	84	80	80	82	86	87	83	72	79
May19	72	83	79	71	80	83	83	79	70	65	59	67	72	76	79	83	85	84	83	82	82	82	79	82	78
May20	83	83	81	80	82	76	75	72	66	63	63	65	72	74	77	83	84	81	80	81	80	79	79	78	77
May21	78	78	81	86	88	86	80	70	62	57	57	61	68	70	72	78	81	83	81	80	84	81	81	81	76
May22	80	80	81	85	89	88	83	71	61	55	50	52	57	62	69	76	78	79	78	85	80	84	80	80	74
May23	81	81	82	86	89	87	79	71	65	62	52	54	61	66	71	78	81	80	83	83	85	82	84	82	76
May24	81	80	81	84	87	82	73	66	58	55	51	52	60	68	73	76	78	80	83	82	83	81	80	81	74
May25	80	81	81	85	85	79	70	66	57	51	52	50	57	66	71	76	81	81	83	82	82	82	81	82	73
May26	81	81	82	87	85	80	73	68	60	58	60	58	60	66	72	79	78	80	79	83	83	82	82	82	75
May27	81	81	84	87	87	81	72	65	63	64	65	62	67	76	78	81	81	80	83	83	83	83	83	81	77
May28	78	78	81	87	87	85	78	71	61	55	59	62	65	63	69	73	77	76	80	83	85	85	84	83	75
May29	83	83	83	86	87	82	80	77	70	63	58	60	54	61	67	71	81	81	86	85	84	85	85	83	76
May30	83	83	84	88	89	82	75	71	69	67	68	69	70	71	75	77	78	81	83	82	83	82	83	82	78
May31	81	81	83	86	88	85	79	74	71	71	68	64	63	69	73	81	81	86	86	85	84	84	84	82	79

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.

2015, Field component: X, Base: 20800.0, 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	213	211	212	209	205	198	192	190	193	203	209	..	..	..	..	..	..	..	..	..	..	..	..	..	::
Jun02	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	::
Jun03	216	214	215	216	217	210	199	193	192	199	207	203	209	205	206	208	210	210	213	216	218	219	216	216	209
Jun04	216	216	215	217	217	207	194	188	191	195	205	205	208	210	208	205	204	206	209	216	218	215	215	214	208
Jun05	213	213	212	214	216	213	204	196	192	190	203	213	220	218	217	218	219	219	219	221	222	223	223	224	214
Jun06	224	226	226	229	233	230	220	207	196	201	192	195	199	207	221	225	223	227	233	223	225	226	222	222	217
Jun07	220	220	221	224	223	213	205	193	194	161	211	213	215	217	218	221	224	227	233	243	245	229	225	226	219
Jun08	224	219	225	225	230	223	186	137	157	189	165	184	138	138	151	158	158	196	179	185	190	196	215	189	185
Jun09	185	188	190	195	195	187	187	176	183	152	182	184	186	192	188	186	193	196	189	204	198	197	200	204	191
Jun10	205	208	199	201	202	196	172	170	154	184	168	179	192	196	192	201	211	212	210	207	203	203	207	205	194
Jun11	207	200	198	203	212	204	199	187	181	187	189	189	193	188	195	194	203	211	196	201	205	206	203	204	198
Jun12	202	200	203	206	208	199	194	188	184	174	195	204	207	221	226	220	224	225	223	228	225	219	218	218	209
Jun13	216	210	212	212	214	207	194	183	181	194	189	204	200	194	194	199	202	205	203	203	201	203	221	225	203
Jun14	242	225	218	213	207	202	191	172	178	176	185	204	209	201	193	192	202	194	207	216	218	214	219	207	203
Jun15	205	202	201	198	199	202	195	185	176	173	180	179	185	180	199	190	184	178	198	200	214	213	215	212	194
Jun16	212	219	209	207	201	197	190	178	167	173	186	194	191	193	193	200	214	193	199	211	215	216	216	214	199
Jun17	212	212	211	222	222	214	..	..	179	176	177	182	177	175	190	180	177	191	198	203	205	203	201	199	::
Jun18	200	196	202	202	207	202	193	179	176	..	194	..	199	200	..	195	210	198	197	203	205	205	204	202	::
Jun19	201	207	201	207	208	200	191	179	173	173	179	179	180	187	195	198	201	201	204	205	206	207	206	205	195
Jun20	205	205	208	213	219	215	203	190	180	182	191	199	199	199	203	208	211	207	210	213	215	217	214	215	205
Jun21	216	212	216	223	228	224	216	207	202	202	200	201	206	211	211	211	222	243	248	249	242	242	229	225	220
Jun22	225	221	222	222	223	219	219	210	205	205	202	202	205	204	215	190	177	188	276	310	118	151	158	177	206
Jun23	164	144	153	114	90	78	100	113	91	69	67	89	92	107	125	132	145	149	161	174	164	151	159	177	126
Jun24	174	166	162	163	155	161	151	131	135	126	135	138	136	150	164	176	191	184	187	197	195	193	189	186	164
Jun25	189	200	204	203	201	196	190	147	168	155	166	160	166	160	145	136	148	170	171	164	168	173	172	167	172
Jun26	170	174	171	175	177	172	167	164	160	148	163	172	172	168	167	173	178	182	184	186	185	189	194	188	174
Jun27	186	184	187	197	197	195	188	168	159	155	165	171	181	192	201	199	198	196	193	189	194	195	199	197	187
Jun28	193	182	186	190	195	180	174	178	178	164	169	167	175	180	198	175	185	188	195	194	198	193	191	191	184
Jun29	191	190	192	198	197	189	187	186	178	173	185	196	198	194	190	196	197	192	194	195	197	198	197	196	192
Jun30	195	197	197	203	206	199	185	185	177	177	174	180	192	198	199	207	212	215	210	207	211	213	208	203	198

2015, Field component: Y, Base: 1300.0, 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	82	101	104	108	115	127	117	113	103	89	81	..	..	..	..	..	..	..	..	..	..	..	..	..	::
Jun02	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	::
Jun03	94	93	95	101	113	128	132	131	118	100	83	71	62	60	65	73	85	92	93	93	93	94	94	95	94
Jun04	93	96	98	103	112	123	131	130	116	100	77	56	45	44	54	68	80	88	91	91	94	93	93	93	90

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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
Jun05	95	98	102	107	114	127	132	133	128	113	92	72	61	57	63	74	80	83	88	89	89	90	90	90	94
Jun06	94	95	98	106	119	126	129	130	124	107	79	60	53	50	53	60	70	79	86	86	87	92	93	93	90
Jun07	95	97	99	105	116	129	136	141	133	112	88	66	54	50	52	67	79	82	81	79	81	96	104	100	93
Jun08	104	107	107	120	133	150	151	141	109	108	88	56	57	64	64	83	88	116	110	95	98	110	109	108	103
Jun09	107	104	91	105	114	119	128	133	125	111	92	76	69	61	59	68	84	97	107	104	103	105	109	104	99
Jun10	104	102	110	121	130	136	138	129	123	105	98	82	71	63	65	76	97	98	100	99	98	98	97	98	103
Jun11	98	104	109	103	105	121	132	130	123	105	79	61	58	55	62	75	93	102	96	94	94	94	96	98	95
Jun12	102	107	111	119	125	132	129	126	122	113	93	75	62	55	52	60	64	69	75	79	85	91	96	96	93
Jun13	94	91	103	110	119	131	133	139	131	105	83	66	59	61	69	80	93	103	107	102	95	99	94	91	98
Jun14	109	123	119	118	116	127	132	123	98	80	68	59	54	55	62	69	81	91	92	93	92	99	103	102	94
Jun15	102	106	108	112	120	128	136	138	130	113	92	70	62	60	75	77	88	94	93	96	101	97	93	95	99
Jun16	93	99	99	108	117	127	136	131	112	88	72	67	65	63	68	79	92	98	102	93	92	93	95	95	95
Jun17	101	96	84	94	105	118	⋮	⋮	101	94	88	77	71	70	81	86	98	101	103	100	99	98	98	100	⋮
Jun18	97	101	101	116	126	137	136	134	126	106	79	⋮	59	63	⋮	80	95	95	97	94	94	96	96	95	⋮
Jun19	95	95	100	103	108	123	132	135	131	112	93	74	67	69	75	84	94	101	103	100	99	99	98	98	99
Jun20	98	98	99	107	118	124	128	130	126	116	95	77	66	64	73	82	92	96	97	97	97	95	94	95	99
Jun21	97	99	101	108	116	124	129	130	122	108	90	73	62	59	59	65	66	64	73	77	85	90	90	96	91
Jun22	95	98	98	110	123	128	130	126	114	105	90	72	62	63	55	62	71	96	97	98	151	126	120	114	100
Jun23	125	136	121	121	107	145	120	154	152	128	115	100	87	85	83	98	109	115	112	110	110	121	111	108	117
Jun24	105	116	146	146	133	139	144	140	137	123	108	97	90	81	74	79	85	96	102	97	100	105	106	108	109
Jun25	110	116	133	125	134	149	140	136	135	112	92	79	64	51	73	85	92	113	112	116	105	103	103	106	107
Jun26	108	107	120	105	116	132	141	140	128	113	100	87	79	80	87	96	106	106	104	105	105	104	102	102	107
Jun27	105	103	116	116	121	131	137	139	129	118	98	85	82	82	81	89	99	105	108	106	101	104	103	109	107
Jun28	122	105	112	112	119	109	122	138	139	127	111	99	93	91	93	93	99	106	106	115	107	99	103	102	109
Jun29	102	106	107	116	129	138	135	129	121	110	93	76	72	75	83	94	101	107	108	104	100	100	99	99	104
Jun30	102	101	103	109	128	129	128	134	130	118	101	86	75	67	72	84	92	93	91	89	94	100	106	105	101

2015, Field component: Z, Base: 43600.0, 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	68	67	69	73	76	72	68	59	52	50	46	⋮	⋮	⋮	⋮	64	68	69	67	68	70	70	69	67	⋮
Jun02	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
Jun03	66	68	69	71	74	72	68	64	54	46	45	49	57	55	60	64	68	70	68	68	69	67	68	68	64
Jun04	68	68	69	69	72	72	72	69	61	51	42	39	40	49	59	65	67	67	68	70	68	66	66	67	63
Jun05	67	68	69	69	71	73	70	67	58	48	42	42	48	52	56	61	66	66	67	68	67	66	66	67	62
Jun06	67	67	67	70	66	62	61	62	56	45	38	41	46	51	54	62	64	66	66	66	66	66	67	67	60
Jun07	66	66	67	70	74	77	62	72	62	49	41	41	45	54	60	63	66	64	62	63	65	68	68	68	63
Jun08	67	67	64	63	61	56	62	70	70	65	62	60	63	69	79	90	97	98	93	88	84	81	74	74	73
Jun09	75	75	76	73	73	74	74	71	70	66	62	57	61	68	74	74	81	86	85	80	79	78	77	74	73

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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
Jun10	73	68	71	74	73	77	79	74	70	65	60	59	60	67	70	76	81	83	81	81	79	78	76	74	73
Jun11	72	72	73	73	73	73	73	71	69	67	64	62	63	71	81	87	88	85	79	76	76	76	76	74	74
Jun12	73	74	74	74	73	72	68	68	64	58	58	57	60	62	65	68	72	71	70	70	70	71	71	72	68
Jun13	73	73	71	73	76	76	76	74	66	56	52	56	62	66	70	70	77	79	80	78	77	76	75	74	71
Jun14	68	66	69	72	74	73	75	69	59	55	56	52	49	54	61	66	71	75	76	75	76	75	72	72	67
Jun15	74	74	76	79	78	72	68	65	63	62	62	61	55	64	81	89	93	87	84	81	78	76	75	74	74
Jun16	74	70	72	75	78	76	76	72	64	57	54	55	59	65	71	80	85	82	78	76	75	74	74	74	72
Jun17	74	75	77	72	71	76	76	..	69	72	62	55	59	70	88	97	92	87	81	79	77	75	74	77	..
Jun18	77	77	77	78	76	75	74	67	69	57	51	..	56	67	..	81	84	84	79	76	76	75	74	75	..
Jun19	75	75	75	79	84	84	80	79	71	62	53	58	63	70	73	77	78	79	78	76	75	75	74	74	74
Jun20	74	75	77	78	77	76	77	79	78	70	58	59	62	68	70	72	72	76	75	74	73	73	73	70	73
Jun21	73	73	75	77	75	76	76	76	74	67	58	54	56	63	70	71	74	73	75	68	68	69	70	70	70
Jun22	71	71	72	74	72	70	70	69	60	61	59	54	54	59	76	86	97	98	103	87	102	113	110	105	79
Jun23	97	95	79	68	53	48	63	77	81	83	94	104	110	103	97	101	105	102	98	96	95	94	93	92	89
Jun24	90	83	86	86	84	81	85	89	92	88	84	81	83	85	84	86	88	90	92	90	89	88	88	88	87
Jun25	87	86	86	88	89	86	84	82	81	74	80	88	89	98	112	107	105	102	104	102	98	94	92	90	92
Jun26	88	87	87	86	85	88	87	85	80	84	78	77	80	86	87	87	88	91	89	89	87	87	86	86	86
Jun27	85	85	84	87	87	87	86	81	80	76	72	68	72	74	73	82	87	89	88	86	85	84	84	84	82
Jun28	82	84	85	86	86	91	90	88	81	84	81	80	79	80	91	96	93	94	91	89	88	87	86	86	87
Jun29	85	85	85	87	86	84	83	83	81	74	68	65	65	71	77	84	86	83	83	82	82	82	82	83	80
Jun30	82	83	84	86	87	86	84	79	76	74	68	62	61	66	74	80	83	84	84	83	82	81	80	81	79

2015, Field component: F, Base: 48400.0, 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	80	80	82	84	85	79	72	64	58	60	59	61	63	64	69	74	77	80	85	83	82	82	81	81	74
Jun02	81	81	83	84	85	82	76	71	63	59	58	61	61	65	68	76	79	81	81	83	85	84	83	81	75
Jun03	80	81	83	85	88	84	76	69	60	54	57	59	68	65	70	75	79	81	81	83	83	80	82	82	75
Jun04	82	81	82	84	86	83	77	72	66	60	54	51	53	61	70	74	75	77	79	84	83	80	80	81	74
Jun05	80	80	81	83	85	86	80	74	63	56	53	57	65	68	71	76	80	82	82	84	84	83	83	84	76
Jun06	84	85	86	87	88	84	79	74	63	51	44	47	54	62	70	80	83	81	81	83	84	85	84	83	75
Jun07	82	83	84	88	91	90	87	77	68	60	55	56	60	69	74	79	82	83	84	89	92	87	86	87	79
Jun08	85	83	83	83	83	76	66	51	59	56	54	60	43	48	63	77	83	101	89	87	85	85	88	76	73
Jun09	75	77	78	78	78	75	66	68	70	70	62	58	62	71	74	83	91	89	86	88	85	84	84	83	76
Jun10	82	79	78	82	82	83	76	69	58	53	54	58	64	71	73	91	94	94	91	90	87	86	86	83	77
Jun11	82	79	80	81	85	82	80	73	69	67	66	64	67	..	84	89	94	96	84	85	85	85	84	83	..
Jun12	81	81	83	84	84	80	73	71	66	61	64	66	70	78	82	83	89	88	86	85	88	86	84	86	79
Jun13	86	84	83	86	89	87	81	75	66	57	56	66	69	69	74	76	84	87	87	89	88	89	90	91	79
Jun14	94	84	84	85	84	82	78	65	57	52	57	61	60	62	65	69	78	79	85	89	90	88	87	82	76

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
Jun15	83	82	83	85	84	81	74	68	61	59	61	59	57	63	86	90	90	83	89	86	90	89	88	86	78
Jun16	86	85	83	85	85	82	79	70	58	53	56	60	63	68	74	85	97	85	84	87	88	88	87	87	78
Jun17	86	87	86	88	88	86	78	68	67	69	59	55	56	66	88	92	87	89	87	86	85	84	84	83	79
Jun18	83	81	84	85	87	84	79	67	60	58	57	:	:	:	:	84	94	88	84	84	84	84	83	83	:
Jun19	82	84	82	89	93	91	84	77	68	58	52	57	61	71	77	82	85	86	86	86	84	84	83	83	78
Jun20	83	84	87	91	92	90	85	82	76	70	62	66	68	73	81	81	83	85	86	86	86	87	86	86	81
Jun21	86	85	88	93	94	93	90	87	82	76	66	62	66	74	81	81	89	97	95	96	93	94	89	88	85
Jun22	89	87	88	90	89	86	87	81	74	71	68	63	64	68	88	86	90	97	139	140	72	96	95	99	88
Jun23	87	77	66	40	15	6	28	48	42	34	42	60	67	66	69	76	85	84	86	89	84	88	80	80	62
Jun24	84	75	77	77	72	72	71	66	70	62	62	60	61	68	74	80	89	88	91	93	92	91	89	87	77
Jun25	88	92	94	95	96	92	87	66	74	62	71	76	79	83	91	82	86	94	95	91	89	87	85	81	85
Jun26	81	81	81	81	81	82	79	76	73	67	68	71	74	77	78	81	84	89	88	88	86	88	89	86	80
Jun27	85	84	85	91	91	91	88	75	69	64	64	62	71	76	80	87	92	93	90	87	88	88	90	88	82
Jun28	85	82	85	88	91	88	84	85	83	75	74	72	75	77	95	89	92	94	94	92	92	89	88	88	86
Jun29	87	86	88	92	91	86	84	84	78	69	68	70	71	75	79	88	91	85	86	86	92	87	87	87	83
Jun30	86	87	89	93	95	92	87	79	76	71	64	61	65	71	79	89	93	95	93	91	92	92	90	88	84

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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.

2015, 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
Jul01	104	104	107	111	112	104	93	89	88	91	87	81	86	89	99	97	99	95	100	102	103	102	100	100	98
Jul02	99	99	101	106	106	98	90	87	82	84	91	99	98	99	103	101	101	101	101	102	103	102	102	104	98
Jul03	102	101	103	108	110	106	100	100	93	89	85	90	94	98	103	109	109	108	108	111	111	110	110	111	103
Jul04	110	109	112	112	112	112	106	103	99	94	99	105	110	110	102	124	135	130	138	102	111	70	69	73	106
Jul05	94	87	83	74	88	75	61	52	46	47	53	51	68	75	70	77	88	87	87	92	99	92	90	87	76
Jul06	91	100	112	87	86	85	77	67	55	60	64	70	79	81	83	85	88	91	91	96	89	87	90	91	83
Jul07	93	90	92	96	...	...	90	82	79	67	75	82	88	...	84	84	87	94	96	101	101	105	89	95	...
Jul08	93	91	92	94	95	95	91	83	78	75	80	81	85	90	84	92	97	97	104	103	100	99	96	96	91
Jul09	98	99	101	101	97	98	91	86	80	80	88	92	96	97	95	88	90	97	104	108	107	101	101	100	96
Jul10	98	98	98	100	95	84	82	85	89	98	99	99	94	95	99	101	112	117	117	126	130	130	146	150	106
Jul11	132	134	130	136	135	125	98	88	77	73	82	71	74	78	75	72	85	89	97	107	102	108	100	103	99
Jul12	105	105	97	101	104	90	81	71	71	75	90	92	96	88	86	91	101	106	112	106	104	104	102	105	95
Jul13	103	113	124	112	92	123	95	76	74	55	49	46	51	51	51	55	65	66	65	101	92	104	105	88	80
Jul14	89	93	82	87	83	71	60	50	49	63	75	84	90	89	89	90	94	97	100	99	103	105	104	102	85
Jul15	99	97	98	100	101	94	86	80	77	81	84	92	100	106	95	101	95	94	96	100	98	99	100	103	95
Jul16	108	101	105	102	105	97	88	77	67	69	74	84	92	93	101	80	87	95	96	105	105	103	104	98	92
Jul17	98	100	102	104	106	102	88	76	77	80	94	102	102	93	92	91	93	96	102	106	104	103	104	101	96
Jul18	101	102	103	106	107	104	92	77	67	64	66	72	81	86	92	98	96	96	103	108	109	108	106	103	93
Jul19	103	103	102	104	107	104	94	81	70	65	68	83	96	104	108	111	111	109	110	113	114	114	115	113	100
Jul20	111	110	112	115	118	115	107	89	78	80	80	90	90	95	99	110	112	117	120	123	127	126	127	129	107
Jul21	133	135	123	125	129	121	105	92	91	82	89	105	105	110	109	109	109	109	110	114	115	113	115	106	111
Jul22	102	105	112	115	116	114	109	114	107	...	...	...	...	110	115	107	114	103	108	111	114	115	113	113	...
Jul23	120	107	111	112	106	93	65	41	34	60	73	72	68	55	50	62	79	85	92	88	81	88	87	98	83
Jul24	87	85	89	91	91	88	76	68	61	64	69	75	71	71	83	82	83	88	89	95	93	94	92	95	90
Jul25	99	104	97	93	96	90	83	74	59	56	79	92	96	97	95	92	92	93	96	100	100	96	92	93	92
Jul26	98	95	95	95	91	85	80	72	65	55	68	81	95	99	98	96	87	96	106	108	111	112	109	111	95
Jul27	108	104	105	106	109	102	90	85	76	67	82	92	75	79	92	85	91	102	105	103	109	108	106	105	95
Jul28	110	105	104	102	95	98	94	94	89	82	88	92	94	83	81	84	106	109	96	101	101	103	104	103	99
Jul29	102	102	103	101	102	96	81	70	68	78	92	100	108	111	108	104	106	109	110	101	103	103	104	105	99
Jul30	105	107	110	112	109	103	...	99	97	92	97	107	116	112	98	109	121	125	117	104	83	96	101	132	...
Jul31	110	111	106	105	97	95	94	86	75	68	74	89	100	109	106	115	120	91	96	108	110	109	110	94	99

2015, Field component: Y, Base: 1300.0, 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	105	102	103	113	125	135	132	132	130	117	96	79	70	71	75	85	96	99	99	98	100	102	103	104	103
Jul02	104	102	103	110	120	128	132	134	131	119	98	80	69	70	77	87	95	100	100	98	97	98	100	102	102
Jul03	103	104	107	114	126	138	138	131	125	114	98	87	79	77	82	90	95	97	95	92	93	96	99	103	103

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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
Jul04	105	107	109	113	125	127	132	137	130	110	94	79	64	52	60	66	63	62	72	113	116	120	140	120	101
Jul05	120	124	146	133	118	131	142	143	137	125	100	86	83	77	81	87	94	101	111	105	106	103	113	113	112
Jul06	108	112	121	121	129	137	146	146	140	128	109	91	81	73	75	81	89	96	101	106	103	102	104	107	109
Jul07	109	113	109	114	...	...	130	131	123	116	99	81	78	...	...	76	86	95	104	106	105	109	107	108	...
Jul08	108	109	111	118	126	138	140	136	126	115	97	85	82	74	70	73	82	97	108	106	103	101	104	105	105
Jul09	105	106	106	112	111	118	128	130	122	106	84	73	66	66	80	89	94	95	97	101	106	104	101	102	100
Jul10	104	106	109	111	126	139	140	131	117	104	94	82	77	73	76	79	81	84	86	87	86	88	90	104	99
Jul11	114	110	97	128	127	132	131	130	121	108	91	83	88	83	85	93	97	103	107	114	107	105	102	96	106
Jul12	96	103	103	116	122	132	130	130	111	95	82	81	79	80	84	92	99	109	110	106	118	105	101	95	103
Jul13	98	104	104	102	102	116	115	118	113	119	103	86	77	83	81	95	119	119	115	127	112	116	114	123	107
Jul14	126	120	119	128	137	141	143	141	127	109	85	73	64	66	75	87	94	98	99	103	101	101	100	100	106
Jul15	103	104	106	109	122	135	134	132	124	106	84	71	62	62	72	89	98	103	103	103	103	104	105	107	102
Jul16	101	94	100	116	126	129	131	126	117	101	83	72	74	77	83	95	104	107	106	107	106	103	105	102	103
Jul17	101	102	101	110	117	123	127	124	116	103	89	80	68	69	80	88	97	104	103	103	103	100	101	101	100
Jul18	102	104	104	108	115	125	135	136	119	103	97	76	67	68	72	84	97	104	106	110	103	103	102	100	103
Jul19	101	101	102	107	114	126	137	139	128	110	89	73	60	62	70	82	94	100	100	97	97	98	99	100	99
Jul20	100	102	105	111	120	129	135	139	131	108	84	62	54	64	69	77	86	92	93	93	94	98	101	104	98
Jul21	106	107	108	115	126	133	135	125	117	107	93	73	62	62	67	76	86	90	90	95	98	105	99	101	99
Jul22	106	108	108	115	125	130	130	128	...	...	...	...	...	79	75	83	86	82	90	95	98	98	96	98	...
Jul23	121	115	114	113	104	106	110	122	114	107	104	...	75	76	84	96	112	114	113	123	117	108	103	109	...
Jul24	109	112	112	119	127	132	133	130	129	116	103	89	81	83	86	93	105	109	103	104	106	118	103	100	108
Jul25	101	95	110	117	132	147	147	138	120	100	91	84	83	84	86	93	101	101	99	103	107	115	119	114	108
Jul26	118	106	106	109	120	131	140	139	124	104	87	75	75	77	87	97	101	104	100	95	96	96	103	105	104
Jul27	108	108	108	119	130	137	136	131	116	98	81	71	73	73	83	87	97	99	99	96	98	104	106	102	103
Jul28	101	107	111	117	125	124	124	123	115	109	95	85	75	85	89	95	103	106	106	100	101	104	106	106	105
Jul29	104	107	108	113	116	124	130	130	122	101	86	83	84	86	89	94	98	102	105	104	99	98	100	102	105
Jul30	106	107	105	119	130	139	...	146	137	123	104	90	83	78	79	82	81	88	102	106	111	104	110	130	...
Jul31	127	126	127	137	136	141	147	137	124	107	92	72	67	61	71	77	82	87	91	94	101	121	133	127	108

2015, Field component: Z, Base: 43600.0, 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	81	82	83	83	80	79	83	81	77	68	63	67	74	74	76	80	86	86	82	81	81	82	82	81	79
Jul02	81	82	83	83	85	82	81	82	78	71	60	63	62	61	70	78	83	83	81	80	81	80	80	80	77
Jul03	80	80	82	86	85	82	80	78	74	64	60	60	64	67	71	74	77	80	78	78	78	77	77	78	75
Jul04	78	78	80	84	83	80	75	71	65	54	42	47	57	62	66	73	74	78	82	85	83	86	85	82	73
Jul05	80	75	72	82	77	78	81	82	82	81	76	72	73	80	87	86	87	93	94	91	88	86	84	85	82
Jul06	83	80	74	74	80	78	85	85	80	76	70	73	72	74	80	86	89	89	88	88	86	85	85	84	81
Jul07	82	83	85	88	...	80	80	83	79	75	74	73	70	...	...	79	83	86	85	85	85	83	82	81	...

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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
Jul08	81	81	82	84	85	85	80	74	71	67	61	56	56	56	61	70	80	87	87	85	84	82	81	81	76
Jul09	81	81	82	83	83	82	85	84	86	86	74	64	66	70	78	81	81	82	81	81	82	82	81	81	80
Jul10	81	81	83	84	85	84	84	83	76	71	71	69	65	65	69	72	75	78	77	78	78	78	79	76	77
Jul11	77	78	76	68	69	68	71	75	71	73	67	63	63	68	78	86	88	90	88	88	87	85	84	83	77
Jul12	81	81	81	82	84	82	77	76	69	60	55	54	62	71	80	85	87	87	88	85	83	83	82	81	77
Jul13	78	76	76	76	76	68	71	76	75	74	72	78	88	91	89	97	107	110	106	95	86	88	87	83	84
Jul14	82	80	84	87	90	90	86	84	77	68	65	63	62	67	73	82	85	83	82	81	82	81	81	82	79
Jul15	83	83	83	85	85	82	81	79	75	70	63	61	58	61	73	86	87	85	84	84	84	82	82	81	78
Jul16	78	77	76	79	83	81	83	81	76	71	69	67	69	75	84	89	89	87	86	85	80	80	80	81	80
Jul17	82	82	83	84	86	83	80	79	80	73	70	69	68	71	78	81	80	80	81	81	82	81	79	79	79
Jul18	81	81	82	84	85	84	85	85	80	72	65	63	64	68	74	79	83	83	81	82	77	77	77	77	78
Jul19	80	80	81	83	85	83	83	81	74	58	46	47	56	65	69	77	80	80	76	76	76	76	76	76	74
Jul20	78	78	79	81	83	85	84	80	74	66	63	66	67	68	72	78	79	77	76	75	79	79	79	79	76
Jul21	76	75	77	77	76	74	72	70	65	62	56	55	60	64	68	75	80	78	77	79	81	81	80	80	72
Jul22	79	79	80	82	83	79	78	82	:	:	:	:	:	72	75	80	80	82	81	81	90	88	87	83	:
Jul23	75	77	78	81	82	77	77	77	77	68	61	:	72	78	84	88	90	90	91	91	86	85	85	84	:
Jul24	82	84	86	88	90	88	84	82	79	80	75	72	72	77	84	89	91	92	87	85	83	84	84	83	84
Jul25	84	83	86	86	87	85	86	84	79	74	68	71	70	70	81	86	82	80	81	83	83	83	84	83	81
Jul26	78	80	83	86	88	88	87	83	79	81	82	81	79	79	82	91	88	85	83	82	84	83	82	81	83
Jul27	81	82	82	86	87	85	85	81	74	69	69	71	77	74	79	83	84	84	84	85	83	84	83	83	81
Jul28	82	81	81	84	85	85	85	83	76	73	74	73	75	78	79	81	86	86	85	85	84	84	83	83	81
Jul29	83	82	83	85	86	81	78	76	75	74	73	73	71	70	74	80	82	82	84	84	83	83	82	82	79
Jul30	82	82	82	82	83	83	:	81	78	76	69	62	59	65	70	74	77	77	83	87	90	88	86	81	:
Jul31	80	80	79	78	81	83	81	82	81	74	68	66	59	67	74	81	86	90	85	84	84	84	82	82	79

2015, Field component: F, Base: 48400.0, 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	89	90	92	93	92	88	87	84	80	72	64	65	74	75	82	84	91	89	88	87	88	88	88	87	84
Jul02	87	87	90	94	94	88	83	83	77	72	64	69	68	68	77	84	89	89	88	87	87	87	87	88	83
Jul03	87	87	90	94	96	91	87	84	79	67	62	63	69	72	79	84	87	89	88	88	88	88	88	89	83
Jul04	88	89	91	93	95	92	86	80	73	60	51	58	69	73	73	89	94	96	103	92	94	79	78	77	82
Jul05	84	77	73	80	79	74	71	68	66	65	63	57	65	75	79	81	87	92	93	93	93	88	86	85	78
Jul06	85	87	86	76	81	83	82	75	68	66	62	66	70	71	78	85	88	90	90	92	87	85	86	85	80
Jul07	85	84	88	92	91	84	82	82	77	67	70	72	71	70	73	77	83	88	89	91	91	91	87	85	82
Jul08	84	83	85	88	90	89	83	75	69	64	60	56	57	60	61	72	85	91	94	91	90	88	86	86	79
Jul09	87	87	89	89	89	87	87	84	84	83	75	68	70	74	82	81	82	86	89	91	91	88	87	87	84
Jul10	86	87	88	90	89	84	83	83	78	77	77	75	70	69	75	79	86	91	90	95	97	98	104	105	86
Jul11	98	99	96	92	92	87	78	78	69	68	66	58	59	65	73	79	87	90	93	97	94	94	90	90	83

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
Jul12	89	87	86	89	92	84	76	71	64	57	59	59	67	72	80	87	93	95	99	94	91	91	89	89	82
Jul13	86	88	92	88	79	86	76	73	71	62	57	60	72	74	73	82	96	99	95	106	88	85	85	84	82
Jul14	84	84	83	87	89	84	76	70	62	60	61	63	64	69	75	83	88	88	88	88	89	89	90	89	79
Jul15	88	87	88	91	91	86	82	77	72	69	64	64	65	70	77	91	90	88	88	90	91	90	89	88	82
Jul16	88	84	85	86	92	87	85	77	69	65	65	67	72	78	86	86	88	91	90	90	87	88	88	87	82
Jul17	87	88	90	91	94	90	82	76	73	71	74	77	75	74	80	83	83	84	88	89	89	88	87	87	83
Jul18	87	88	89	92	95	92	88	82	73	64	58	58	62	68	77	84	87	88	88	91	90	88	87	87	82
Jul19	87	87	88	90	94	92	87	80	69	52	41	48	61	73	79	87	90	90	87	88	89	90	90	89	80
Jul20	89	89	91	94	97	98	94	83	72	65	62	68	69	72	78	88	90	90	91	91	89	93	95	95	85
Jul21	96	97	93	95	96	91	83	74	69	62	59	65	69	75	78	85	88	88	88	91	92	91	92	88	84
Jul22	86	88	91	95	96	92	89	91	90	87	82	81	82	83	87	89	92	89	90	92	94	93	92	91	89
Jul23	91	87	89	93	91	80	69	59	56	58	57	60	64	64	68	77	86	89	92	92	88	88	86	88	78
Jul24	83	83	87	90	92	89	80	75	69	71	68	68	66	70	82	86	89	92	88	89	89	91	88	88	82
Jul25	89	90	86	89	92	87	85	77	68	61	66	74	74	75	84	88	84	83	86	88	89	89	87	86	82
Jul26	84	84	87	89	89	88	85	79	71	68	73	78	82	84	87	94	87	89	91	92	92	93	91	92	85
Jul27	90	90	91	94	97	92	87	82	70	62	68	65	72	70	81	82	85	90	92	93	93	93	91	91	84
Jul28	92	89	89	91	89	90	88	86	78	72	75	76	78	76	77	80	87	88	89	91	90	91	91	90	85
Jul29	89	89	90	92	93	86	77	71	68	71	76	79	81	81	84	87	90	92	94	90	89	90	90	90	85
Jul30	90	91	92	94	94	91	...	87	84	80	75	...	...	77	75	85	92	94	96	95	88	92	93	102	...
Jul31	91	91	89	87	86	88	86	83	77	67	64	68	66	77	82	93	99	91	89	93	94	94	93	86	85

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

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
2015, Field component: X, Base: 20900.0, Unit: nT																									
Aug01	100	94	98	98	96	97	89	82	77	76	83	96	108	109	107	103	104	102	97	102	106	106	110	113	98
Aug02	103	104	112	99	104	105	96	77	58	58	66	79	93	91	95	95	98	97	105	106	105	108	104	105	94
Aug03	98	100	100	110	112	105	99	90	59	84	79	79	82	82	87	103	103	103	106	109	111	105	105	109	98
Aug04	105	101	103	105	108	106	99	92	87	85	78	79	84	88	100	102	105	109	114	111	111	108	119	111	100
Aug05	101	104	107	109	108	109	102	...	81	80	81	90	88	96	102	104	107	110	111	112	114	114	108	109	:
Aug06	114	110	107	112	115	112	104	93	84	60	66	75	82	87	84	92	89	93	107	110	117	118	119	110	98
Aug07	108	107	106	108	109	110	97	83	72	76	79	80	75	85	82	74	75	104	110	114	109	106	108	110	96
Aug08	104	102	102	104	109	109	97	80	72	70	77	73	85	66	78	78	83	92	101	107	106	98	99	104	92
Aug09	101	101	105	103	101	109	86	80	75	75	81	82	95	96	90	80	94	92	95	102	107	108	112	103	94
Aug10	104	112	108	106	103	93	75	80	80	84	86	91	97	90	93	94	95	105	106	97	102	106	108	109	97
Aug11	107	103	113	106	106	99	94	88	86	82	92	101	99	99	101	100	101	97	101	104	103	105	112	105	100
Aug12	109	112	110	106	114	102	94	86	86	93	100	105	106	108	109	86	97	97	100	92	91	110	102	99	101
Aug13	92	95	95	94	102	94	...	64	79	68	80	84	92	93	89	88	82	81	86	90	93	92	95	98	:
Aug14	97	97	98	100	100	94	87	79	76	78	90	101	104	102	100	98	98	101	108	110	114	112	110	110	99
Aug15	121	112	107	110	112	108	98	95	107	108	109	81	37	27	55	58	65	74	71	78	86	86	106	107	88
Aug16	121	98	93	94	103	79	61	38	18	63	66	68	75	69	55	65	65	66	83	78	80	93	89	84	75
Aug17	94	90	96	87	91	79	58	59	60	47	60	49	41	60	53	50	62	74	95	103	84	85	92	87	73
Aug18	95	97	86	84	83	76	61	45	46	51	64	75	78	81	82	77	85	86	94	100	102	97	95	99	81
Aug19	115	97	92	107	98	79	63	65	50	48	57	70	61	47	58	74	74	81	88	97	106	111	99	98	81
Aug20	100	94	91	98	102	96	80	73	64	57	66	79	63	78	87	91	91	88	95	100	101	100	106	102	88
Aug21	97	98	98	96	99	95	85	70	66	66	73	82	89	92	91	94	99	101	103	104	104	104	105	109	92
Aug22	107	99	97	96	98	95	85	79	79	82	95	105	103	85	72	61	68	77	80	98	102	104	102	109	92
Aug23	113	105	120	120	114	122	104	75	72	69	67	57	75	75	57	72	77	80	83	113	94	102	109	111	87
Aug24	93	89	92	93	93	85	86	75	72	69	75	92	101	97	102	99	95	95	99	96	96	88	92	98	91
Aug25	99	98	98	96	100	101	110	83	81	86	98	101	105	103	94	93	86	90	99	92	96	97	103	109	95
Aug26	109	101	103	119	108	107	82	43	55	65	53	35	41	59	66	57	50	61	63	69	52	51	65	95	81
Aug27	78	84	98	83	113	103	74	57	47	37	38	35	41	41	44	39	22	33	37	27	35	50	65	99	59
Aug28	95	75	78	91	83	83	66	57	55	53	38	55	58	64	55	29	49	43	47	54	70	76	95	84	64
Aug29	86	79	82	80	80	74	71	57	55	53	61	90	106	105	99	94	85	77	82	100	95	92	95	93	83
Aug30	95	91	91	91	91	82	71	59	55	64	75	90	102	108	107	104	97	98	98	103	104	100	98	97	90
Aug31	94	93	93	94	95	93	83	73	69	69	81	98	109	114	113	107	103	100	101	100	104	101	97	97	95
2015, Field component: Y, Base: 1300.0, Unit: nT																									
Aug01	115	107	109	119	125	127	130	124	114	105	90	79	74	73	74	83	98	108	103	100	102	107	104	107	103
Aug02	110	101	113	116	125	133	141	146	134	116	93	75	63	65	77	88	98	104	106	100	101	101	104	107	105
Aug03	109	111	109	108	127	131	131	134	130	112	95	81	69	60	68	77	90	103	103	102	103	107	108	104	103

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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
Aug04	111	112	112	107	117	131	137	135	127	117	99	80	66	65	72	79	90	101	113	108	104	110	111	107	105
Aug05	111	110	110	112	124	133	138	⋮	136	124	106	82	66	65	66	75	90	101	103	104	104	101	109	109	⋮
Aug06	107	111	111	113	121	127	137	134	120	108	88	77	73	70	75	87	95	105	111	104	98	102	105	103	103
Aug07	105	99	102	107	119	133	139	125	113	102	86	79	77	80	97	107	99	91	93	94	96	97	99	105	102
Aug08	107	114	119	115	118	128	132	129	112	100	85	75	67	72	84	89	96	98	100	106	117	116	109	107	104
Aug09	112	111	109	117	126	124	126	123	113	97	88	87	86	84	83	92	101	107	110	104	100	117	109	107	106
Aug10	109	98	111	115	120	126	126	115	111	100	88	83	80	90	98	97	98	100	108	112	102	101	104	112	104
Aug11	113	111	105	114	122	133	130	123	115	98	90	86	83	87	91	95	100	101	98	99	101	102	104	107	104
Aug12	106	109	112	117	123	130	132	135	130	115	97	82	77	82	88	100	113	108	110	112	106	117	116	119	110
Aug13	128	130	119	113	133	⋮	⋮	132	110	97	85	79	78	88	98	106	113	117	118	111	109	109	104	105	⋮
Aug14	108	108	111	116	128	136	139	132	119	105	91	81	75	82	88	92	102	105	102	101	102	103	106	104	106
Aug15	101	106	113	113	120	126	132	134	126	106	88	75	77	63	73	77	87	119	105	109	110	110	113	129	105
Aug16	144	159	128	104	113	102	95	104	110	116	99	82	79	73	75	85	94	134	119	125	130	129	120	101	109
Aug17	109	114	116	117	101	112	126	118	121	113	100	86	79	86	84	102	106	110	127	125	122	106	107	110	108
Aug18	106	102	117	122	131	141	142	137	118	99	85	76	73	79	85	98	109	106	105	105	107	109	111	108	107
Aug19	122	121	113	102	110	119	132	133	124	108	83	74	66	72	86	106	110	113	105	105	120	112	114	108	106
Aug20	107	106	111	104	112	134	148	143	125	105	90	73	70	78	83	94	105	113	103	104	108	116	115	109	107
Aug21	109	110	114	114	126	142	147	142	131	113	93	78	71	73	84	94	103	108	107	109	106	103	101	107	108
Aug22	115	114	113	120	128	133	135	129	116	116	83	74	77	80	91	94	105	106	110	118	108	109	110	107	106
Aug23	116	116	98	114	124	131	135	128	110	94	84	72	68	63	82	107	106	109	111	125	108	109	113	107	105
Aug24	109	103	109	117	123	126	129	128	120	111	96	85	80	89	95	103	110	108	107	109	108	109	110	110	108
Aug25	111	109	109	109	114	125	131	130	120	110	98	92	85	87	94	105	109	114	119	130	117	107	104	112	110
Aug26	120	121	110	108	115	117	121	117	109	103	97	87	74	86	93	95	97	141	134	154	137	141	126	157	115
Aug27	141	140	124	114	122	133	145	136	132	121	103	84	65	80	80	80	113	123	129	141	147	149	155	142	121
Aug28	138	133	142	155	161	156	154	139	124	106	85	76	80	47	39	77	98	125	153	129	134	115	127	125	117
Aug29	113	108	125	127	136	140	143	141	130	107	92	82	70	83	93	99	104	110	116	113	112	110	111	117	112
Aug30	117	115	115	119	129	137	141	135	124	101	81	70	70	79	93	104	112	107	103	109	112	110	109	113	109
Aug31	116	118	120	121	121	135	138	135	135	103	88	72	69	79	93	102	107	104	109	106	109	111	114	115	109

2015, Field component: Z, Base: 43600.0, 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	81	80	81	84	86	88	90	85	81	78	69	61	62	67	75	84	88	91	88	85	83	82	82	80	81
Aug02	81	80	77	80	84	88	90	84	82	77	71	68	71	76	85	85	88	87	84	81	82	81	81	81	81
Aug03	81	81	82	83	82	75	76	79	83	75	72	67	68	75	83	84	85	86	83	82	82	82	82	80	79
Aug04	79	80	81	84	84	85	83	81	83	80	77	75	70	69	73	80	83	85	83	81	82	82	80	76	80
Aug05	78	79	80	81	81	79	80	⋮	82	78	73	64	60	67	72	76	80	82	80	80	81	81	79	80	⋮
Aug06	78	77	78	80	82	83	83	83	75	72	67	58	59	68	75	80	85	85	86	85	84	83	81	79	78
Aug07	80	81	80	82	83	82	83	83	79	72	73	73	79	84	101	105	97	88	83	83	84	84	84	83	84

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
Aug08	82	82	83	85	86	83	84	87	85	79	70	70	74	76	86	90	89	87	86	86	86	87	87	85	83
Aug09	85	85	85	86	87	83	81	80	78	77	77	75	72	72	81	86	89	90	92	90	86	83	82	82	83
Aug10	83	82	80	83	85	82	83	75	69	66	65	67	71	75	83	84	82	80	82	85	85	84	83	83	79
Aug11	83	83	81	81	83	80	80	76	74	70	67	70	70	70	73	80	86	84	82	82	83	83	80	81	78
Aug12	82	81	82	84	87	85	83	76	72	67	64	65	73	77	82	87	89	87	88	90	90	85	83	81	81
Aug13	81	81	83	84	84	·	·	84	81	81	84	86	82	75	76	83	90	91	91	90	88	88	87	87	·
Aug14	86	86	86	87	87	82	79	78	77	75	76	75	71	69	71	76	81	82	81	82	82	81	82	82	80
Aug15	79	78	77	76	77	85	84	81	72	66	67	75	75	84	89	93	100	101	102	102	99	91	86	79	85
Aug16	72	73	77	76	77	85	80	72	82	73	79	75	69	72	85	92	100	105	102	99	95	90	87	88	88
Aug17	83	85	86	89	88	87	88	84	79	82	80	79	83	83	86	98	104	98	95	91	90	87	86	88	88
Aug18	87	84	85	89	91	92	89	87	86	75	70	69	73	77	84	87	91	90	87	88	87	86	85	86	84
Aug19	80	80	84	80	82	83	85	81	81	78	72	70	79	87	95	102	102	98	95	91	88	87	86	84	86
Aug20	85	84	85	89	91	89	86	89	87	81	82	81	83	85	83	85	90	92	90	89	88	85	86	84	86
Aug21	85	86	87	88	90	89	88	82	77	81	72	66	68	74	80	85	86	85	85	86	85	85	85	84	83
Aug22	83	83	84	86	88	90	80	80	77	70	74	70	72	85	91	90	91	91	89	89	88	88	88	88	84
Aug23	83	84	85	81	82	80	85	84	80	79	80	79	76	85	94	95	93	93	94	86	86	86	86	86	85
Aug24	87	88	86	88	88	87	87	85	83	74	74	73	76	76	78	81	83	83	84	92	87	91	89	84	83
Aug25	86	84	86	85	85	85	85	86	84	80	80	78	80	78	82	86	92	93	92	95	92	100	95	96	86
Aug26	84	84	84	82	83	84	83	88	84	80	82	84	87	91	93	100	110	115	109	103	99	112	106	98	91
Aug27	85	85	80	75	68	73	86	93	90	82	82	85	89	93	99	112	130	129	124	120	116	108	101	92	96
Aug28	83	88	91	90	90	88	97	92	84	85	87	86	89	95	103	118	130	136	128	118	111	108	93	89	99
Aug29	99	95	93	96	96	97	92	88	90	89	85	83	85	87	88	91	95	96	98	94	93	89	89	92	92
Aug30	92	92	92	93	95	95	92	88	84	83	80	76	80	82	86	89	89	89	89	89	89	88	88	89	88
Aug31	90	90	90	91	92	91	84	78	75	78	71	77	76	76	80	86	91	89	88	88	88	91	91	89	85

2015, Field component: F, Base: 48400.0, 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	87	84	86	89	91	92	91	84	78	74	69	66	73	78	84	91	95	97	92	91	92	91	92	92	86
Aug02	88	88	88	86	93	96	93	81	70	66	63	65	74	78	87	88	93	91	92	90	90	90	89	89	84
Aug03	87	88	88	93	94	85	82	82	76	75	69	65	67	73	82	90	92	93	92	91	92	92	90	90	84
Aug04	88	87	89	91	94	94	89	85	84	81	74	72	69	70	79	86	90	94	95	92	92	92	95	88	86
Aug05	85	88	89	91	91	89	88	86	81	77	72	66	62	71	79	83	88	92	90	91	93	93	89	90	84
Aug06	90	88	88	92	95	94	92	87	75	62	59	55	59	69	74	82	86	88	95	95	97	96	95	90	83
Aug07	90	90	89	92	96	93	95	82	73	68	70	71	74	83	97	98	90	95	93	95	93	92	93	93	88
Aug08	90	89	90	93	96	93	89	84	79	73	67	64	73	67	81	85	87	89	91	95	95	92	93	92	85
Aug09	91	92	93	93	94	88	81	74	74	73	75	74	77	77	82	87	91	91	95	96	94	93	93	89	86
Aug10	91	93	90	92	92	85	78	68	67	66	66	70	76	77	85	86	86	88	91	89	92	93	93	93	84
Aug11	92	90	93	90	92	87	84	78	75	69	71	77	76	76	80	86	91	89	88	90	90	91	91	89	85

Table 8.8 (cont'd)

day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	mean
Aug12	92	93	92	93	99	92	87	79	74	72	72	75	82	86	91	86	93	91	94	91	91	95	89	88	87
Aug13	85	86	87	87	92	90	87	75	70	73	81	84	84	78	78	83	88	88	90	91	91	89	90	91	85
Aug14	90	90	90	93	93	86	81	76	73	72	78	82	79	77	77	82	86	88	90	92	94	93	92	92	85
Aug15	95	90	89	93	95	95	90	85	83	77	78	73	54	57	66	79	84	94	93	97	98	99	95	88	85
Aug16	89	81	81	80	86	79	69	63	59	73	71	67	65	65	70	81	89	95	99	94	91	92	88	87	80
Aug17	86	87	90	89	90	84	76	75	71	65	69	63	63	71	71	81	91	91	98	98	89	89	89	88	82
Aug18	90	88	85	88	90	88	78	67	62	60	61	65	70	75	81	83	90	89	90	93	94	92	90	91	82
Aug19	93	85	86	89	87	80	75	76	70	62	60	63	67	68	81	95	95	95	95	95	97	97	90	91	83
Aug20	91	87	87	93	97	93	84	78	72	69	73	76	72	80	83	87	91	92	93	94	94	93	94	90	86
Aug21	89	90	92	92	95	93	88	82	79	72	67	65	70	77	82	87	90	91	92	92	93	92	92	92	87
Aug22	92	89	89	90	93	94	88	80	75	69	77	79	80	83	83	78	82	90	93	95	95	93	95	95	85
Aug23	95	92	95	96	95	97	89	69	61	70	71	65	74	79	80	88	88	89	92	101	89	88	90	92	85
Aug24	90	89	88	90	91	86	85	80	75	68	69	76	82	80	85	86	87	87	90	90	91	92	92	91	89
Aug25	91	91	90	89	91	91	91	84	80	81	85	85	87	85	85	89	91	94	93	94	91	95	96	96	88
Aug26	94	91	91	96	93	94	95	88	81	75	81	82	82	78	83	85	92	102	97	96	84	84	86	90	83
Aug27	82	85	86	75	82	82	83	68	71	73	67	62	68	72	79	88	98	102	99	92	92	95	91	101	88
Aug28	88	84	88	93	90	88	82	76	67	64	65	71	75	83	85	89	109	112	109	102	102	101	103	96	90
Aug29	97	91	90	93	93	92	88	80	76	75	74	84	92	94	92	93	93	91	95	99	96	95	94	95	88
Aug30	95	93	93	95	96	93	86	77	71	73	75	78	86	91	94	96	93	93	93	95	96	94	94	93	89
Aug31	93	93	93	94	95	94	91	83	76	71	74	81	84	87	90	91	92	91	93	93	95	93	93	93	89

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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.

2015, 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	103	104	103	103	103	100	93	84	79	80	87	95	99	103	104	107	107	106	108	109	106	104	107	104	100
Sep02	102	104	104	103	108	104	95	82	82	75	88	100	109	115	111	109	112	112	100	107	97	98	94	95	100
Sep03	110	107	100	104	105	96	96	83	71	73	81	97	105	106	106	103	100	101	103	102	101	108	108	111	99
Sep04	109	96	88	83	107	96	86	59	68	58	68	77	71	77	85	83	85	89	88	84	94	99	101	113	86
Sep05	99	96	97	98	98	100	84	58	56	58	64	78	88	90	89	91	81	92	99	95	97	98	105	103	88
Sep06	102	101	103	106	109	98	85	87	78	80	85	91	97	74	85	94	92	97	90	103	99	93	95	:	:
Sep07	103	106	98	96	92	82	82	85	73	73	88	95	92	94	60	36	35	31	47	45	47	57	47	80	73
Sep08	102	137	77	58	71	80	75	66	55	:	:	89	102	103	98	93	91	95	103	105	108	106	121	112	:
Sep09	102	109	127	126	75	66	47	:	13	1	4	7	14	13	26	23	12	39	60	47	66	60	79	90	:
Sep10	72	71	72	70	67	60	51	46	50	57	77	89	98	96	90	89	86	64	73	75	105	108	116	92	78
Sep11	101	104	100	100	94	86	92	88	18	28	52	56	59	44	45	41	39	47	71	79	81	92	102	87	71
Sep12	73	87	83	81	74	63	59	39	39	50	64	80	86	90	93	84	79	82	86	88	96	90	89	:	:
Sep13	88	88	91	90	91	86	77	66	58	62	71	77	82	86	78	56	60	75	93	86	92	94	104	:	81
Sep14	94	91	92	95	94	89	84	76	73	80	85	92	100	96	88	58	40	57	93	80	89	90	94	104	81
Sep15	89	94	102	84	91	89	76	66	49	50	66	71	60	81	92	85	67	76	86	93	100	95	103	97	85
Sep16	100	96	95	100	94	95	86	74	66	74	80	88	96	103	100	99	95	88	93	100	102	96	90	90	82
Sep17	122	92	98	99	100	100	88	77	72	69	70	80	83	87	91	98	97	96	97	99	99	99	93	109	93
Sep18	105	101	106	106	103	107	99	90	79	68	65	66	78	76	87	79	84	85	100	93	95	94	119	125	94
Sep19	102	109	108	99	103	108	101	66	61	60	80	92	99	97	93	93	93	97	98	102	102	102	97	98	90
Sep20	106	97	102	96	99	112	107	58	38	37	30	50	41	42	43	30	53	71	66	76	86	85	105	114	95
Sep21	90	87	87	85	83	84	77	74	71	74	87	85	96	101	94	90	88	92	95	96	96	97	87	87	71
Sep22	104	100	99	102	102	100	99	87	76	92	98	100	99	94	84	89	91	96	91	92	90	95	95	:	:
Sep23	95	95	98	101	98	100	100	101	79	79	88	90	94	98	97	87	85	53	71	85	94	97	96	94	95
Sep24	99	100	99	104	103	95	87	87	83	84	90	100	102	103	104	102	97	98	94	94	104	111	94	95	91
Sep25	99	96	102	105	103	105	103	99	95	99	93	84	94	90	98	99	101	103	102	103	103	102	99	101	97
Sep26	99	98	100	99	100	99	96	92	90	93	97	101	107	113	112	107	103	102	102	97	100	98	106	102	99
Sep27	102	100	102	102	100	98	95	86	89	89	100	113	119	122	118	110	107	105	105	104	104	101	100	106	101
Sep28	104	101	100	100	99	96	88	81	84	89	95	99	109	113	110	105	102	104	106	105	104	106	103	106	103
Sep29	104	98	99	103	104	94	85	78	71	67	81	89	103	114	117	109	104	100	101	103	104	104	107	105	101
Sep30	104	104	103	102	102	102	101	78	58	91	92	96	102	111	116	112	108	107	110	111	112	110	105	105	98
																								109	105

2015, Field component: Y, Base: 1300.0, 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	110	109	113	119	124	128	134	132	119	102	86	80	76	85	93	101	106	103	103	104	108	111	115	112	107
Sep02	114	116	122	117	121	130	139	140	129	111	89	74	73	75	83	91	96	97	115	129	121	128	126	116	110
Sep03	109	112	116	117	117	120	130	134	126	114	97	79	72	77	84	90	89	93	103	108	110	108	111	133	106
Sep04	143	138	122	118	117	131	122	118	112	107	99	78	70	74	86	93	104	111	118	133	121	112	110	110	110

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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
Sep05	115	115	118	118	117	133	143	142	123	107	94	88	84	89	102	109	107	132	116	102	104	107	113	114	112
Sep06	109	110	107	118	124	125	130	131	125	108	93	88	78	92	103	106	105	106	115	156	127	112	109	⋮	⋮
Sep07	110	116	116	127	126	123	105	110	113	107	97	86	84	77	89	106	170	124	164	178	144	145	145	148	121
Sep08	145	166	194	148	141	153	153	145	131	⋮	⋮	82	74	81	94	101	103	105	105	103	104	107	129	121	⋮
Sep09	117	105	111	104	103	117	113	⋮	122	108	87	83	82	73	94	100	104	112	166	149	162	178	145	⋮	110
Sep10	125	125	133	130	135	141	144	135	117	106	92	86	85	86	87	90	88	90	89	117	112	103	114	116	110
Sep11	110	118	119	124	119	110	123	119	115	74	80	81	79	84	99	143	118	105	105	110	111	121	130	137	⋮
Sep12	125	101	115	128	129	126	129	118	117	95	87	80	83	101	112	111	125	118	113	110	113	113	117	⋮	114
Sep13	120	121	122	123	124	128	131	128	117	106	89	85	85	91	97	119	124	126	135	112	110	114	125	107	115
Sep14	111	111	122	123	125	125	132	131	117	95	79	84	85	97	107	117	130	138	141	118	111	113	126	122	113
Sep15	120	101	121	124	126	136	139	135	122	106	83	70	80	89	97	109	121	116	110	110	114	126	122	121	113
Sep16	115	119	123	126	126	127	130	132	125	108	89	79	77	84	99	112	108	134	119	108	111	120	112	117	111
Sep17	115	123	121	121	123	125	134	139	130	108	94	82	81	87	96	104	109	110	110	111	111	111	119	105	113
Sep18	120	120	122	121	120	126	131	125	129	118	94	85	79	85	89	100	108	117	135	123	115	118	123	121	109
Sep19	106	105	123	121	104	124	138	138	131	115	96	82	76	85	95	103	105	106	111	110	111	112	113	113	113
Sep20	113	117	117	114	109	121	118	122	106	106	93	82	83	111	112	109	155	123	129	122	112	112	113	124	⋮
Sep21	118	118	119	120	124	125	126	124	120	112	100	96	91	87	94	98	100	104	106	112	108	111	115	⋮	112
Sep22	115	118	121	120	120	122	130	134	131	120	108	100	94	86	92	98	103	107	112	116	110	110	117	114	113
Sep23	115	117	117	119	119	128	128	131	127	112	98	91	90	97	98	104	109	134	119	112	111	109	115	117	108
Sep24	114	117	118	117	117	119	128	127	120	106	88	77	79	88	97	104	106	105	107	108	114	109	117	121	111
Sep25	124	125	120	118	118	116	118	120	121	111	99	92	90	96	106	101	103	104	108	109	109	112	117	122	113
Sep26	122	120	121	120	123	123	125	127	123	111	99	91	87	92	104	105	103	108	116	113	124	114	115	113	110
Sep27	119	118	119	120	123	122	124	126	124	114	99	89	88	90	97	103	102	103	105	107	112	113	114	114	113
Sep28	119	121	119	118	122	125	130	132	129	118	104	97	94	91	98	102	104	104	113	116	112	113	119	122	113
Sep29	127	129	127	129	136	129	131	135	129	118	101	88	81	82	91	100	103	105	107	109	110	112	114	116	113
Sep30	115	116	116	117	117	121	128	136	138	129	111	92	79	77	88	101	103	102	104	106	110	110	112	110	110

2015, Field component: Z, Base: 43600.0, 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	88	87	86	86	87	87	87	86	81	74	68	67	75	79	81	85	86	85	86	86	86	87	85	85	83
Sep02	86	86	85	86	87	85	84	84	81	77	72	73	75	79	81	82	81	81	84	86	88	87	86	86	83
Sep03	83	82	83	86	88	90	89	88	86	78	76	77	78	80	81	82	83	84	86	87	88	88	87	85	84
Sep04	83	85	85	86	85	87	85	83	80	77	74	75	79	84	87	89	92	92	93	94	93	90	88	84	86
Sep05	85	86	85	87	88	88	88	86	83	77	75	75	79	87	91	92	94	94	95	92	90	90	88	87	87
Sep06	87	87	87	88	87	88	89	88	85	82	78	78	83	89	89	87	88	87	90	89	87	89	89	⋮	⋮
Sep07	88	87	86	86	87	87	89	86	81	78	73	74	77	85	83	87	87	87	112	104	99	89	90	83	92
Sep08	76	60	58	74	81	84	86	82	79	⋮	⋮	68	75	77	83	87	88	88	104	88	88	85	83	82	⋮
Sep09	83	84	74	69	75	81	84	⋮	82	84	91	100	107	118	126	127	125	114	112	108	98	96	86	86	⋮

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
Sep10	91	93	94	97	99	101	99	97	91	89	87	83	84	85	86	85	92	103	104	104	101	97	93	94	94
Sep11	94	91	91	91	91	89	88	88	87	94	91	91	99	106	121	134	124	114	107	103	101	99	94	91	99
Sep12	94	91	91	93	94	94	93	90	90	86	87	87	90	93	91	90	93	96	95	94	94	93	92	⋮	⋮
Sep13	93	93	93	93	93	94	94	90	87	85	86	88	91	95	98	102	106	104	98	94	95	95	94	91	94
Sep14	91	92	93	93	94	95	95	90	85	80	80	83	86	86	90	99	96	97	102	98	97	95	92	90	92
Sep15	90	88	83	88	89	90	91	88	88	79	73	79	87	93	90	92	94	93	97	95	93	90	90	91	89
Sep16	90	89	90	90	90	91	93	92	90	85	84	89	94	95	95	94	94	93	95	92	91	91	90	90	91
Sep17	81	85	84	87	90	90	93	93	85	78	76	82	87	88	89	89	89	89	95	90	90	91	88	83	87
Sep18	81	84	84	84	85	88	90	91	85	80	75	75	81	88	93	93	93	95	92	93	92	91	91	89	87
Sep19	86	83	81	85	86	88	89	89	85	81	77	77	83	85	85	86	86	88	89	89	89	89	88	87	85
Sep20	84	86	87	87	84	85	87	88	94	91	92	97	99	105	112	115	110	110	106	103	100	98	97	95	97
Sep21	92	91	93	91	93	93	95	94	92	87	81	81	84	83	83	84	88	90	91	91	91	91	91	⋮	⋮
Sep22	90	90	90	89	87	87	89	89	86	77	72	71	73	76	80	84	87	88	91	91	92	91	91	91	86
Sep23	91	90	90	88	88	87	85	82	74	71	70	73	75	78	81	83	89	98	100	97	95	93	93	92	86
Sep24	91	90	90	88	86	86	88	86	82	80	75	71	74	76	77	80	81	85	88	90	90	89	87	88	85
Sep25	89	89	88	87	86	85	86	85	81	76	75	75	74	76	78	81	84	86	87	87	88	88	88	88	84
Sep26	89	89	88	88	87	89	92	92	87	85	85	83	81	80	81	81	82	85	86	86	89	89	89	88	86
Sep27	87	88	87	87	86	88	91	88	84	80	75	75	77	77	78	81	82	85	86	86	87	88	87	86	84
Sep28	86	88	87	87	87	89	90	85	85	79	77	77	77	79	81	82	83	85	86	86	87	86	86	86	84
Sep29	85	86	87	86	85	85	85	82	77	72	68	68	74	79	82	82	83	85	86	86	86	86	86	86	82
Sep30	86	86	86	86	86	86	88	88	83	70	63	63	68	72	75	78	80	82	84	84	84	85	84	84	80

2015, Field component: F, Base: 48400.0, 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	95	94	93	94	94	93	90	85	78	72	69	72	80	86	88	93	95	93	95	95	95	95	94	93	89
Sep02	92	93	93	94	96	94	89	83	75	72	74	79	85	91	91	91	92	92	90	95	92	92	90	90	89
Sep03	93	91	90	93	96	94	93	87	80	73	74	82	86	88	89	89	88	90	93	94	96	96	96	96	89
Sep04	94	90	86	86	94	91	85	71	73	66	67	71	72	78	86	87	91	92	93	94	95	95	94	96	85
Sep05	90	90	92	93	93	94	88	75	71	65	65	71	80	88	91	93	90	96	100	95	94	94	96	94	87
Sep06	94	93	93	94	96	93	89	88	82	79	78	80	87	83	87	90	90	91	91	97	93	91	92	94	89
Sep07	95	95	91	90	90	85	85	85	76	73	74	78	79	87	84	90	108	95	94	86	82	77	74	82	86
Sep08	84	86	60	64	76	83	82	75	66	64	66	70	81	84	88	89	88	90	94	86	96	96	100	94	82
Sep09	91	94	93	88	71	73	66	63	51	48	54	63	73	82	96	95	88	91	99	95	89	85	85	89	80
Sep10	84	86	88	90	90	89	84	79	75	76	83	76	88	85	87	86	90	90	96	97	107	105	85	89	89
Sep11	100	98	96	96	94	88	91	89	58	67	76	83	85	89	99	110	99	93	98	98	97	100	105	96	91
Sep12	87	90	89	90	89	84	81	70	69	70	79	76	88	93	93	89	92	93	100	94	94	100	93	91	87
Sep13	93	94	94	94	89	94	90	81	75	74	79	83	88	93	93	88	89	93	100	94	96	95	96	93	91
Sep14	94	93	94	96	97	96	94	85	79	77	79	85	91	90	90	85	85	90	104	94	97	96	99	94	91

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
Sep15	91	91	91	87	91	92	87	80	72	64	65	72	74	89	92	91	87	92	95	97	98	99	94	93	87
Sep16	96	93	94	96	94	95	92	87	81	79	80	88	96	100	99	98	96	93	97	97	97	95	94	99	93
Sep17	97	87	92	92	93	95	94	89	80	72	69	78	84	87	90	94	93	93	94	95	95	95	102	99	90
Sep18	89	91	93	93	93	97	96	92	84	73	66	66	77	83	92	89	91	93	98	95	95	94	95	94	89
Sep19	92	93	92	90	93	97	95	80	75	70	74	79	88	88	87	88	89	92	93	95	96	96	96	99	89
Sep20	93	91	94	91	89	96	96	78	73	69	66	79	77	83	91	88	98	101	96	98	98	97	96	94	89
Sep21	93	91	92	90	91	92	90	88	84	81	81	80	87	89	86	86	88	92	94	95	95	95	94	96	90
Sep22	98	95	95	95	94	93	94	90	83	81	79	78	79	80	79	85	88	92	92	93	93	95	94	94	89
Sep23	94	95	94	94	92	93	91	89	77	69	71	75	79	84	85	83	88	83	92	95	97	97	95	95	88
Sep24	96	96	95	95	93	90	88	86	81	79	77	77	80	84	87	88	90	92	92	93	97	97	93	95	89
Sep25	94	93	95	95	93	94	94	90	85	82	78	74	77	78	87	89	92	94	93	95	95	95	96	95	90
Sep26	94	94	94	93	93	94	96	94	89	88	90	89	89	91	93	90	89	93	94	93	95	94	94	96	92
Sep27	94	93	94	94	93	94	94	91	84	82	82	86	91	92	92	91	91	92	94	94	94	94	94	95	91
Sep28	94	93	93	92	92	93	91	86	84	81	82	83	87	91	91	90	90	92	94	94	93	95	95	94	90
Sep29	93	92	93	94	94	89	85	79	71	65	67	70	82	91	95	92	90	90	92	93	93	93	94	94	87
Sep30	93	93	93	93	93	93	95	94	87	74	68	69	75	83	88	90	89	91	94	94	95	95	94	94	89

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.

2015, Field component: X, Base: 20800.0, 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	214	212	208	207	208	211	209	201	197	196	197	204	209	206	201	187	166	176	162	148	159	176	209	200	194
Oct02	197	195	198	196	199	184	181	171	153	165	173	181	179	177	172	164	166	169	178	181	183	189	197	199	181
Oct03	200	200	204	199	199	190	180	180	166	165	172	176	183	180	175	160	170	175	185	187	191	201	200	198	184
Oct04	206	212	196	193	184	177	161	162	158	159	163	170	164	168	158	163	172	172	176	182	185	207	203	181	178
Oct05	179	193	193	189	190	198	175	171	168	159	138	164	175	169	174	178	180	176	176	183	190	192	200	194	179
Oct06	190	188	190	194	187	194	200	183	181	177	176	174	168	162	175	166	172	155	147	161	180	192	157	178	177
Oct07	192	204	210	203	195	193	204	183	137	133	145	168	159	151	144	110	..	81	77	102	136	130	142	123	..
Oct08	137	149	146	158	159	137	146	166	144	152	147	131	129	114	121	138	151	142	179	165	167	199	191	175	152
Oct09	171	177	174	170	171	170	177	170	168	162	150	148	140	152	150	155	169	187	169	182	186	179	187	171	168
Oct10	173	172	172	175	176	176	168	155	166	166	168	170	173	182	177	168	162	182	180	182	183	181	185	191	174
Oct11	180	181	189	197	186	183	180	182	184	187	188	182	168	172	176	172	173	183	179	199	171	183	203	203	183
Oct12	192	192	193	194	198	195	194	181	180	177	170	162	182	187	188	177	165	173	142	166	180	179	180	181
Oct13	188	187	184	187	192	204	191	172	174	152	171	175	181	185	183	153	155	156	193	185	181	212	183	173	180
Oct14	169	176	176	199	211	210	192	188	178	167	146	144	158	171	173	170	170	174	167	196	185	187	185	187	178
Oct15	192	189	190	192	194	201	198	199	185	173	167	167	175	183	177	176	176	176	175	184	192	194	201	192	185
Oct16	199	197	194	186	192	194	194	190	181	175	169	168	176	180	182	187	188	188	192	196	198	196	196	200	188
Oct17	199	204	204	202	200	213	210	201	186	171	169	169	175	180	167	166	174	179	194	188	202	203	202	205	190
Oct18	201	216	216	210	214	205	207	202	173	141	132	159	147	147	146	146	158	170	168	173	179	191	186	185	178
Oct19	183	183	185	186	191	192	193	188	180	171	165	170	177	184	193	196	195	194	194	194	196	196	186	199	188
Oct20	195	193	195	198	199	200	197	190	188	185	186	192	193	186	181	180	182	178	174	185	191	209	204	202	191
Oct21	200	199	201	200	203	211	209	198	192	193	197	186	193	177	194	190	187	183	178	182	194	196	204	196	194
Oct22	192	192	195	198	197	199	198	188	181	179	179	187	198	202	199	187	183	190	187	195	192	196	198	199	192
Oct23	204	199	199	200	199	200	199	194	189	189	191	195	201	198	196	191	193	193	195	199	198	196	203	210	197
Oct24	203	199	196	197	196	199	195	195	194	189	187	187	192	197	199	199	203	204	202	211	206	207	215	209	199
Oct25	205	198	201	205	201	212	211	206	195	193	190	194	198	187	196	201	205	204	205	200	207	200	198	198	201
Oct26	199	202	202	202	204	206	203	208	202	198	181	182	187	193	197	198	202	204	205	199	200	200	199	199	197
Oct27	199	197	198	200	201	206	209	207	199	192	184	186	191	189	193	197	199	201	200	208	198	207	204	200	198
Oct28	200	200	201	202	205	206	207	207	207	187	180	184	..	200	203	206	207	205	208	209	209	207	206	..
Oct29	207	208	210	212	214	218	218	216	209	200	196	196	198	199	199	200	201	200	198	196	196	200	200	208	204
Oct30	207	203	202	202	206	207	207	205	200	192	187	189	190	191	183	171	162	168	185	196	199	200	195	199	193
Oct31	196	198	199	201	205	207	207	204	190	187	185	179	184	179	182	184	180	184	193	198	200	204	203	197	194

2015, Field component: Y, Base: 1300.0, 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	111	116	118	119	119	121	125	126	123	115	100	86	73	72	85	90	112	108	126	137	139	124	135	128	113
Oct02	122	120	120	123	109	119	131	133	132	113	100	91	89	98	103	107	111	111	112	126	130	119	123	125	115
Oct03	125	129	131	129	127	124	127	134	129	116	102	95	93	96	100	112	107	102	106	109	113	112	113	115	114

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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
Oct04	116	130	125	118	116	109	121	126	134	123	115	103	98	99	102	115	115	119	120	118	122	125	149	149	119
Oct05	138	105	121	119	116	107	117	119	120	115	95	97	92	83	111	104	111	117	129	130	125	119	127	132	115
Oct06	129	135	122	118	116	114	131	139	136	129	111	92	86	89	91	108	117	124	123	135	159	167	143	128	123
Oct07	107	102	120	125	112	69	85	97	115	122	105	93	93	94	92	91	...	182	173	168	175	170	193	140	...
Oct08	116	120	120	121	119	114	129	132	140	134	120	132	111	111	133	121	160	156	154	125	124	123	118	120	127
Oct09	114	108	109	112	112	117	125	136	136	123	112	100	114	100	125	122	130	135	134	144	137	147	132	131	123
Oct10	119	114	115	123	122	120	122	127	135	127	114	103	101	103	110	128	128	133	118	121	123	126	130	134	121
Oct11	126	122	121	121	121	120	120	126	129	124	114	103	101	103	102	109	107	112	122	145	135	122	112	115	118
Oct12	120	120	119	117	114	116	119	122	125	120	105	95	91	93	96	104	130	171	131	126	126	159	141	125	120
Oct13	120	119	118	115	101	95	95	112	123	120	119	106	99	99	103	130	134	123	130	113	129	173	160	179	121
Oct14	144	136	126	113	113	100	106	123	135	125	121	102	108	103	106	111	123	134	130	130	122	120	120	118	120
Oct15	113	120	121	122	119	119	115	112	118	116	110	103	99	92	102	114	110	115	117	125	124	126	138	127	116
Oct16	126	132	131	120	118	120	119	126	134	130	118	103	88	81	95	104	108	110	113	115	117	118	119	117	115
Oct17	116	116	117	121	113	115	119	128	133	129	118	105	88	81	80	85	102	108	147	125	116	116	118	119	113
Oct18	120	110	113	114	115	118	117	120	120	124	115	99	90	93	97	114	112	135	131	126	123	127	123	122	116
Oct19	121	120	120	116	117	119	127	138	146	140	123	106	92	92	99	109	114	114	114	116	115	117	121	122	117
Oct20	121	119	116	112	114	117	125	132	132	129	110	97	85	89	96	99	103	109	127	115	119	126	121	118	114
Oct21	118	116	117	116	116	116	125	129	128	125	101	101	77	83	92	99	111	115	120	119	124	124	120	120	113
Oct22	118	116	116	116	118	122	132	140	132	125	117	99	90	89	95	103	107	108	122	123	119	120	118	122	116
Oct23	118	123	119	119	119	120	124	130	135	130	113	97	88	88	94	99	107	109	116	114	115	116	120	123	114
Oct24	123	126	120	120	118	118	126	133	141	138	120	102	92	94	101	108	109	109	112	124	121	116	116	127	117
Oct25	128	125	119	112	113	115	121	133	139	132	115	95	91	95	103	105	108	111	112	113	115	118	118	118	115
Oct26	117	116	114	115	115	117	124	135	140	133	109	92	89	94	102	108	112	114	116	117	117	118	117	116	114
Oct27	116	114	114	114	114	116	124	134	140	131	113	95	89	92	100	106	110	113	115	117	121	134	123	117	115
Oct28	115	115	114	114	113	118	126	138	144	135	113	95	...	93	102	107	109	111	111	113	115	116	116	116	...
Oct29	115	115	114	114	114	114	117	124	131	126	112	100	94	97	100	105	109	112	114	116	119	120	122	130	114
Oct30	136	124	119	115	116	117	121	130	135	132	116	96	89	89	97	103	111	112	117	119	131	131	133	127	117
Oct31	116	114	114	114	115	115	120	129	134	134	119	109	93	92	96	101	109	113	122	120	122	140	142	126	117

2015, Field component: Z, Base: 43600.0, 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	83	82	83	83	84	86	88	86	79	68	61	62	69	77	84	90	97	99	102	105	103	100	89	88	85
Oct02	89	89	89	90	91	90	94	95	91	86	83	83	87	87	93	95	96	98	98	95	96	94	91	90	91
Oct03	88	87	86	87	87	91	92	94	91	85	81	76	78	82	89	97	97	98	97	97	96	94	93	92	90
Oct04	90	84	84	83	85	88	93	99	99	96	94	94	93	90	96	98	98	97	98	96	95	90	85	84	92
Oct05	85	87	86	85	89	90	90	88	88	86	85	88	90	90	93	94	94	96	96	96	93	90	90	88	90
Oct06	88	88	88	89	91	91	92	92	86	76	74	75	79	86	91	94	99	102	106	104	98	91	93	93	90
Oct07	90	85	82	83	85	85	82	87	90	92	90	91	91	97	106	120	...	140	134	122	110	99	90	101	...

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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
Oct08	102	102	103	103	102	104	105	104	99	95	95	100	107	113	120	118	116	114	107	104	104	98	92	96	104
Oct09	97	97	96	97	99	100	103	105	101	96	94	94	98	101	109	110	107	104	103	101	97	95	89	94	99
Oct10	94	96	95	96	97	99	101	101	98	92	87	84	86	89	94	98	102	101	100	99	98	98	96	93	96
Oct11	93	94	93	90	91	93	97	99	97	92	88	86	88	91	95	97	99	99	99	97	99	99	96	91	94
Oct12	93	94	94	94	93	93	96	96	93	85	81	82	83	87	91	95	100	105	108	107	102	95	96	96	94
Oct13	95	94	95	96	95	92	94	94	96	94	93	92	89	91	97	103	107	107	103	100	99	93	93	90	96
Oct14	93	93	93	90	88	88	92	95	92	90	87	92	96	100	99	101	101	101	102	98	97	97	97	95	95
Oct15	94	93	95	95	88	95	98	100	102	94	90	87	87	91	94	97	99	101	101	100	98	97	94	93	95
Oct16	92	91	91	92	92	93	99	104	97	96	93	93	91	94	97	99	98	97	96	98	98	97	93	93	95
Oct17	93	91	90	89	90	91	95	98	97	89	83	80	81	85	95	99	99	100	98	99	96	95	94	93	93
Oct18	93	89	85	86	86	89	94	97	99	97	97	98	97	98	102	107	106	106	105	105	103	99	97	97	97
Oct19	97	97	97	97	97	97	99	101	99	89	86	87	89	92	94	94	94	94	94	95	95	94	94	93	94
Oct20	93	94	94	92	92	93	96	98	92	86	82	81	84	90	95	96	97	99	103	102	100	97	95	94	94
Oct21	93	93	92	92	92	91	93	94	89	82	78	75	81	86	89	93	94	96	98	98	97	94	94	93	91
Oct22	94	93	93	91	92	92	95	96	91	83	78	76	77	83	86	90	92	94	95	96	96	95	94	94	90
Oct23	92	91	92	90	91	92	94	95	92	85	79	78	82	88	90	91	92	94	94	94	94	94	92	90	90
Oct24	89	88	90	90	91	92	94	94	85	73	67	68	73	79	86	88	88	89	90	90	92	92	89	87	86
Oct25	88	89	89	89	88	88	91	89	86	78	73	72	75	80	86	87	88	89	89	90	90	90	91	91	86
Oct26	91	91	90	90	90	90	92	92	91	85	77	80	86	91	92	91	91	90	91	91	90	90	89	90	89
Oct27	91	91	90	90	90	91	93	94	92	85	81	83	88	92	93	92	92	91	91	89	92	90	89	90	90
Oct28	90	90	90	90	90	90	92	94	92	84	78	74	:	81	85	87	88	89	89	90	89	89	88	89	∴.
Oct29	89	88	88	88	87	88	89	89	88	85	82	82	84	86	90	87	88	90	90	91	91	90	91	88	88
Oct30	87	87	88	89	89	89	91	93	89	82	76	75	83	89	94	96	100	101	98	96	95	93	93	91	90
Oct31	91	91	91	91	91	91	94	90	88	82	79	81	84	89	92	94	95	96	96	95	93	91	89	90	90

2015, Field component: F, Base: 48400.0, 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	95	94	93	93	94	94	97	92	85	73	68	71	79	85	90	89	87	93	91	87	90	95	99	94	89
Oct02	93	93	94	93	91	89	91	90	77	74	77	80	83	83	85	84	86	89	93	93	94	94	95	95	88
Oct03	94	94	94	92	93	93	89	87	82	76	74	72	77	79	83	84	89	91	95	96	97	100	98	96	89
Oct04	98	96	89	86	84	83	82	88	86	84	83	86	82	84	83	87	90	90	92	93	93	99	93	83	88
Oct05	83	90	89	90	91	94	85	83	80	74	63	78	84	82	87	89	90	91	91	94	95	95	96	92	87
Oct06	90	89	90	91	89	94	97	91	84	74	71	70	71	75	85	84	91	87	87	92	96	94	81	89	86
Oct07	92	92	92	90	89	87	90	85	69	69	72	81	78	80	85	83	91	92	84	84	88	75	73	73	83
Oct08	79	84	85	90	89	81	86	94	81	80	77	75	80	79	89	94	99	94	103	93	94	103	94	90	88
Oct09	89	92	89	89	89	91	98	96	92	85	78	76	77	85	92	94	98	103	94	99	96	92	90	87	91
Oct10	88	89	88	90	92	93	92	87	89	83	79	77	80	86	89	89	91	98	96	96	95	95	95	95	90
Oct11	90	91	93	94	91	91	94	96	95	91	88	84	80	84	90	90	92	96	95	103	92	96	102	98	92

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
Oct12	95	96	97	97	98	96	97	93	90	82	74	72	81	86	91	90	90	99	87	96	98	103	92	92	91
Oct13	95	94	94	96	96	98	94	87	90	79	86	86	86	89	94	88	92	93	105	98	96	105	92	86	93
Oct14	86	89	89	95	98	97	93	95	89	81	70	73	82	91	92	93	93	95	93	102	96	96	96	96	91
Oct15	96	95	96	97	98	101	102	104	97	87	81	78	81	89	89	92	93	94	95	98	99	99	100	97	94
Oct16	97	96	94	92	94	96	102	104	98	91	85	84	86	89	93	97	97	96	97	99	99	97	97	98	95
Oct17	98	99	97	96	96	102	105	104	96	83	76	73	76	82	85	89	92	96	102	99	102	101	100	100	94
Oct18	98	102	98	96	98	97	102	103	92	77	73	85	79	79	83	87	92	97	96	97	98	100	97	95	93
Oct19	95	95	96	96	98	99	101	101	94	83	77	80	84	90	96	97	97	97	97	98	98	98	98	98	94
Oct20	96	96	97	97	97	99	100	98	93	86	82	83	86	89	91	92	94	94	96	98	101	106	102	100	95
Oct21	99	98	98	97	98	101	103	98	92	85	83	76	83	81	91	93	93	94	93	95	99	100	97	97	94
Oct22	95	95	96	96	97	98	100	96	89	81	75	77	83	90	91	89	90	94	95	99	97	98	99	99	93
Oct23	99	96	97	96	96	97	99	98	94	87	81	82	88	92	93	92	95	96	97	99	98	98	99	100	95
Oct24	96	94	94	95	95	97	97	97	89	76	70	70	76	84	91	94	96	96	96	101	100	100	102	97	92
Oct25	96	94	95	97	98	99	101	99	91	83	76	76	80	85	89	93	95	96	97	98	97	96	96	95	93
Oct26	96	97	96	96	97	98	100	100	95	85	76	78	85	93	96	95	96	96	95	96	96	96	96	96	94
Oct27	95	95	95	96	96	99	102	101	97	88	80	82	89	92	95	95	96	97	96	96	96	99	97	96	95
Oct28	95	96	96	97	98	99	102	102	97	86	76	74	80	86	92	95	97	97	98	98	98	98	97	97	94
Oct29	97	98	98	98	99	101	102	102	98	92	87	86	88	91	95	95	96	95	95	95	96	97	96	98	96
Oct30	96	95	95	95	97	98	100	101	95	86	77	77	84	90	91	88	88	91	97	100	98	98	96	96	93
Oct31	95	95	96	97	98	99	99	98	93	84	80	78	83	85	89	92	91	94	98	99	98	99	97	94	93

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.

2015, Field component: X, Base: 20800.0, 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	199	199	201	208	214	214	209	202	195	179	164	156	163	168	168	163	163	167	163	178	192	198	199	200	186
Nov02	201	199	201	202	202	202	201	199	194	188	185	187	195	198	184	180	195	196	201	202	204	203	203	207	197
Nov03	206	212	212	215	228	228	228	243	195	176	172	169	158	157	148	170	166	177	176	144	163	176	175	177	186
Nov04	185	193	182	184	213	213	189	168	175	155	138	133	123	122	137	171	183	188	185	188	182	181	189	186	173
Nov05	181	180	193	188	190	191	191	187	166	153	159	156	175	170	170	172	177	181	168	175	189	194	183	196	179
Nov06	202	184	187	185	187	187	190	193	188	182	181	182	181	185	181	189	193	189	202	195	191	200	181	188	189
Nov07	188	179	192	207	237	196	181	151	151	153	141	125	139	141	151	150	152	161	153	165	177	180	181	181	168
Nov08	182	181	185	187	187	191	192	186	181	173	169	169	143	148	148	152	159	172	159	166	163	185	165	187	172
Nov09	190	184	187	188	183	187	192	175	161	156	150	134	141	140	134	132	130	151	165	170	176	178	195	180	166
Nov10	189	192	194	190	194	193	183	160	153	149	147	110	96	143	164	168	188	172	163	168	187	208	184	178	170
Nov11	179	188	186	184	193	187	181	177	169	170	174	170	164	158	164	176	175	181	176	178	195	188	185	188	179
Nov12	191	188	187	188	191	191	194	191	189	184	179	181	184	184	182	183	189	193	193	192	191	195	197	196	189
Nov13	198	191	190	192	197	200	201	200	196	196	188	192	204	203	178	159	162	169	172	170	188	197	185	191	188
Nov14	184	188	193	193	195	197	196	191	181	176	176	169	178	173	169	185	190	191	189	191	186	198	194	194	187
Nov15	195	201	200	201	203	206	205	198	186	183	183	179	187	193	195	194	202	201	199	193	187	193	196	196	195
Nov16	200	195	201	201	210	207	205	204	194	180	174	173	174	165	147	146	145	156	159	174	182	183	197	196	182
Nov17	189	191	192	193	202	200	202	199	189	179	181	185	189	190	189	183	184	177	170	187	193	198	196	195	190
Nov18	194	195	196	200	202	203	206	206	195	172	165	174	186	191	184	172	169	190	193	194	231	187	186	194	191
Nov19	188	185	186	181	190	193	195	196	190	182	172	161	175	183	189	190	192	193	192	194	196	195	195	194	188
Nov20	195	196	197	200	199	203	203	212	198	184	177	184	196	201	202	202	204	205	207	208	209	206	204	204	200
Nov21	200	194	197	200	199	201	203	197	188	182	178	184	191	195	199	201	203	203	201	199	198	199	201	200	196
Nov22	199	200	199	201	203	205	204	193	185	179	174	177	187	195	200	203	204	205	204	202	201	203	201	199	197
Nov23	199	200	202	204	204	205	206	204	195	186	182	186	193	196	202	205	207	207	206	204	205	202	202	203	200
Nov24	203	203	204	205	207	210	209	206	197	189	184	186	193	198	201	203	206	208	209	208	207	206	206	203	202
Nov25	205	205	206	208	211	214	215	212	202	192	189	193	200	207	211	211	211	212	212	211	211	209	209	207	207
Nov26	209	209	210	212	214	215	216	214	207	200	198	201	205	207	209	207	202	195	189	182	186	193	196	196	202
Nov27	200	200	201	212	218	217	213	207	197	189	193	198	199	201	203	201	196	195	200	203	201	167	199	198	202
Nov28	200	204	204	208	209	209	208	208	206	203	202	204	197	199	202	206	207	208	209	203	191	179	180	186	201
Nov29	189	192	196	198	201	205	208	208	206	197	192	197	200	204	200	203	204	203	198	196	189	182	190	190	197
Nov30	188	193	193	202	204	203	213	214	165	165	162	162	175	178	181	182	184	185	185	195	196	201	201	200	189

2015, Field component: Y, Base: 1300.0, 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	123	117	114	100	109	110	115	125	132	123	115	101	94	99	90	91	101	112	124	133	129	120	119	118	113
Nov02	119	117	116	116	117	119	125	134	139	132	116	103	95	89	90	101	109	110	116	118	119	119	119	118	115
Nov03	118	118	117	120	115	115	117	127	131	117	94	84	87	86	107	108	114	160	173	179	177	157	131	128	124
Nov04	122	94	108	89	99	98	113	115	114	121	128	113	111	139	111	108	115	116	120	125	128	128	128	126	115

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
Nov05	128	125	118	122	122	124	129	137	142	132	116	112	99	102	114	107	133	140	123	129	125	135	136	135	124
Nov06	136	124	123	119	123	123	124	129	126	126	116	106	104	106	111	111	115	122	129	122	153	147	159	145	125
Nov07	128	107	94	54	73	52	89	115	114	128	121	108	106	109	116	106	111	119	115	138	126	127	128	126	109
Nov08	127	127	126	124	125	128	135	144	146	140	126	111	116	115	109	131	118	121	144	167	153	165	152	137	133
Nov09	126	135	129	118	111	107	107	128	123	119	109	91	100	91	104	106	131	126	134	170	141	145	166	117	122
Nov10	112	112	123	110	107	113	114	98	115	123	109	111	108	115	107	128	133	142	130	133	133	134	131	135	121
Nov11	124	99	121	121	119	112	116	122	136	130	115	106	113	131	121	115	133	157	135	135	136	125	126	135	124
Nov12	122	122	122	122	122	123	125	131	132	126	113	104	104	111	115	117	115	118	120	122	124	127	125	124	120
Nov13	123	122	122	119	117	116	121	129	132	123	109	97	91	92	103	106	120	134	159	140	127	130	150	146	122
Nov14	125	117	119	120	117	116	115	127	136	130	114	106	106	101	105	112	115	118	121	126	127	125	124	126	119
Nov15	116	120	119	120	116	114	121	130	130	121	109	99	101	103	107	112	110	114	117	123	135	127	135	120	117
Nov16	153	143	132	126	125	116	112	123	132	137	125	107	100	108	109	107	107	120	137	130	126	129	123	126	123
Nov17	125	122	121	107	113	119	124	134	138	136	124	107	100	103	109	106	113	117	133	124	127	127	128	127	120
Nov18	124	123	124	118	121	122	125	132	136	130	115	102	101	104	102	106	110	115	116	128	161	160	175	197	127
Nov19	149	132	130	117	121	121	126	133	134	131	114	104	105	108	113	114	116	120	124	126	125	123	123	121	122
Nov20	120	120	116	115	117	120	125	131	134	130	114	102	100	105	110	113	115	117	118	119	120	120	122	120	118
Nov21	121	124	121	124	123	121	126	134	137	131	118	107	101	106	111	112	115	116	117	120	122	123	122	121	120
Nov22	121	120	120	121	120	123	128	137	138	127	114	103	97	101	110	115	116	117	119	119	122	123	122	122	119
Nov23	120	118	117	119	119	121	125	136	140	131	118	108	101	105	112	115	117	118	120	120	121	122	122	121	119
Nov24	119	117	116	116	118	121	125	134	139	132	117	101	98	103	109	114	116	117	119	119	120	120	120	119	118
Nov25	119	118	116	116	116	117	121	129	133	125	111	101	97	103	109	113	115	116	117	118	119	119	119	118	116
Nov26	118	117	116	115	116	118	120	128	134	127	116	108	105	108	109	112	112	113	115	127	130	129	125	126	119
Nov27	126	121	116	115	128	125	121	128	132	125	114	108	105	104	108	110	110	113	120	121	122	127	130	134	119
Nov28	126	121	119	119	119	119	119	124	128	124	113	94	97	99	100	107	106	114	116	116	135	144	142	136	118
Nov29	124	121	120	121	121	122	122	129	130	121	118	111	103	97	105	111	113	114	118	135	146	150	150	154	123
Nov30	128	125	126	124	120	112	113	115	127	116	110	106	99	110	116	121	123	127	125	128	133	132	128	129	120

2015, Field component: Z, Base: 43600.0, 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	89	90	90	90	87	88	91	95	94	89	89	88	91	97	100	102	103	103	104	102	100	97	95	94	94
Nov02	92	92	91	91	91	91	91	92	89	84	80	81	83	87	92	94	93	93	93	92	92	91	91	90	90
Nov03	90	89	87	85	84	84	85	82	84	82	84	93	96	101	107	104	101	101	100	103	101	97	98	97	93
Nov04	95	89	86	88	86	85	91	96	96	94	98	100	107	118	120	108	103	100	100	99	100	100	99	98	98
Nov05	97	98	95	94	95	95	98	98	97	95	90	89	93	97	101	101	101	102	103	102	101	97	97	95	97
Nov06	91	94	95	94	94	95	96	96	93	89	87	90	94	97	97	98	97	96	95	95	93	94	90	91	94
Nov07	90	93	90	85	75	80	83	92	98	97	96	103	109	112	113	111	110	105	112	111	108	105	103	102	100
Nov08	101	100	99	98	98	99	102	101	101	95	92	95	103	108	106	107	107	105	104	104	101	93	97	92	100
Nov09	88	90	92	93	94	95	98	100	99	93	92	97	100	107	110	114	117	115	110	107	106	101	94	95	100

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
Nov10	92	89	89	92	92	94	99	106	106	105	105	109	121	117	113	108	106	106	105	106	102	96	96	98	102
Nov11	99	94	92	96	97	98	100	99	95	91	88	93	100	104	107	104	103	104	103	102	99	98	98	99	99
Nov12	98	98	98	98	98	98	97	97	93	89	85	88	94	98	98	99	100	99	98	98	98	97	96	96	96
Nov13	94	95	96	96	96	96	97	97	95	91	88	89	93	95	97	102	105	104	106	106	103	100	98	97	97
Nov14	97	96	95	96	97	97	98	97	94	90	85	88	93	98	99	99	99	99	99	98	99	98	97	96	96
Nov15	96	95	95	95	96	95	96	98	97	94	89	92	94	96	96	96	96	95	95	95	97	97	95	92	95
Nov16	88	91	90	90	90	91	92	94	96	94	92	90	91	97	105	109	111	111	110	109	105	102	99	95	98
Nov17	96	97	97	98	98	96	97	96	94	93	91	88	92	96	97	99	103	100	103	102	100	98	98	97	97
Nov18	97	96	95	95	94	94	93	93	93	90	88	88	91	93	97	100	100	100	99	99	95	96	96	91	95
Nov19	91	92	94	96	96	97	98	99	94	89	89	92	95	96	97	98	98	98	98	98	97	97	96	96	95
Nov20	95	95	94	94	94	94	95	96	95	93	93	92	95	95	94	94	95	95	94	94	94	93	93	93	94
Nov21	93	94	94	93	94	93	97	99	96	93	90	91	95	98	97	96	96	95	95	96	96	96	95	95	95
Nov22	94	94	94	93	93	92	92	92	87	91	90	92	96	98	98	96	95	94	94	94	94	94	93	93	94
Nov23	93	93	93	92	92	92	92	92	89	85	79	88	93	95	95	95	94	93	93	93	93	91	94	93	92
Nov24	93	93	92	92	92	90	90	92	91	82	88	83	90	94	95	94	93	92	92	92	93	91	91	91	91
Nov25	91	91	91	91	91	90	87	88	85	89	80	90	91	91	92	90	91	91	90	90	91	90	90	90	91
Nov26	90	90	90	90	89	89	89	91	90	82	85	82	86	90	90	90	91	92	94	95	97	97	95	94	90
Nov27	92	92	92	91	90	88	89	89	91	88	84	83	88	92	92	92	92	92	94	93	93	93	93	93	91
Nov28	93	92	91	91	90	90	89	89	89	85	84	85	87	88	90	93	93	94	92	93	95	100	99	98	91
Nov29	96	96	95	95	94	92	90	89	85	82	88	84	86	89	92	93	93	94	95	96	98	99	99	95	92
Nov30	94	92	92	92	91	91	89	89	86	88	91	93	95	98	101	100	99	100	99	99	98	96	95	93	94

2015, Field component: F, Base: 48400.0, 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	95	95	96	98	99	99	100	101	98	86	79	74	80	87	90	90	90	93	93	98	101	101	99	99	93
Nov02	98	97	97	97	97	97	98	97	93	85	80	82	87	91	90	90	96	96	98	99	99	98	98	99	94
Nov03	98	100	98	98	102	102	103	107	88	78	78	84	82	86	88	94	91	97	96	85	92	93	93	92	93
Nov04	93	91	84	86	96	97	91	87	88	80	77	76	78	88	95	100	100	99	98	99	97	97	99	97	91
Nov05	94	94	97	94	96	97	99	98	88	80	78	76	87	88	92	93	96	99	93	96	101	100	96	99	93
Nov06	98	93	94	93	94	94	97	93	93	87	85	88	90	95	94	98	99	96	101	98	97	96	97	92	95
Nov07	91	89	91	92	97	83	80	77	82	82	75	75	86	89	95	93	93	97	95	100	102	101	100	99	90
Nov08	98	97	98	98	98	100	104	102	98	89	84	86	82	89	87	94	94	97	92	95	90	93	87	93	93
Nov09	90	90	92	93	92	94	99	87	87	80	75	73	79	84	85	90	90	97	99	100	100	97	98	91	90
Nov10	92	91	93	93	95	97	97	92	90	87	85	74	79	95	101	98	107	102	93	97	102	105	94	94	94
Nov11	95	93	91	95	99	98	96	93	88	84	82	85	89	91	96	98	97	100	97	97	99	98	97	98	96
Nov12	99	98	97	98	100	99	102	98	95	88	88	85	92	96	95	96	100	100	100	99	102	100	100	99	96
Nov13	99	96	96	98	99	101	102	102	98	95	88	91	99	101	93	88	93	96	99	98	100	100	97	99	97
Nov14	95	96	97	98	99	100	101	98	92	86	81	80	88	91	90	97	99	100	99	99	98	101	101	98	95

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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
Nov15	99	100	100	101	102	102	103	102	96	92	87	88	93	97	99	98	102	101	100	98	97	97	97	96	98
Nov16	95	95	97	96	100	100	100	101	99	91	86	83	85	86	86	89	91	96	97	102	102	100	103	99	95
Nov17	97	98	98	99	101	101	103	101	95	90	88	86	92	96	97	96	97	95	95	101	102	103	101	100	97
Nov18	99	99	99	100	100	100	101	101	95	84	78	82	91	94	95	92	93	100	101	101	115	97	97	97	96
Nov19	92	92	93	92	97	99	101	102	95	87	82	81	88	94	97	98	99	100	99	100	100	100	99	98	95
Nov20	98	98	98	99	99	100	102	106	100	92	88	90	98	100	100	100	101	102	102	103	103	102	101	100	99
Nov21	98	96	98	98	98	100	103	103	97	91	87	89	96	100	101	101	102	102	101	100	100	101	100	100	98
Nov22	99	99	99	99	100	100	102	99	93	88	84	87	95	100	102	102	102	102	101	100	100	101	99	98	98
Nov23	98	98	99	100	100	100	100	99	92	85	84	88	94	99	101	101	102	101	101	100	101	100	99	100	98
Nov24	100	99	99	100	101	101	101	101	94	84	79	83	92	98	100	101	101	101	101	101	100	100	99	99	97
Nov25	99	99	99	100	101	101	102	103	98	91	89	92	96	99	101	101	101	101	101	101	101	101	99	100	99
Nov26	99	99	100	100	101	101	100	101	95	88	85	89	94	98	99	99	97	95	94	93	93	96	98	97	96
Nov27	98	98	98	100	102	101	100	100	95	89	88	88	93	97	98	98	97	97	99	100	99	99	98	98	97
Nov28	98	99	99	100	100	99	99	98	96	93	90	92	91	93	96	100	100	101	101	99	96	91	96	97	97
Nov29	97	97	99	99	100	99	99	98	94	87	86	89	91	96	97	99	100	100	99	100	99	96	97	97	97
Nov30	95	95	94	96	98	98	101	101	88	79	80	82	89	93	97	97	96	97	98	97	101	99	101	99	95

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.

2015, Field component: X, Base: 20800.0, 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	192	190	192	199	196	194	197	197	198	191	184	175	167	170	168	164	160	162	175	184	173	181	195	202	184
Dec02	190	188	189	189	194	193	196	201	187	190	181	179	178	177	178	176	174	181	184	180	181	186	191	194	186
Dec03	193	194	194	195	197	199	200	201	194	188	191	194	198	198	197	196	196	196	199	201	197	192	196	201	196
Dec04	200	198	201	204	205	207	206	203	196	186	185	190	192	197	198	198	196	198	202	203	200	199	197	203	198
Dec05	193	198	200	204	208	210	208	209	192	181	188	195	195	185	185	184	148	159	178	180	170	178	197	207	190
Dec06	193	192	195	197	197	213	212	207	190	180	176	155	145	145	177	164	161	181	180	198	179	183	188	183	183
Dec07	191	187	189	195	199	209	214	210	197	182	170	178	175	161	161	170	179	181	182	187	206	191	189	189	187
Dec08	209	202	191	189	189	191	194	189	184	178	175	174	171	191	190	191	190	187	189	192	195	194	204	201	190
Dec09	197	196	198	198	199	202	204	202	193	185	182	184	188	193	184	181	182	191	192	188	202	187	196	198	193
Dec10	199	214	201	203	205	215	212	202	181	169	176	174	172	166	175	173	173	185	180	193	204	188	193	212	190
Dec11	210	193	193	194	199	203	203	195	185	177	162	170	177	182	176	173	192	169	185	201	207	180	181	195	188
Dec12	191	191	194	185	194	199	202	198	196	182	176	177	182	182	184	184	190	191	191	194	203	203	200	196	191
Dec13	195	198	198	197	198	198	203	199	188	176	169	174	181	189	196	196	198	199	201	201	202	200	196	196	194
Dec14	196	197	199	202	201	203	204	202	195	186	180	182	191	201	204	191	154	125	121	150	175	180	198	163	183
Dec15	170	190	184	189	178	180	179	179	173	169	170	172	178	180	168	170	176	188	193	193	186	197	188	181	180
Dec16	198	183	180	181	185	190	186	189	191	191	189	189	191	190	189	189	191	191	193	196	195	195	196	195	190
Dec17	195	195	195	195	199	203	205	202	195	188	184	183	186	193	190	186	182	186	181	180	181	187	190	188	190
Dec18	190	190	189	195	193	192	192	194	190	184	183	187	190	193	198	200	200	200	198	198	200	197	192	194	193
Dec19	197	196	193	193	196	198	201	200	195	188	184	187	191	196	196	196	202	197	210	196	200	227	237	209	199
Dec20	197	198	204	226	228	197	227	196	168	173	167	155	118	122	124	102	33	53	35	41	80	45	32	76	133
Dec21	111	94	120	133	141	136	147	130	120	126	124	117	128	138	147	158	163	163	164	167	164	171	166	171	142
Dec22	171	164	171	176	177	175	180	187	175	169	171	144	160	171	178	180	182	182	180	170	171	172	170	175	173
Dec23	178	179	184	184	188	187	190	194	192	189	188	183	183	186	175	176	178	174	178	170	178	185	198	185	183
Dec24	183	183	183	185	185	190	195	206	201	195	194	190	181	178	182	190	192	192	192	192	185	185	185	183	189
Dec25	188	191	195	193	193	195	198	200	191	188	192	193	189	193	192	194	192	192	197	197	192	193	195	191	193
Dec26	187	193	193	199	200	203	205	206	198	195	198	200	199	194	170	173	191	194	189	191	186	229	195	181	194
Dec27	178	188	185	184	191	193	195	198	198	187	179	187	191	190	187	201	199	195	194	201	202	199	197	197	192
Dec28	195	198	199	202	204	207	210	211	206	200	198	196	192	182	192	194	195	197	198	199	200	198	198	196	199
Dec29	198	201	200	197	199	202	206	212	208	197	191	191	190	189	189	193	194	192	187	187	191	199	194	191	196
Dec30	194	195	196	199	202	206	210	211	206	198	192	190	191	192	190	189	193	197	197	196	196	196	202	200	197
Dec31	201	209	211	212	209	217	227	212	221	185	185	197	147	113	112	119	131	156	165	145	125	131	117	127	170

2015, Field component: Y, Base: 1300.0, 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	124	124	119	111	120	122	125	131	131	124	116	114	114	113	115	144	122	136	137	143	156	147	125	119	126
Dec02	127	125	121	124	119	120	123	127	129	122	117	111	108	108	124	116	117	123	124	132	137	133	125	124	122
Dec03	123	123	123	122	122	123	127	132	133	126	118	114	111	114	118	119	121	122	121	123	123	125	126	121	122

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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
Dec04	121	120	121	119	117	122	127	130	132	125	117	109	107	109	114	118	118	121	121	121	122	124	127	135	121
Dec05	133	125	120	119	116	119	124	129	130	110	109	101	102	105	110	113	114	119	126	152	158	134	131	127	122
Dec06	124	125	118	123	102	113	115	114	119	123	111	106	107	106	108	110	134	125	142	158	150	139	133	134	122
Dec07	118	121	122	120	116	102	108	116	124	115	110	111	111	120	116	136	122	152	141	145	131	128	126	126	123
Dec08	120	132	127	121	120	117	129	133	133	129	117	113	116	116	119	122	124	127	131	127	126	129	130	126	124
Dec09	126	118	121	118	117	122	127	133	136	131	122	113	112	114	117	131	122	125	125	141	161	130	126	124	126
Dec10	125	120	125	121	92	116	121	131	132	126	118	104	98	105	110	118	141	131	136	149	135	137	135	117	123
Dec11	135	126	123	117	114	117	121	125	131	124	125	120	111	119	120	152	136	117	127	149	139	148	139	134	128
Dec12	129	122	123	117	112	117	122	129	135	124	133	116	104	109	117	123	131	131	123	129	131	133	133	131	125
Dec13	124	117	120	120	121	122	126	132	138	136	123	109	104	110	116	121	122	131	124	127	128	130	129	126	123
Dec14	124	122	118	115	123	127	130	137	142	138	126	115	106	107	112	119	122	100	115	140	137	170	198	152	129
Dec15	154	158	144	132	134	132	131	134	136	132	122	115	114	108	111	128	111	123	125	127	131	140	142	137	130
Dec16	133	140	137	130	131	130	130	131	133	128	120	115	115	118	121	123	123	124	125	125	127	128	127	126	127
Dec17	126	126	124	124	124	124	124	129	129	121	113	108	106	111	113	115	113	124	125	147	155	133	135	133	124
Dec18	132	130	125	122	124	124	126	130	134	132	123	112	109	109	116	121	122	121	124	125	126	139	144	134	125
Dec19	128	129	125	122	124	126	126	129	131	125	118	114	111	111	111	117	108	112	112	123	138	144	146	136	124
Dec20	125	121	109	113	108	81	73	97	116	114	113	105	97	113	103	103	86	110	151	184	216	218	208	183	127
Dec21	163	233	205	187	159	147	146	143	119	129	128	120	116	117	116	118	123	124	125	134	134	140	147	141	142
Dec22	140	139	128	131	129	130	129	135	135	130	119	116	115	113	111	114	125	127	124	133	134	140	136	135	128
Dec23	137	128	127	127	127	124	128	131	135	130	125	122	114	111	116	114	114	116	138	124	134	132	141	141	126
Dec24	140	134	138	131	127	128	124	127	133	128	121	112	111	108	111	119	123	125	125	141	134	133	134	138	127
Dec25	131	125	124	126	123	124	126	130	133	127	123	113	110	109	114	113	115	120	123	124	126	132	132	133	123
Dec26	133	129	132	124	123	125	126	129	129	124	121	113	115	111	115	124	121	121	124	133	136	153	141	133	127
Dec27	132	127	131	126	127	130	128	127	133	131	131	123	118	111	124	119	119	123	127	131	127	128	141	131	127
Dec28	126	122	121	118	120	120	123	125	133	130	124	119	114	119	120	120	122	124	124	126	126	128	128	127	126
Dec29	121	122	124	122	122	123	124	128	135	133	127	121	113	112	121	126	120	124	126	132	139	145	141	129	124
Dec30	126	124	122	121	122	123	127	131	135	134	129	121	111	112	118	122	122	123	123	125	127	128	133	131	126
Dec31	124	122	122	123	119	115	114	113	116	116	112	112	96	109	107	115	128	138	138	140	214	221	200	226	135

2015, Field component: Z, Base: 43600.0, 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	93	94	95	94	94	95	94	95	92	89	88	92	98	100	100	102	105	104	104	102	100	100	97	91	97
Dec02	92	94	95	95	96	96	95	94	93	93	94	93	95	98	99	101	101	101	100	101	101	100	99	97	97
Dec03	97	96	96	96	96	96	96	96	94	90	89	90	92	93	94	96	96	96	95	95	95	96	95	94	95
Dec04	93	94	94	94	94	94	95	96	93	90	89	91	94	95	96	95	95	95	95	95	94	94	94	93	94
Dec05	94	93	94	94	93	93	92	92	90	88	86	91	93	97	98	99	103	106	104	102	102	101	97	91	96
Dec06	92	94	94	93	90	90	91	94	94	95	98	98	105	108	104	105	106	104	102	99	104	100	98	98	98
Dec07	93	95	96	96	97	97	92	91	92	93	90	93	100	106	106	106	105	103	103	101	97	96	97	97	97

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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
Dec08	93	90	93	95	95	95	96	96	95	93	94	97	101	104	102	100	99	99	99	99	98	97	96	95	97
Dec09	94	95	94	95	95	95	95	96	96	96	96	94	97	99	100	101	101	100	99	98	97	98	97	96	97
Dec10	95	91	91	91	92	87	91	93	94	94	93	93	96	100	102	102	103	103	101	100	98	97	96	92	96
Dec11	86	91	93	94	94	95	95	98	97	97	97	98	100	103	104	103	104	103	102	99	96	96	98	96	98
Dec12	95	96	95	96	96	96	95	96	94	92	95	95	97	100	102	102	101	101	100	100	98	97	96	96	97
Dec13	96	96	95	96	96	97	97	99	100	98	95	93	96	98	99	99	98	98	97	97	96	96	96	96	97
Dec14	96	96	96	95	96	96	95	95	93	89	90	92	97	99	97	97	103	116	127	128	119	112	104	104	101
Dec15	101	97	95	94	96	96	99	98	98	96	97	100	101	101	105	107	105	104	103	102	102	100	100	102	100
Dec16	97	96	99	100	100	99	98	98	98	94	94	95	99	101	102	102	101	101	101	100	100	99	99	98	99
Dec17	98	98	98	98	98	97	95	95	93	91	94	98	100	101	102	100	102	103	104	105	105	103	101	101	99
Dec18	100	99	100	99	98	98	98	97	94	93	90	92	97	99	100	100	99	99	99	99	99	98	99	99	98
Dec19	98	97	97	97	97	98	96	96	94	93	94	91	93	95	99	100	100	98	99	101	100	94	87	88	96
Dec20	91	91	93	89	87	88	85	85	88	92	96	99	105	115	118	126	159	163	164	164	141	132	135	134	114
Dec21	108	111	109	106	104	104	105	109	111	108	107	108	112	118	118	117	116	117	116	115	115	114	113	113	111
Dec22	111	110	110	107	107	106	105	104	99	96	98	103	106	110	113	111	109	108	109	110	111	111	111	110	107
Dec23	108	108	106	106	105	104	102	103	100	98	99	99	104	108	110	111	110	111	112	113	112	110	107	106	106
Dec24	106	105	105	104	104	103	103	102	102	100	98	96	101	107	105	105	104	104	105	104	104	105	105	106	103
Dec25	105	104	103	102	102	102	101	101	99	97	97	97	100	103	104	104	104	103	103	103	103	103	102	106	102
Dec26	102	102	102	101	101	100	99	99	96	100	104	102	101	104	106	108	105	105	105	105	106	101	98	101	102
Dec27	103	102	102	103	103	102	102	102	101	100	101	97	98	101	104	104	102	102	103	103	102	101	100	100	102
Dec28	99	100	99	99	99	98	98	100	100	94	93	95	96	100	104	104	102	102	101	101	100	100	99	99	99
Dec29	98	97	97	98	99	99	98	98	97	97	96	94	95	99	101	102	101	101	102	102	102	100	100	88	99
Dec30	99	99	99	99	98	98	97	96	96	95	95	93	96	101	102	95	96	102	98	100	100	100	98	98	98
Dec31	98	96	96	96	97	96	94	93	94	100	101	99	105	116	123	125	124	121	117	116	114	113	115	109	107

2015, Field component: F, Base: 48400.0, 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	95	95	97	98	97	98	99	99	97	91	87	86	88	91	91	92	92	93	98	100	95	98	100	97	95
Dec02	94	95	95	96	98	98	98	98	93	94	91	89	91	93	94	95	94	97	98	97	98	99	100	100	96
Dec03	99	99	99	99	100	101	101	102	93	90	91	93	96	97	98	99	99	99	100	101	99	98	99	100	98
Dec04	98	98	99	101	102	102	103	102	97	90	89	92	96	99	100	100	99	100	101	101	100	99	98	100	99
Dec05	97	98	99	101	102	103	101	101	92	85	87	93	96	94	96	96	85	92	99	99	96	97	101	100	96
Dec06	94	95	97	97	98	101	101	99	95	92	92	83	85	88	98	93	94	100	98	104	97	98	98	96	96
Dec07	95	94	96	99	101	105	104	100	96	90	83	88	93	93	93	98	100	100	100	101	105	97	97	97	97
Dec08	102	97	95	95	95	97	99	97	93	89	88	90	93	104	102	102	100	98	99	100	101	100	103	100	98
Dec09	99	98	98	99	100	101	102	98	98	95	93	93	96	101	98	97	98	100	100	98	104	98	100	100	99
Dec10	100	102	102	98	99	99	102	100	91	86	88	86	88	90	95	95	96	102	98	105	105	97	99	102	97
Dec11	97	94	95	96	99	101	102	101	96	92	86	90	94	100	98	97	105	94	100	105	105	93	95	99	97

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
Dec12	97	97	98	95	98	100	101	100	98	91	90	90	94	97	99	100	102	102	101	102	105	104	102	100	98
Dec13	100	100	99	100	101	101	103	104	100	93	87	87	92	98	102	102	102	102	103	102	102	101	100	99	99
Dec14	99	100	100	101	101	102	103	101	97	90	87	89	97	104	104	98	87	86	95	109	111	109	110	93	99
Dec15	94	98	94	95	92	95	95	94	92	88	89	92	96	97	95	98	99	103	104	103	101	104	100	98	97
Dec16	102	94	96	97	98	100	97	99	98	95	95	95	100	101	102	102	102	102	103	103	102	102	102	101	100
Dec17	100	100	101	101	102	103	103	101	96	92	93	95	98	103	102	101	99	101	101	101	102	102	102	100	100
Dec18	101	100	100	102	101	100	100	100	96	92	88	92	97	100	104	105	104	104	103	103	104	103	101	101	100
Dec19	101	101	99	99	101	102	102	102	98	93	92	91	94	98	101	103	105	102	107	103	105	112	110	98	101
Dec20	96	96	100	105	105	91	101	88	80	85	87	84	73	84	88	85	85	98	92	96	93	70	66	84	89
Dec21	75	72	81	83	85	81	87	83	80	81	79	76	84	94	98	102	103	104	104	104	103	105	103	104	90
Dec22	102	99	101	101	101	100	101	103	94	89	90	83	93	101	106	106	106	105	104	101	103	103	102	103	100
Dec23	103	103	103	103	104	103	103	106	101	99	99	97	101	106	103	104	104	103	106	104	106	107	111	104	103
Dec24	103	102	102	102	102	104	105	109	107	102	100	96	97	101	102	105	105	105	106	106	108	103	103	103	103
Dec25	104	104	105	104	104	104	105	106	100	97	98	99	99	104	105	106	104	104	107	106	104	104	105	103	103
Dec26	101	102	104	105	106	106	106	101	101	103	107	107	105	106	98	100	106	106	105	106	105	119	101	98	104
Dec27	99	103	100	101	103	104	105	105	107	99	97	97	99	101	102	108	106	105	105	108	107	105	104	104	103
Dec28	102	104	104	105	105	106	107	109	107	99	98	99	97	97	105	105	106	105	105	105	105	104	103	104	103
Dec29	102	102	104	103	104	106	105	108	106	101	97	95	95	98	101	104	103	102	101	103	103	105	103	102	103
Dec30	102	102	102	103	104	106	107	106	104	99	97	94	97	102	102	102	103	104	104	103	103	103	105	103	102
Dec31	103	106	105	106	106	109	111	108	105	98	99	102	85	82	87	92	97	105	105	97	88	90	85	85	98

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