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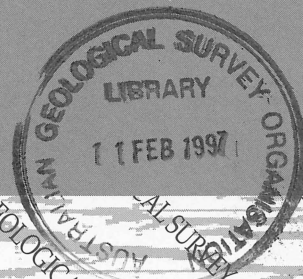
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The Australia-Wide Array of Geomagnetic Stations (AWAGS): data corrections

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W. D. WELSH & C. E. BARTON

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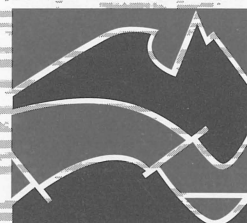


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The Australia-Wide Array of Geomagnetic
Stations (AWAGS): data corrections

W. D. WELSH¹ & C. E. BARTON¹

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DEPARTMENT OF PRIMARY INDUSTRIES & ENERGY

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Abstract

The Australia-Wide Array of Geomagnetic Stations (AWAGS) recorded 1-minute vector data in a network of 58 stations (4 magnetic observatories and 54 portable magnetometers at temporary stations) spanning the Australian continent. Preliminary data processing to recover X, Y, and Z values of the field from the portable fluxgate magnetometers was carried out at Flinders University of South Australia. This paper describes further processing carried out to (i) compensate for clock errors, (ii) remove spikes, (iii) remove step shifts, (iv) smooth abnormally noisy segments, (v) correct for instrument drift, and (vi) adjust each station to a common (DGRF) reference level. Sudden storm commencements were used to make clock corrections. Artifacts in the data were identified by a careful comparison between each station record and corresponding data from one or more reference observatories and, if necessary, neighbouring stations. The resulting data set is considered to be in “definitive” form.

Introduction

The Australia-Wide Array of Geomagnetic Stations (AWAGS) experiment was run jointly by Flinders University of South Australia and the Australian Geological Survey Organisation (AGSO, previously BMR). An array of 58 stations covered mainland Australia, but not Tasmania, and comprised 54 portable three-component fluxgate magnetometers (Chamalaun and Walker, 1982) plus AGSO's four permanent magnetic observatories. AWAGS sites and their geographic coordinates are listed in Appendix A. Geomagnetic field fluctuations were recorded at 1-minute intervals with 1 nT sensitivity, together with sensor temperature and time. The portable magnetometers were programmed to commence recording simultaneously at 0119 Universal Time (UT) on 18 November 1989. Most instruments were kept operating for a nominal interval of 8 months, and a north-south line of stations was kept going for 12 months. The last data were recorded on 17 December 1990. The AWAGS experiment is described in detail by Chamalaun and Barton (1990, 1992, 1993a, 1993b), Barton and Chamalaun (1991), and Whellams (1996).

The portable magnetometers were designed to record unattended for 4 months. A few instruments ran for longer, but most recorded for shorter intervals, depending on battery life. Thus, the data at each station were obtained as a set of runs of varying lengths, with gaps between the runs. Instruments were visited at the end of each run: the clock was checked, data were read out from memory, and a newly-serviced magnetometer was installed.

One run only (nominally 4 months) was recorded at stations CED, CRO, GLE, GOV, MAC, WAN, and WEI. Two runs (nominally 8 months) were recorded at 40 stations. Three runs (nominally 12 months) were recorded at 7 stations, forming an approximately north-south transect across the centre of the continent: ASP, DAR, DYW, MTD, PTA, TCK, and ETA/MAC. (At this last site, the first two runs were recorded at ETA and the third at MAC, a distance of 420 km away). The intervals of data recovered for each station are illustrated in Figure 1 and listed in Appendix B.

The four permanent magnetic observatories run by AGSO were located at Canberra in the southeast (CNB), Charters Towers in the northeast (CTA), Gwangara in the southwest (GNA), and Learmonth in the northwest (LRM). These provided accurate one-minute absolute data throughout the AWAGS survey, with the exception of Gwangara (GNA), which was inoperative from 24 April to 3 July 1990. The present observatories at Alice Springs and Kakadu were not installed until after the AWAGS survey.

The groups responsible for magnetometer installations for the first and second runs are shown in Figures 2 and 3, respectively. A light aircraft was chartered by AGSO to cover the north and northwest; staff from AGSO's Mundaring Geophysical Observatory, Perth, covered the southwest; Flinders University covered the south and northeast; and AGSO staff from Canberra covered the southeast. For the third run, personnel from Canberra reinstalled magnetometers at ASP, DAR, DYW, and TCK and personnel from Flinders University

reinstalled magnetometers at MAC, MTD, and PTA. An history of station installation legs is given in Appendix C; details of magnetic observations and data recovery at individual stations are contained in Appendix D.

Magnetometer calibration and orientation

Each of the portable magnetometers was calibrated at Flinders University before use. Zero offset was set using a shield, sensitivity was determined by applying known fields using a calibrated solenoid, and orthogonality was checked by rotation on a graduated scale (sensors had to be orthogonal to better than 0.1 degree).

Magnetometers were buried at the stations with the Z-axis vertical (determined by a spirit level), but with arbitrary X and Y orientation. The direction of the magnetic meridian in instrument coordinates was obtained subsequently from the first few nights of quiet data. The azimuthal orientation was then determined by comparison with the true magnetic meridian given by the Australian Geomagnetic Reference Field (AGRF90). As stations were deliberately located at sites remote from localized magnetic anomalies, the orientation procedure was deemed to be accurate to better than 1 degree. Sun compass measurements made on some instruments in-situ, and magnetic absolute measurements made adjacent to instruments at several stations, indicated this to be the case.

Absolute geomagnetic measurements were carried out at many stations using a proton-precession magnetometer for F and a fluxgate-theodolite (DIM) for D and I determinations. The results are given in Appendix D. The AWAGS magnetometers were left switched on while absolute measurements were being made and during the following night. The intention was to obtain an approximate "diurnal" correction for the absolutes using the variometer record, and then use the absolutes to calibrate the variometer data. In practice, this was not done because many of the preliminary variometer records were not recovered and absolutes were not available at all stations. Instead, a common levelling procedure was applied using the magnetic observatories as reference standards for determining the displacement of the local magnetic field from its normal (undisturbed) value; each station record was then step-shifted (independently for X, Y, and Z) so that the normal values corresponded to DGRF 1990 at the site.

Filename conventions

.RAW files

Files with a .RAW extension are the raw data files read out of the magnetometers in the field using program MGREAD. An example is *aby40a.raw*, where *aby* is the station code, *40* is the magnetometer number, and *a* is the readout sequence code (*a* being the first readout from

magnetometer memory, *b* is the second, and so on). .RAW files contain blocks of 258 base-16 numbers, presented as 9 lines of 26 numbers, and 1 line of 24 numbers, each terminated with a DOS carriage return + line feed. Each block contains a header and 78 minutes of data (1 day = 18.46 blocks) when recording at one-minute intervals. Each block starts with

```
##   hh mm ss  dd mm yy  tt tt tt  vv vv vv  XX XX XX  YY YY YY  ZZ ZZ ZZ
(mag#  time      date      temp      m.volts   X-count   Y-count   Z-count)
```

all in hex. The X, Y, and Z values are the full counts corresponding to the date and time in the header line. The 78 difference values for each of X, Y, and Z are coded as follows

```
...., 82=+2counts, 81=+1count, 80=0counts, 01=-1count, 02=-2counts,....
```

Example of a block:

```
40 02 38 00 21 10 89 42 da ff b8 33 ff d6 0b 02 45 8d ff eb 5c ff 83 85 81 83
84 82 00 81 00 83 00 82 82 81 01 81 00 82 01 81 00 81 81 82 81 82 81 00 81 01
81 00 01 03 00 81 82 81 00 82 82 82 00 82 00 00 81 03 00 00 82 00 00 00 03 01
02 01 00 00 00 81 81 81 81 00 00 01 00 01 00 81 81 01 00 81 81 81 01 0f 02 02
88 8a 88 86 83 00 06 04 02 86 03 81 00 01 01 06 06 82 00 83 00 82 89 84 02 00
03 85 00 0b 09 01 85 83 04 82 87 87 06 06 07 03 02 00 81 00 81 84 83 01 01 04
00 00 01 82 82 81 83 81 00 00 81 84 84 00 04 00 01 83 01 82 83 89 82 8a 01 01
00 00 81 00 00 81 81 81 04 01 00 82 81 01 81 00 00 01 00 00 00 00 00 00 81 01
00 00 00 81 00 01 00 01 81 00 00 00 81 81 00 00 00 00 01 00 00 00 81 00 00
00 00 01 81 01 81 01 81 81 00 01 00 81 00 81 00 81 01 81 00 00 00 3c 40
```

The final 2 bytes (3c 40) are checksums.

When compressed the files have a .ZIP extension, e.g., *aby40a.zip*. The software to uncompress the files is *pkunzip.exe*, version 0.9 or later. File *rob04a.zip* is a 20 second file; the rest contain 1-minute data.

.MAG files

Files with a .MAG extension (e.g., *aby40a.mag*) were prepared at Flinders University. AGSO's copy of these files was recorded on 26 March 1993 on a set of 3.5 inch, MSDOS-formatted floppy discs numbered 1 to 41 and M01 to M05, which reside with C. Barton. They are stored in a compressed format with a .ZIP extension, e.g., *aby40a.zip*. The software to uncompress the files, *pkunzip.exe* (version 1.02), is included with the files.

The .MAG files are prefaced with 9 lines of header information providing details on the filename, run number, longitude, latitude, magnetic deviation, strike, tilt, sample interval, preset start date and time, time drift correction, thermister constants, X (north), Y (east) and Z (down) scale factors in nT/count and nT/degree Celsius applied to the data, and the MEMMAG processing date.

One hour blocks of data follow. Each is headed with one line of figures representing date, time, temperature, battery voltage, and starting X, Y, and Z values in nT. Consecutive strings

of 60 magnetic variation values in X, then Y, then Z are listed as hundreds, tens, and units of nanotesla, the higher order information being deduced by the user from the header information.

.FIL files

Files with a .FIL extension (e.g., *aby.fil*) contain a selection of data from a station and are created by running *SELECT* on a .MAG file. *SELECT* requests start time, number of records, and time interval between records. The format of a .FIL file is

```

ABY40a.mag 8 12 89 12 0 780 6.00
      X      Y      Z      F      Mins
22031.0 -526.0 -57401.0 61483.6 0.0
22031.0 -526.0 -57403.0 61485.5 6.0

```

where start = 8 Dec 89 @ 12h 00m, 781 records @ 6 min intervals.

WB files

There are 165 data files with the WB suffix (e.g., *aby40awb*), each contains a header of 4 lines, then a set of sequential one-minute values for the X, Y, and Z components of the Earth's magnetic field in nT. Generally, there are one, two, or three files of data per station, corresponding to the different runs. The exceptions are stations ROM, TOO, and TWO which each have 2 files for the second run, and station DAR which has 3 files for the second run. The observatories each have one data file per calendar month.

From left to right, the columns in the data files represent:

Field	Possible values	Columns
year	89 or 90	1-2
day of year	1 to 365	4-6
minute of day	0 to 1439	8-11
X (nT)	-99999 to 99999 ¹	13-18
Y (nT)	-99999 to 99999 ¹	20-25
Z (nT)	-99999 to 99999 ¹	27-32

Data file names are created from the station code (3 letters), magnetometer number (2-digits), a serial file run indicator (1 letter), and the process version (2 letters). For example, file *aby40awb* was recorded at station Albany (*aby*) using magnetometer number 40; it is

¹ Missing data are assigned the value 99999.

chronologically the first file recorded at the station (*a*), with corrections applied by Welsh and Barton (*wb*). A second run of data at Albany was obtained with magnetometer number 48, so the complete data set for the station comprises files *aby40awb* and *aby48wb*.

A serial file indicator of *a* always refers to the first run, *b* usually refers to the second run, and *c* usually refers to the third run. The exceptions are for stations DAR, ROM, TOO, TWO, and the observatories, which have more files than runs. In these cases, the indicator is incremented sequentially without regard to the run number.

Preliminary data processing

After recovery from the field stations, data from the portable magnetometers were sent to Dr Francois Chamalaun at Flinders University for preliminary processing:

- Data recorded before 01:19, 18 November 1989 UT were not processed.
- Multiple files per run were created where there were large data gaps within a run.
- X and Y in geographic coordinates were derived from the two orthogonal horizontal components - in instrument coordinates (see 'Magnetometer calibration and orientation').
- Magnetometer counts were converted to magnetic units, nT.

Additional pre-processing was carried out at AGSO to simplify the data format and to complete the dataset:

- The data format was converted from one hour blocks of X, Y, and Z to one minute of data per line: year, day of year, minute of day (0 to 1439), X, Y, Z (in nT).
- The files were checked for chronological data gaps. There were none.
- AGSO observatory data were extracted and put into the AWAGS format. There are no Gnamag data for May and June 1990.

Data corrections

The raw data recovered from the magnetometers suffered from clock errors, baselevel uncertainties and drift, step shifts, spikes, and noise. Corrections were applied to remove these problems, and missing data within a run were labelled.

Problems with the data were identified by comparing progressively 24-hour magnetograms with corresponding records from the nearest permanent observatory (or observatories in some cases), and also with neighbouring stations. ('Nearest' denotes nearness in terms of similarity in morphology of the daily variation of the field, although the observatory may be more than 2000 km away.) A program for doing this rapidly on a computer screen was produced by Peter Crosthwaite. The comparison method was essential for distinguishing artifacts in the data from real transient changes in the geomagnetic field.

Spike, step, noise, and baselevel drift corrections were applied independently to each of the X, Y, and Z components. Corrections were applied in the following sequence for each run of data.

Time corrections

Time was corrected to the nearest minute. Sudden Storm Commencements (SSCs) recorded at the observatories were used as time markers to correct the AWAGS data. These sudden changes, listed in Appendix E, are most pronounced in the X-component and can be treated as synchronous over Australia at 1-minute resolution. A typical SSC, as used to determine time corrections, is shown in Figure 4. All four observatories were used, where available, for all time corrections.

With this method of time correction, accuracy greater than one minute was not possible as the observatories and the portable magnetometers recorded their one-minute values differently. The portable AWAGS magnetometers recorded one-minute spot values; CTA and LRM recorded minute averages (using an EDA variometer); and CNB and GNA recorded one round of D, I, and F as 20-second spot values each minute (using an Elsec Automatic Magnetic Observatory (AMO) magnetometer).

About 95% of the magnetometer clocks were accurate to within 3 minutes over a run. More than 60% of the files required no time corrections. The most significant corrections were:

- *pta44b* had a 10 minute drift
- *dyw10b* was a constant 9 minutes out
- *eta34b* was a constant 12 hours out
- *men24a* had some sections of data (24 to 614 minutes) repeated that initially seemed like a large time drift
- X and Y traces in runs *two55b* and *two55c* were sign inverted - the X and Y sensors were wired back-to-front

Time drifts were approximately linear but were too small for linear interpolation to be meaningful. Thus, minute values were added or removed in magnetically quiet periods where the changes would be least likely to introduce errors, and subsequent time values incremented accordingly.

Spike removal

Spikes were deemed to be artifacts if they had no counterpart at reference observatories or neighbouring stations. Isolated spikes were removed manually by substituting linearly-interpolated values. When large numbers of spikes occurred, typically over a period of hours

or days and only in a few files, a spike removal algorithm was applied that operated on a 5-point moving window and replaced the mid-point with an interpolated value if a difference in excess of 3 nT (typically) was detected. This algorithm was applied only to quiet data.

Step elimination

Steps that were identified as artifacts were eliminated by applying a DC shift to all subsequent data (a procedure akin to that used for MAGSAT data). The size of the shift was chosen so as to optimise the visual correspondence between the magnetometer record and that of the 'nearest' reference observatory. In cases of doubt, records from additional observatories or neighbouring stations were consulted.

The first run at Mt Isa, *isa07a*, recorded more than 140 steps over its 130-day duration; the first run at Geraldton, *ger12a*, recorded hundreds of steps, averaging more than 100 nT each, over a four-day interval. Some runs recorded no steps. A few steps coincided with the first large movement of an SSC.

Noise smoothing

Noise was deemed to be an artifact if it had no counterpart at a reference observatory or neighbouring station. Noisy traces, typically over periods of hours and only in a few files, were smoothed using a moving-average algorithm that operated on a 3 or 5 point moving window (depending on the amplitude of the noise) and replaced the mid-point with the neighbour-average. The algorithm was applied only to quiet data. Through this smoothing process, small variations in the traces emerged that resembled the observatory variations.

Where noise was present, it usually occurred on all three, X, Y, and Z, components simultaneously. Figure 5 illustrates an occasion where this was not so, only the Z trace being noisy.

Magnetic drift removal

Drift of the output signal was a serious problem during most runs. Part of the drift was due to the well-known temperature sensitivity of fluxgate systems and part to physical subsidence of the buried instruments. However, these factors were not sufficient to account for all of the drift and much of it was attributed to other instrumental sources. F. Chamalaun comments "The drift problem is quite vexing. Basically temperature drift etc should vary from sensor to sensor and you would not expect 'coherent' drift, if it is coherent then that would be coincidental. The common part of the circuit is the reference, A/D section, and mechanical stability. This could cause coherent drift, but we have difficulty understanding how."

Drift was usually coherent between the three, X, Y, and Z, components, as in Figures 6 and 7, which show drift over 5 days and a whole run, respectively. Figures 8 and 9 illustrate

drift varying independently between the components. By derivation, the X and Y components are not independent. They are obtained from x and y sensor data (which are independent data) by rotation.

Intervals of linear drift were identified visually by comparison with records from a 'nearby' reference observatory, with emphasis on quiet local-midnight values. Minute-difference plots spanning several days were used to identify rapidly varying drift over periods of minutes to days. Plots of 1400 to 1600 UT daily mean differences from the reference observatory were then used to identify the more slowly varying drift. These intervals of linear drift were subtracted, and all subsequent data re-levelled accordingly. This procedure compensates for drift caused by subsidence, other instrumental sources, and part of the thermal contribution.

The 'nearby' reference observatory was either the closest or, if two may have been equally appropriate, the observatory giving the smallest scatter of differences. The reference observatory for each station is listed in Appendix F. Gngangara recorded no data during May and June 1990 and so could not be used as a reference for any second run files.

During some runs drift rates and directions changed abruptly, yet, during others, drift was smoothly varying. The following statistics indicate the drift problem:

- The greatest drift gradient removed exceeded 2000 nT/day and lasted for approximately 15 minutes.
- For a single magnetic component, a maximum of 10 linear sections were used to remove a section of rapid drift, and a maximum of 15 linear sections used to remove the less-steep drift over a single run.
- There was a maximum of 3 sections of rapid drift per file.

Baselevel equalisation between files at a station

After applying the spike, step, noise, and drift corrections independently to each field element (X, Y, and Z) for each file, the data in each file had an independent, non-absolute baseline. DC shifts in X, Y, and Z were applied to whole files of data to bring all the data for a particular station to a common baseline (still non-absolute). To accompanish this, local midnight values were averaged for each file. The same was done for the appropriate reference observatory covering the same time interval. The baseline shifts in X, Y, and Z were chosen as the representative difference for quiet days. Appendix G lists each station and its reference observatory.

Adjustment of each station to a common (DGRF) reference

The final stage of correction was to apply step shifts to the X, Y, and Z data for each station so as to bring all the stations to a common reference level. Ideally, this should be the absolute zero of the field at each station (so that the final X, Y, and Z values are the true values of the field at the station). In practice, this procedure was not followed, as explained above under 'Magnetometer calibration and orientation'. Instead, baselines were adjusted so that the average field at a station corresponds to the DGRF (Definitive International Geomagnetic Reference Field) at that location at the mid-time of the station data. Second-order corrections arising from the geomagnetic secular variation are much smaller than other errors and were ignored.

For short runs of data it cannot be assumed that disturbances cancel out and that the run-mean is equal to the normal value of the field. Allowance for this was made for short runs of data by obtaining an estimate of the 'disturbance' contribution to the mean from a comparison of the displacement between the run-mean and the reference observatory mean for the run interval, and that between the latter and the annual mean for the observatory centred on the mid-run time. The difference between these two displacements was applied as the disturbance correction to the initial (short) run-mean. In practice, these disturbance corrections to the means of short runs were generally no more than 10 nT.

The sum of the baselevel shifts applied at the last two stages (baselevel equalisation and adjustment to DGRF) is listed in each file header and is referred to as the 'apparent' crustal anomaly. In the case of the observatories, this is the true crustal anomaly since the observatory data have absolute baselines.

Rogue data

Problems with the data occurred at every station and during every run. The reliability of the portable magnetometers varied between installations, although there is a tendency for any particular magnetometer to be one of the better ones or one of the worse ones.

One installation, however, stood out as being anomalous. Magnetometer number 38, when installed at Tennyson-Woods observatory, produced poor quality data (run *two38a*). The recordings were very noisy, and the data, particularly in the last third of the file, and even after applying the corrections above, do not correlate well with the observatory data. An example of the data problems is shown in Figure 10 - the traces are noisy and there are steps and periodic spikes. The file has been included in the dataset. These problems were not repeated during the second run at the station, nor were they repeated at Newcastle at the next installation of the same magnetometer.

Acknowledgements

We thank Peter Crosthwaite for writing the magnetogram viewing program, *view_ml*, and Dr Wally Campbell for his advise on comparing magnetograms. Dr Francois Chamalaun played the pivotal role in the AWAGS experiment and carried out the preliminary data processing.

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Appendix A - AWAGS sites

station number	station code	station name	latitude (deg N)	longitude (deg E)	elevation (metres)
47	ABY	Albany	-34.945	117.805	75
21	ALP	Alpha	-23.655	146.587	420
18	ASP	Alice Springs	-23.807	133.898	540
49	BAL	Balranald	-34.624	143.573	64
26	BIR	Birdsville	-25.910	139.352	55
36	BUK	Bourke	-30.052	145.952	117
45	CDN	Condobolin	-33.063	147.213	217
42	CED	Ceduna	-32.130	133.713	20
08	CKT	Cooktown	-15.477	145.187	6
54	CNB	Canberra	-35.317	149.367	859
23	CNE	Carnegie	-25.803	122.945	452
07	CRO	Croydon	-18.215	142.253	120
55	CTA	Charters Towers	-20.083	146.250	370
33	CVN	Carnarvon	-24.882	113.665	5
01	DAR	Darwin	-12.403	130.859	31
09	DER	Derby	-17.370	123.663	5
05	DYW	Daly Waters	-16.273	133.373	230
32	EMU	Emu	-28.630	132.198	300
48	ESP	Esperance	-33.685	121.822	150
34	ETA	Etadunna	-28.718	138.633	20
41	EUC	Eucla	-31.682	128.880	5
13	GER	Geraldton	-28.797	114.703	35
38	GFN	Grafton	-29.767	153.020	27
24	GIL	Giles	-25.035	128.300	609
19	GLE	Glenormiston	-22.883	138.817	158
57	GNA	Gnangara	-31.783	115.950	60
02	GOV	Gove	-12.377	136.740	50
15	GRN	The Granites	-20.560	130.355	380
10	HAL	Halls Creek	-18.233	127.667	440
14	HED	Port Hedland	-20.377	118.630	4
12	ISA	Mt. Isa	-20.667	139.490	341
17	KIW	Kiwirrkurra	-22.867	127.550	450
30	LAV	Laverton	-28.612	122.422	462
56	LRM	Learmonton	-22.217	114.100	4
58	MAC	Mabel Creek	-28.950	134.316	244
29	MEK	Meekatharra	-26.610	118.545	518
44	MEN	Menindee	-32.400	142.417	61
37	MOR	Moree	-29.498	149.847	230
25	MTD	Mt. Dare	-26.067	135.245	62
51	MYB	Maryborough	-25.523	152.728	10
46	NEW	Newcastle	-32.796	151.836	7
50	POL	Portland	-38.313	141.467	93
43	PTA	Port Augusta	-32.483	137.750	5
27	QUI	Quilpie	-26.608	144.253	215
06	ROB	Robinson River	-16.717	136.950	80
28	ROM	Roma	-26.550	148.775	308
39	SOX	Southern Cross	-31.239	119.355	345
11	TCK	Tennant Creek	-19.627	134.183	376
16	TEL	Telfer	-21.705	122.228	293
35	TIB	Tibooburra	-29.448	142.053	120
53	TOO	Toolangi	-37.533	145.467	457
52	TWO	Tennyson-Woods	-35.032	138.578	163

station number	station code	station name	latitude (deg N)	longitude (deg E)	elevation (metres)
22	VER	Mt. Vernon	-24.230	118.237	400
31	WAN	Serpentine Lakes	-28.510	129.000	310
03	WEI	Weipa	-12.680	141.925	19
20	WTN	Winton	-22.367	143.082	215
04	WYN	Wyndham	-15.510	128.147	5
40	ZAN	Zanthus	-31.037	123.568	267

Appendix B - AWAGS file start and end values

filename	first year	day	min	last year	day	min
aby40awb	1989	322	79	1990	60	114
aby48bwb	1990	60	287	1990	194	883
alp49awb	1989	322	79	1990	88	1334
alp27bwb	1990	89	166	1990	220	1245
asp03awb	1989	322	79	1990	42	499
asp23bwb	1990	126	714	1990	153	970
asp32cwb	1990	217	630	1990	344	1409
bal47awb	1989	322	79	1990	62	1353
bal37bwb	1990	64	478	1990	199	1400
bir44awb	1989	322	79	1990	89	252
bir08bwb	1990	89	496	1990	182	435
buk39awb	1989	322	79	1990	67	351
buk25bwb	1990	67	529	1990	199	1384
cdn37awb	1989	322	79	1990	62	70
cdn32bwb	1990	62	639	1990	178	638
ced36awb	1989	322	79	1990	76	1038
ckt14awb	1989	322	79	1990	90	194
ckt14bwb	1990	90	649	1990	204	55
cnb00awb	1989	305	0	1989	334	1439
cnb00bwb	1989	335	0	1989	365	1439
cnb00cwb	1990	1	0	1990	31	1439
cnb00dwb	1990	32	0	1990	59	1439
cnb00ewb	1990	60	0	1990	90	1439
cnb00fwb	1990	91	0	1990	120	1439
cnb00gwb	1990	121	0	1990	151	1439
cnb00hwb	1990	152	0	1990	181	1439
cnb00iwb	1990	182	0	1990	212	1439
cnb00jwb	1990	213	0	1990	243	1439
cnb00kwb	1990	244	0	1990	273	1439
cnb00lwb	1990	274	0	1990	304	1439
cnb00mwb	1990	305	0	1990	334	1439
cnb00nwb	1990	335	0	1990	365	1439
cne15awb	1989	322	79	1990	68	45
cne06bwb	1990	68	269	1990	195	1168
cro49bwb	1990	89	637	1990	200	216
cta00awb	1989	305	0	1989	334	1439
cta00bwb	1989	335	0	1989	365	1439
cta00cwb	1990	1	0	1990	31	1439
cta00dwb	1990	32	0	1990	59	1439
cta00ewb	1990	60	0	1990	90	1439
cta00fwb	1990	91	0	1990	120	1439
cta00gwb	1990	121	0	1990	151	1439
cta00hwb	1990	152	0	1990	181	1439
cta00iwb	1990	182	0	1990	212	1439
cta00jwb	1990	213	0	1990	243	1439
cta00kwb	1990	244	0	1990	273	1439
cta00lwb	1990	274	0	1990	304	1439
cta00mwb	1990	305	0	1990	334	1439
cta00nwb	1990	335	0	1990	365	1439
cvn50bwb	1990	79	253	1990	187	1152
dar28awb	1989	322	79	1990	84	438
dar28bwb	1990	93	257	1990	120	1204

filename	first year	day	min	last year	day	min
dar28cwb	1990	134	1031	1990	162	610
dar28dwb	1990	176	455	1990	223	94
dar28ewb	1990	224	116	1990	337	655
der51awb	1989	322	235	1990	81	896
der51bwb	1990	96	567	1990	208	1
dyw10awb	1989	322	79	1990	53	500
dyw10bwb	1990	94	123	1990	220	472
dyw10cwb	1990	221	145	1990	351	61
emu11awb	1989	322	79	1990	26	978
emu11bwb	1990	115	630	1990	202	208
esp48awb	1989	322	78	1990	58	170
esp41bwb	1990	58	274	1990	199	170
eta08awb	1989	322	79	1990	88	378
eta34bwb	1990	88	572	1990	203	1438
euc53awb	1989	322	78	1990	108	437
euc33bwb	1990	119	33	1990	200	320
ger12awb	1989	322	79	1990	41	378
ger21bwb	1990	93	524	1990	201	233
gfn30awb	1989	322	235	1990	38	1434
gfn19bwb	1990	71	596	1990	137	595
gil17awb	1989	322	235	1990	73	1134
gil22bwb	1990	83	303	1990	204	182
gle29awb	1989	322	79	1990	103	78
gna00awb	1989	305	0	1989	334	1439
gna00bwb	1989	335	0	1989	365	1439
gna00cwb	1990	1	0	1990	31	1439
gna00dwb	1990	32	0	1990	59	1439
gna00ewb	1990	60	0	1990	90	1439
gna00fwb	1990	91	0	1990	120	1439
gna00iwb	1990	182	0	1990	212	1439
gna00jwb	1990	213	0	1990	243	1439
gna00kwb	1990	244	0	1990	273	1439
gna00lwb	1990	274	0	1990	304	1439
gna00mwb	1990	305	0	1990	334	1439
gna00nwb	1990	335	0	1990	365	1439
gov26awb	1990	67	1033	1990	91	1392
grn09awb	1989	322	235	1990	85	303
grn03bwb	1990	85	413	1990	169	472
hal43awb	1989	322	79	1990	86	1399
hal43bwb	1990	95	955	1990	198	5
hed50awb	1989	322	79	1990	74	19
hed20bwb	1990	74	256	1990	190	195
isa07awb	1989	322	79	1990	87	392
isa04bwb	1990	87	611	1990	198	1407
kiw22awb	1989	322	79	1990	44	618
kiw42bwb	1990	82	258	1990	192	1337
lav41awb	1989	322	79	1990	56	548
lav45bwb	1990	56	730	1990	188	1149
lrm00awb	1989	305	0	1989	334	1439
lrm00bwb	1989	335	0	1989	365	1439
lrm00cwb	1990	1	0	1990	31	1439
lrm00dwb	1990	32	0	1990	59	1439
lrm00ewb	1990	60	0	1990	90	1439
lrm00fwb	1990	91	0	1990	120	1439

filename	first year	day	min	last year	day	min
lrm00gwb	1990	121	0	1990	151	1439
lrm00hwb	1990	152	0	1990	181	1439
lrm00iwb	1990	182	0	1990	212	1439
lrm00jwb	1990	213	0	1990	243	1439
lrm00kwb	1990	244	0	1990	273	1439
lrm00lwb	1990	274	0	1990	304	1439
lrm00mwb	1990	305	0	1990	334	1439
lrm00nwb	1990	335	0	1990	365	1439
mac18cwb	1990	224	79	1990	345	317
mek18awb	1989	322	79	1990	69	353
mek15bwb	1990	69	511	1990	200	182
men24awb	1989	322	79	1990	65	197
men47bwb	1990	65	531	1990	203	1367
mor31awb	1989	322	78	1990	72	406
mor31bwb	1990	72	1407	1990	199	67
mtd23awb	1989	322	157	1990	83	1283
mtd17bwb	1990	84	128	1990	222	323
mtd49cwb	1990	224	79	1990	350	1423
myb19awb	1989	322	79	1990	20	438
myb16bwb	1990	70	545	1990	130	124
new32awb	1989	322	79	1990	59	1278
new38bwb	1990	61	56	1990	115	715
pol52awb	1989	322	78	1990	99	300
pol05bwb	1990	99	635	1990	213	62
pta34awb	1989	322	79	1990	84	78
pta44bwb	1990	91	659	1990	224	192
pta45cwb	1990	224	363	1990	344	1322
qui02awb	1989	322	79	1990	68	319
qui39bwb	1990	68	558	1990	210	1097
rob04awb	1989	322	27	1990	3	684
rob13bwb	1990	87	59	1990	181	540
rom16awb	1989	322	79	1990	59	1278
rom02bwb	1990	69	508	1990	122	286
rom54cwb	1990	123	386	1990	200	296
sox45awb	1989	322	1	1990	55	413
sox12bwb	1990	55	595	1990	152	55
tck13awb	1989	322	80	1990	67	439
tck09bwb	1990	86	187	1990	219	92
tck09cwb	1990	219	561	1990	339	86
tel42awb	1989	322	79	1990	53	559
tel30bwb	1990	81	731	1990	205	48
tib25awb	1989	322	79	1990	66	246
tib24bwb	1990	66	429	1990	89	308
too54awb	1989	323	35	1990	81	987
too52bwb	1990	100	313	1990	176	11
too52cwb	1990	183	54	1990	206	1433
two38awb	1989	326	379	1990	33	18
two55bwb	1990	60	439	1990	169	378
two55cwb	1990	170	558	1990	232	257
ver20awb	1989	322	79	1990	71	113
ver18bwb	1990	71	335	1990	201	515
wan33awb	1989	322	79	1990	113	919
wei35awb	1989	322	80	1990	91	76
wtn27awb	1989	322	79	1990	43	198

filename	first year	day	min	last year	day	min
wtn07bwb	1990	88	496	1990	200	255
wyn46awb	1989	322	80	1990	94	1341
wyn46bwb	1990	95	410	1990	199	98
zan06awb	1989	322	79	1990	66	18
zan40bwb	1990	66	558	1990	216	321

Appendix C - Installation operations

Sep,Oct 1989

Flinders		
?	FHC,RW	SA leg TWO PTA POL CED EUC WAN EMU TOO
?	RW,DE	QLD leg ETA BIR GLE WTN ALP MYB ROM QUI
Canberra		
25-28/9	APH,CR	MOR GFN NEW
18-23/10	RH,AML	BAL MEN TIB BUK CDN
Mundaring		
10-18/10	EPP,BJP	GER SOX LAV ZAN ESP ABY
Aircraft		
19-21/9	CEB,PLM	CVN VER MEK CNE GIL KIW MTD
22/9-3/10	CEB,SS	ASP GRA TCK DYW ROB ISA CRO CKT WEI GOV DAR WYN HAL DER TEL HED

Feb-Apr 1990

Flinders		
?	FHC,RW,GE	TWO PTA POL CED EUC WAN TOO
?	RW,GE	ETA BIR
Aircraft		
22/3-6/4	CEB	TEL KIW GIL MTD ASP GRA TCK ROB ISA WTN ALP CRO CKT WEI GOV DAR DYW WYN HAL DER HED EMU
Canberra		
28/2-13/3	SS,CR	NEW CDN BAL MEN TIB BUK QUI ROM MYB GFN MOR
Mundaring		
20/2		GER
24/2-2/3	PJG	SOX LAV ESP ABY
6-22/3	EPP,GW	ZAN CNE MEK VER HED CVN GER
3-4/4	BJP	GER reinstalled

Jul,Aug 1990

Canberra		
3-12/8/90	PGC, DJM	ASP TCK DYW DAR
Mundaring		
27/9	VD	GER
Flinders		
?	RW,GE	MTD ETA(relocated to MAC) PTA

APH = Adrian Hitchman
CEB = C. Barton
DJM = Don McKnight
GE = Graham Evans
PJG = Peter Gregson
RW = Bob Walker

AML = Andrew Lewis
CR = Chris Rochford
EPP = Ed Paul
GW = Geoff Woad
PLM = Phil McFadden
SS = Steve Scherf

BJP = Barry Page
DE = Dick Eddyvean
FHC = Francois Chamalaun
PGC = Peter Crosthwaite
RH = Rod Hutchinson
VD = Vic Dent

Appendix D - Individual station logs

Rev: 8/11/1996

NOTES

nn nn nn - denotes either deg min sec, or hrs min sec

If the same mag is reused then the orientation of the casing should be unchanged

UT for the RMAG command is at the 4E record (sometimes 1 min before)

lt = local time est=UT+10:00 ; cst=UT+09:30 ; wst=UT+08:00

mT = magnetometer time (ideally the same as UT)

(UT-magT) = UT- magnetometer time in mm:ss

Readout: 78 mins/block, 18.46 blocks/day

APH = Adrian Hitchman

CEB = C. Barton

EPP = Ed Paul

PGC = Peter Crosthwaite

MGO = Mundaring Observ

SS = Steve Scherl

AML = Andrew Lewis

CR = Chris Rochford

FHC = Francois Chamalaun

PJC = Peter Gregson

RH = Rod Hutchinson

VD = Vic Dent

BJP = Barry Page

DJM = Don McKnight

GW = Geoff Woad

PLM = Phil McFadden

RW = Bob Walker

FORMAT

Acronym Sitename-Station lat°N lon°E elevation (m)

WC85 model values for epoch 1989.75 (ie @ installation)

DGRF 1990 model values for epoch 1990.2 (ie @ mid-time of runs 1+2)

Run# Magnetometer number**Start date** (local time) oic

initial time correction

Time when mag was started (using RMAG command)

TT readout: ut(hhmmss), F,X,Y,Z (nT), Temp (°K), Battery (mV) F is calculated from XYZ

Suncompass: ut Magnetic angle Shadow angle

Absolutes: F (nT), D(degE) & I (deg down) at the specified repeat station

End date similar data for end of this run

No.blocks No.days End date

final time correction

Corrected variometer record: **Filename for corrected data**

year day min to year day min UT

Apparent crustal anomaly X, Y, Z(nT)

etc.....

ABY Albany-A

-34.945

117.805

75 m

WC85@1989.75

F=60243

D=-3.427

I=-69.584

DGRF1990@1990.2

F=60318

D=-3.178

I=-69.450

Run-1

Mag#40

17/10/89 wst EPP

(UT-magT)=

06 04 00 ut RMAG

06 17 48 ut

F=60059

D=-3.027

I=-69.136

Rainy

06 40 13 ut

F=60065

D=-3.010

I=-69.136

"

06 56 11 ut

F=60071

D=-3.001

I=-69.136

"

07 13 26 ut

F=60077

D=-3.008

I=-69.136

"

07 41 30 ut F=60861

X=20880

Y=6630

Z=-56781

T=288

V=6417

1/3/90 wst PJC

01 25 36 ut

F= 60144

D= -3.112

I= -69.185

01 41 12 ut

F= 60142

D= -3.110

I= -69.185

01 58 00 ut Mag removed, then #48 installed

1967 blocks = 106 days

(UT-magT)= +00:13.7

Corrected variometer record: **aby40awb** 1989 322 79 to 1990 60 114 UT

Apparent crustal anomaly X=877

Y=639

Z=-904

No time correction required.

Spikes and steps > 5nT removed.

Reference observatory: GNA

Run-2 Mag#48

1/3/90 wst PJC

(UT-magT)=

02 08 42 ut F= 58946

X=+10437

Y=+18153

Z=-55102

T=296

V=6378

No suncompass

05 15 00 ut

F= 60075

D= -3.026

I= -69.191

05 27 54 ut

F= 60073

D= -3.007

I= -69.183

Jul/Aug90 Recovered

(UT-magT)=

Corrected variometer record: **aby48bwb** 1990 60 287 to 1990 194 883 UT

Apparent crustal anomaly X=-857

Y=349

Z=3281

Time drift correction: 0 to 3 minutes removed over the file.

Spikes and steps > 5nT removed.

Reference observatory: LRM

ASP Alice Springs-E -23.807 133.898 540 m
 WC85@1989.75 F=53710 D=5.108 I=-56.321
 DGRF1990@1990.2 F=53746 D=5.043 I=-56.216
Run-1 Mag#3 about .2 km from E (UT-magT)=
 22/09/89 cst CEB
 23 30 approx buried mag near gravel heap
 23 52 14 ut F= 54064 X=-9886 Y= 27789 Z= -45310 T=298 V=6492
 01 58 27 ut F= 53766 D= 4.972 I=-56.216
 02 40 33 ut F= 54057 X=-9878 Y= 27802 Z=-45295 T=299 V=6491
 25/3/90 lt Dead, no absolutes
 1588 blocks = 86 days = 11/2/90 (UT-magT)= 01:53
 Corrected variometer record: **asp03awb** 1989 322 79 to 1990 42 499 UT
 Apparent crustal anomaly X=-849 Y=-599 Z=-1181
 Time drift correction: 0 to 1 minute added over the file.
 Spikes and steps > 5nT removed.
 Reference observatory: CTA

Run-2 Mag#23 (UT-magT)=00:02
 26/3/90 cst CEB T=307 V=6571
 09 27 02 ut F= 53720 X=+18856 Y=+22642 Z=-44918
 09 28 30 ut RMAG
 10 39 06 ut F= 53761 D= 5.024 I=-56.260
 11 12 06 ut F= 53744 D= 4.999 I=-56.280
 3/8/90 cst PGC
 07 22 30 ut F= 53753 D=5.044 I=-56.228
 08 04 00 ut F= 53758 D=5.028 I=-56.224
 08 30 00 ut Mag retrieved, OK, level
 Funny X channel
 F(mag-E)= 57776 - 51774 = 6002 ???
 2454 blocks = 133 days (UT-magT)= +00:15.5
 Much data were unrecoverable. Original run was 13:24 25/3/90 to 00:23 5/8/90 UT (ie.1990 84 804 to 1990 217 23)
 Corrected variometer record: **asp23bwb** 1990 126 714 to 1990 153 970 UT
 Apparent crustal anomaly X=-814 Y=53 Z=-487
 No time correction required.
 Spikes and steps > 5nT removed.
 Reference observatory: CTA

Run-3 Mag#32 (ex Condobolin) (UT-magT)=
 5/8/90 cst PGC
 07 45 00 ut Mag buried
 07 48 37 ut F=54463 X=+30262 Y=+1216 Z=-45266 T=295 V=6528
 07 52 00 ut RMAG
 6/8/91 lt
 00 40 00 ut F=53774 D=4.946 I=-56.189
 01 13 00 ut F=53772 D=4.932 I=-56.187
 Nov/Dec 90 lt Mag# 32 Recovered by FAC, no absolutes
 (UT-magT)=
 Corrected variometer record: **asp32cwb** 1990 217 630 to 1990 344 1409 UT
 Apparent crustal anomaly X=691 Y=-144 Z=-1017
 No time correction required.
 Spikes and steps > 5nT removed.
 Reference observatory: CTA

ALP Alpha-A -23.655 146.587 420 m
 WC85@1989.75 F=52339 D=8.450 I=-54.473
 DGRF1990@1990.2 F=52389 D=8.570 I=-54.470
Run-1 Mag#49 (UT-magT)=
 21/10/89 lt BW
 03 58 00 ut F=52410 D= I=-54.661
 04 23 39 ut F= X= Y= Z=- T= V=0000
 000000 ut Mag= Shadow=
 30/3/90 lt CEB Running OK
 23 07 33 ut F= 52426 D= 8.671 I= -54.673 check ref. azimuth next visit
 23 31 08 ut F= 52422 D= 8.663 I= -54.671 "
 00 08 00 ut RMAG
 2443 blocks = 132 days = 29/3/90 (UT-magT)= +00:16
 Corrected variometer record: **alp49awb** 1989 322 79 to 1990 88 1334 UT
 Apparent crustal anomaly X=-1671 Y=-422 Z= 1971
 No time correction required.
 Spikes and steps > 5nT removed.
 Reference observatory: CTA

Run-2 Mag#27 (ex WTN) (UT-magT)=00:02
 30/3/90 lt CEB

00 06 32 ut F= 52340 X=-26481 Y=-16019 Z=-42209 T=299 V=6637
 00 15 20 ut Mag= 179.5 Shadow= 46.0
 02 51 32 ut F= 52424 D= 8.757 I= -54.646 check ref. azimuth next visit
 03 12 00 ut F= 52424 D= 8.772 I= -54.645 "
 Jul/Aug90 Recovered (UT-magT)=
 Corrected variometer record: **alp27bwb** 1990 89 166 to 1990 220 1245 UT
 Apparent crustal anomaly X=989 Y=107 Z=1143
 No time correction required.
 At least one mag steps was removed from the file.
 Reference observatory: CTA

BAL Balranald old values: -35.625 143.577
 WC85@1989.75 non-repeat -34.624 143.573 64 m (based on ARP estimate)
 DGRF1990@1990.2 F=59567 D=9.940 I=-67.361
 F=59097 D=9.997 I=-66.418
Run-1 Mag#47 5.6m north of abs site
 17/10/89 lt AML (UT-magT)=
 04:25:23 ut F= 59304 X=-22168 Y=5873 Z=-54691 T=295 V=6483
 06 18 00 RMAG
 06 43 02 ut F= 59131 D=10.006 I=-66.474
 07 19 19 ut F= 59131 D= 9.973 I=-66.474
 3/3/90 lt SS
 23 38 32 ut F= 59123 D= 9.770 I=-66.512
 00 40 4/3/90 Mag removed (UT-magT)= -00:20
 Corrected variometer record: **bal47awb** 1989 322 79 to 1990 62 1353 UT
 Apparent crustal anomaly X=195 Y=-443 Z= 982
 No time correction required.
 Reference observatory: CNB

Run-2 Mag#37
 5/3/90 lt SS (UT-magT)=
 No Canon data, Overcast, no suncompass
 06 38 00 ut RMAG
 08 25 43 ut F= 59145 D= 9.956 I= -66.470
 Jul/Aug90 Recovered (UT-magT)=
 Corrected variometer record: **bal37bwb** 1990 64 478 to 1990 199 1400 UT
 Apparent crustal anomaly X=526 Y=32 Z=1794
 No time correction required.
 Reference observatory: CNB

BIR Birdsville ? -25.910 139.352 55 m
 WC85@1989.75 F=54527 D=6.831 I=-58.102
 DGRF1990@1990.2 F=54607 D=6.855 I=-58.066
Run-1 Mag#44
 24/10/89 lt (UT-magT)=
 06 20 31 ut F=54829 X=20154 Y=20488 Z=-46694 T=303 V=6465
 000000 ut Mag= Shadow=
 05 18 00 ut F=54533 D=7.015 I=-57.963
 000000 lt AAA (UT-magT)=
 Corrected variometer record: **bir44awb** 1989 322 79 to 1990 89 252 UT
 Apparent crustal anomaly X=-191 Y= 20 Z= -454
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: CTA

Run-2 Mag#08
 000000 lt AAA (UT-magT)=
 000000 ut F= X=+ Y=+ Z=- T= V=0000
 000000 ut Mag= Shadow=
 14 24 52 ut F=54528 D=6.941 I= -57.998
 Jul/Aug90 Recovered (UT-magT)=
 Corrected variometer record: **bir08bwb** 1990 89 496 to 1990 182 435 UT
 Apparent crustal anomaly X=-253 Y=-82 Z=-353
 No time correction required.
 Reference observatory: CTA

BUK Bourke-C -30.052 145.952 117 m
 WC85@1989.75 F=56292 D=9.514 I=-61.700
 DGRF1990@1990.2 F=56327 D=9.727 I=-61.678
Run-1 Mag#39 51m east of stn C
 Aboriginal shanty town about 0.5 km away
 21/10/89 est RH (UT-magT)=
 23 31 31 ut F= 56188 X=+14794 Y=+20199 Z=-50301 T=291 V=6427
 05 24 00 ut F=55985 X=+16105 Y=+20933 Z=-49364 T=297 V=6434

05 28 00 ut RMAG
 05 56 00 ut F=56245 D=9.835 I=-61.800
 06 29 00 ut F=56256 D=9.842 I=-61.805
 07 03 47 ut F=56018 X=+16134 Y=+20946 Z=-49386 T=297 V=6425
 8/3/90 est SS
 05 28 56 ut F= 56245 D= 9.859 I= -61.758
 05 59 00 ut Mag removed (UT-magT)= +00:43
 Corrected variometer record: **buk39awb** 1989 322 79 to 1990 67 351 UT
 Apparent crustal anomaly X=-412 Y=-666 Z= 364
 No time correction required.
 At least one mag steps was removed from the file.
 Reference observatory: CNB

Run-2 Mag#25
 8/3/90 est SS (UT-magT)=
 06 12 00 ut RMAG
 07 15 30 ut Mag= 348 Shadow= 95.5
 08 02 47 F= 56251 D= 9.823 I= -61.769
 Jul/Aug 90 Recovered (UT-magT)=
 Corrected variometer record: **buk25bwb** 1990 67 529 to 1990 199 1384 UT
 Apparent crustal anomaly X=1050 Y=83 Z=-1129
 No time correction required.
 Reference observatory: CNB

CVN Carnarvon-E -24.882 113.665 5 m
 WC85@1989.75 F=55095 D=-1.752 I=-59.854
 DGRF1990@1990.2 F=55030 D=-1.317 I=-59.737
Run-1 Mag#21
 19/9/89 wst CEB (UT-magT)=
 00 00 approx Buried mag
 03:31:42 ut F=54865 D=-1.428 I=-59.927
 04:05:56 ut F=55354 X= 3931 Y= 27674 Z=-47778 T=294 V=6516
 20/3/90 wst EPP
 01 04 00 ut F= 54943 D= 1.507 I= -59.822
 01 26 00 ut F= 54941 D= 1.508 I= -59.815
 01 50 00 ut F= 54937 D= 1.505 I= -59.812
 02 30 00 ut mag removed
 13 32 + ut 2275 blocks = 123 days (UT-magT)= +00:44
 Broken track around integrator circuit; no data rescued.

Run-2 Mag#50
 20/3/90 wst EPP (UT-magT)=
 02 40 00 ut mag installed
 02 50 22 ut F= 54634 X=-17525 Y=-21205 Z=-47203 T=303 V=6305
 02 54 00 ut RMAG
 05 07 00 ut F= 54902 D= 1.383 I= -59.778
 05 27 30 ut F= 54899 D= 1.370 I= -59.780
 05 48 30 ut F= 54898 D= 1.355 I= -59.782
 Nov/Dec 90 Recovered (UT-magT)=
 Corrected variometer record: **cvn50bwb** 1990 79 253 to 1990 187 1152 UT
 Apparent crustal anomaly X=-422 Y=-295 Z= 732
 No time correction required.
 Reference observatory: LRM

CNE Carnegie-A -25.803 122.945 452 m
 WC85@1989.75 F=55565 D=1.736 I=-59.892
 DGRF1990@1990.2 F=55524 D=1.838 I=-59.704
Run-1 Mag#15
 20/9/89 wst CEB (UT-magT)=
 06 00 approx buried mag on rise in stream bed, big heap
 06:21:47 ut F=56212 X=+07124 Y=+27127 Z=-48716 T=296 V=6577
 06:54:00 ut F=55430 only
 9/3/90 wst EPP
 23 48 00 ut F= 55478 D= 1.792 I= -59.783
 00 10 30 ut F= 55479 D= 1.793 I= -59.788
 00 30 00 ut F= 55477 D= 1.780 I= -59.790
 01 25 00 ut mag removed, #6 installed
 02 40 30 ut (UT-magT)= +00:30
 Corrected variometer record: **cne15awb** 1989 322 79 to 1990 68 45 UT
 Apparent crustal anomaly X=396 Y=-302 Z=1601
 No time correction required.
 Reference observatory: LRM

Run-2 Mag#6
 9/3/90 wst EPP
 01 49 00 ut F= 56267 X=+24491 Y=+15264 Z=-48303 (UT-magT)=
 01 52 00 ut RMAG T=307 V=6438
 04 14 30 ut F= 55443 D= 1.897 I= -59.757
 04 36 00 ut F= 55444 D= 1.908 I= -59.755
 04 53 30 ut F= 55446 D= 1.917 I= -59.752
 Jul/Aug90 Recovered (UT-magT)=
 Corrected variometer record: **cne06bwb** 1990 68 269 to 1990 195 1168 UT
 Apparent crustal anomaly X=903 Y=-53 Z=-845
 No time correction required.
 Reference observatory: LRM

CED Ceduna-? -32.130 133.713 20m
 WC85@1989.75 F=58569 D=5.503 I=-65.312
 DGRF1990@1990.2 F=58670 D=5.587 I=-65.237
Run-1 Mag#36
 13/11/89 lt FUSA (UT-magT)=
 02 17 34 ut F=58790 X=18242 Y=16447 Z=-53413 T=294 V=6474
 000000 ut Mag= Shadow=
 000000 ut F= D= I=
 No dates on DIM obs; No F obs.
 000000 lt AAA (UT-magT)=
 Corrected variometer record: **ced36awb** 1989 322 79 to 1990 76 1038 UT
 Apparent crustal anomaly X=131 Y=-65 Z=-373
 No time correction required.
 Reference observatory: CNB

Run-2 Mag#LOST
 000000 lt AAA (UT-magT)=
 000000 ut F= X=+ Y=+ Z=- T= V=0000
 000000 ut Mag= Shadow=
 000000 ut F= D= I=-
 Jul/Aug90 RW Mag lost in corn field xxxxxxxxxxxxxxxxxxxx

CDN Condobolin-C -33.063 147.213 217 m
 WC85@1989.75 F=57820 D=10.667 I=-64.502
 DGRF1990@1990.2 F=57824 D=10.940 I=-64.462
Run-1 Mag#37 30m north of Stn.C
 22/10/89 lt RH (UT-magT)=-00:02
 05 04 30 ut F= 56878 X=-16826 Y=-16866 Z=-51649 T=297 V=6488
 05 39 00 ut F= 57815 D= 10.517 I= -64.549
 06 04 10 ut F= 57820 D= 10.505 I= -64.545
 06 42 12 ut F= 56890 X=-16822 Y=-16883 Z=-51657 T=296 V=6484
 2/3/90 lt SS
 00 34 46 ut F= 57814 D= 10.387 I= -64.498
 (UT-magT)= -00:05
 Corrected variometer record: **cdn37awb** 1989 322 79 to 1990 62 70 UT
 Apparent crustal anomaly X=-733 Y=-319 Z= 1459
 No time correction required.
 Reference observatory: CNB

Run-2 Mag#32
 3/3/90 lt SS
 No Canon data, no suncompass data
 03 34 35 ut F= 57817 D= 10.555 I= -64.485
 23/7/90 lt PGC Recovery
 07 06 00 ut F= 57831 only
 07 12 20 ut F= 57831 only
 07 26 00 ut F= 57830 only
 07 49 00 ut F= 57829 only
 21 39 30 ut F= 57827 only
 25/7/90 readout (UT-magT)= -00:05 (-2s?)
 Corrected variometer record: **cdn32bwb** 1990 62 639 to 1990 178 638 UT
 Apparent crustal anomaly X=440 Y=123 Z=-943
 No time correction required.
 Reference observatory: CNB

CKT Cooktown-D -15.477 145.187 6 m
 WC85@1989.75 F=47180 D=6.932 I=-43.704
 DGRF1990@1990.2 F=47257 D=6.921 I=-43.693
Run-1 Mag#14
 27/09/89 est CEB (UT-magT)=

mag buried this morning, not properly equilibrated

21 12 00 RMAG

22 04 13 ut F=47213 D=6.874 I=-43.752

22 47 22 ut F=47395 X=18738 Y=28712 Z=-32723 T=300 V=6472

31/3/90 est CEB Running OK

04 44 11 ut F= 47215 D= 6.936 I= -43.752

05 14 35 ut F= 47218 D= 6.933 I= -43.758

2467 blocks = 133 days = 30/3/90 (UT-magT)= -00:08

Corrected variometer record: **ckt14awb** 1989 322 79 to 1990 90 194 UT

Apparent crustal anomaly X=304 Y=-19 Z=-336

No time correction required.

Reference observatory: CTA

Run-2 Mag#14 (slightly rotated from old position) (UT-magT)= -00:02

31/3/90 est CEB

05 37 00 ut Mag= 56 Shadow= 45

08 09 00 ut F= 47857 X=+19739 Y=+28342 Z=-33127 T=302 V=6557

08 11 00 ut RMAG

1/4/90 est

21 15 11 ut F= 47233 D= 6.877 I= -43.739

21 37 54 ut F= 47235 D= 6.874 I= -43.738

Jul/Aug90 Recovered by Colin Grant (UT-magT)=

Corrected variometer record: **ckt14bwb** 1990 90 649 to 1990 204 55 UT

Apparent crustal anomaly X=415 Y=18 Z=-637

No time correction required.

Reference observatory: CTA

CRO Croydon-B -18.215 142.253 120 m

WC85@1989.75 F=49312 D=6.611 I=-48.067

DGRF1990@1990.2 F=49388 D=6.578 I=-48.041

Run-1 Mag#5 about .5 km from B (UT-magT)=

26/09/89 est CEB

02 30 approx buried mag in mine hole

02 48 47 ut F= 50177 X=-324 Y=33786 Z=-37097 T=303 V=6496

02 53 23 ut RMAG

04 21 24 ut F= 49413 D=6.661 I=-47.935

04 51 05 ut F= 50198 X=-279 Y=33795 Z=-37117 T=303 V=6496

30/3/90 est CEB Mag flooded, no absolutes, no readout (UT-magT)= none

No data - Mag not switched on.

Run-2 Mag#49 (ex Alpha) (UT-magT)= -2 sec

30/3/90 est CEB

07 58 00 ut F= 48452 X=+9581 Y=+30915 Z=-36057 T=301 V=6614

Overcast, no suncompass

07 59 00 ut RMAG

31/3/90 est next morning (rainy & rained all night)

21 31 04 ut F= 49355 D= 6.518 I= -48.102 (UT-magT)=

Jul/Aug90 Recovered by Shire

Corrected variometer record: **cro49bwb** 1990 89 637 to 1990 200 216 UT

Apparent crustal anomaly X=-1509 Y= 44 Z= 1604

No time correction required.

Reference observatory: CTA

DAR Darwin-G -12.403 130.859 31 m

W2C85@1989.75 F=46707 D=3.577 I=-40.872

DGRF1990@1990.2 F=46670 D=3.526 I=-40.621

Run-1 Mag#28 about .1 km from G (UT-magT)=

9/9/89 cst CEB

mag buried previous evening

23 13 35 F= 46737 D= 3.929 I= -40.871

(03 03 10 ut F= 46435 D= 3.565 I= -40.590 at station E)

04:23:55 ut F= 47109 X=27266 Y=22730 Z=-309710 T=306 V=6496

3/4/90 cst CEB Dead, no absolutes

23 30 00 Mag= 008 Shadow= 245

2361 blocks = 128 days = 25/3/90 (UT-magT)= +01:01

Corrected variometer record: **dar28awb** 1989 322 79 to 1990 84 438 UT

Apparent crustal anomaly X=526 Y=114 Z=-989

No time correction required.

At least one mag steps was removed from the file.

Reference observatory: CTA

Run-2 Mag#28 (UT-magT)= -00:01

3/4/90 cst CEB

04 01 46 mt F= 47440 X=27661 Y=22782 Z=-31087 T=304 V=6589

04 03 30 RMAG
 08 01 00 ut F= 46722 D= 3.973 I= -40.842
 08 34 00 ut F= 46720 D= 3.965 I= -40.848
 11/8/90 cst PGC
 03 49 30 ut F= 46704 D= 3.946 I= -40.780
 04 14 30 ut F= 46711 D= 3.960 I= -40.778
 04 30 00 ut Mag retrieved, OK, not level
 Problems reading certain blocks
 2405 blocks = 130 days (UT-magT)= 00:31.5
 Corrected variometer record: **dar28bwb** 1990 93 257 to 1990 120 1204 UT
 Apparent crustal anomaly X=783 Y=112 Z=-1156
 No time correction required.
 Spikes and steps > 5nT removed.
 Reference observatory: CTA
 Corrected variometer record: **dar28cwb** 1990 134 1031 to 1990 162 610 UT
 Apparent crustal anomaly X=787 Y=118 Z=-1152
 No time correction required.
 No spikes/steps > 5 nT to remove.
 Reference observatory: CTA
 Corrected variometer record: **dar28dwb** 1990 176 455 to 1990 223 94 UT
 Apparent crustal anomaly X=792 Y=116 Z=-1151
 No time correction required.
 Spikes and steps > 5nT removed.
 Reference observatory: CTA

Run-3 Mag#28
 12/8/90 cst PGC (UT-magT)=
 23 16 16 mt F= 47253 X=+27086 Y=+23034 Z=-31124 T=299 V=6416
 23 18 00 RMAG
 07 34 00 ut F= 46684 D= 3.960 I= -40.892
 08 00 00 ut F= 46681 D= 3.965 I= -40.835
 Nov/Dec 90 Collected by P.Ryan - no absolutes
 Corrected variometer record: **dar28ewb** 1990 224 116 to 1990 337 655 UT
 Apparent crustal anomaly X=691 Y=132 Z=-1256
 No time correction required.
 Spikes and steps > 5nT removed.
 Reference observatory: CTA

DYW Dally Waters-C -16.273 133.373 230 m
 WC85@1989.75 F=48935 D=4.414 I=-46.464
 DGRF1990@1990.2 F=48937 D=4.316 I=-46.301
Run-1 Mag#10 about 1 km from C
 24/9/89 cst SS (UT-magT)=
 02 00 approx buried mag
 05 19 06 ut F= 49045 D= 4.511 I= -46.092
 06 09 36 ut F= 49332 X=-33369 Y=4719 Z=-36026 T=303 V=6467
 4/4/90 cst CEB Dead, no absolutes
 23 08 00 ut Mag=170 Shadow=080
 1792 blocks = 97 days = 22/2/90 (UT-magT)=
 Corrected variometer record: **dyw10awb** 1989 322 79 to 1990 53 500 UT
 Apparent crustal anomaly X=-98 Y= 61 Z=-816
 Time drift correction: 0 to 2 minutes added over the file.
 No spikes/steps > 5 nT to remove.
 Reference observatory: CTA

Run-2 Mag#10
 4/4/90 cst CEB (UT-magT)=
 01 40 20 ut F= 49202 X=-33399 Y=+4725 Z=-35820 T=307 V=6621
 04 58 03 ut F= 49045 D= 4.511 I= -46.099
 05 23 48 ut F= 49040 D= 4.514 I= -46.104
 8/8/90 cst PGC
 000000 ut F= X=+ Y=+ Z=- T= V=0000
 08 04 00 ut F= 49031 D= 4.492 I= -46.116
 08 29 00 ut F= 49031 D= 4.488 I= -46.118
 09 00 Mag retrieved, OK, not level 2338 blocks = 127 days (UT-magT)= 09:34.5
 Corrected variometer record: **dyw10bwb** 1990 94 123 to 1990 220 472 UT
 Apparent crustal anomaly X=-109 Y=49 Z=-548
 Constant 9 minutes added to whole file
 Spikes and steps > 5nT removed.
 Reference observatory: CTA

Run-3 Mag#10
 9/8/90 cst PGC (UT-magT)=
 23 45 15 ut F= 49187 X=-33659 Y=+3206 Z=-35724 T=298 V=6567
 23 47 00 ut RMAG

F(mag-C) = 49030 - 49057 = -27 nT
 04 57 00 ut F= 49057 D= 4.469 I= -46.066
 05 24 00 ut F= 49054 D= 4.476 I= -46.073
 Nov/Dec 90 Recovered by publican (UT-magT)=
 Corrected variometer record: **dyw10cwb** 1990 221 145 to 1990 351 61 UT
 Apparent crustal anomaly X=-20 Y=68 Z=-456
 Time drift correction: 0 to 1 minute added over the file.
 At least one mag steps was removed from the file.
 Reference observatory: CTA

DER Derby-E -17.370 123.663 5 m
 WC85@1989.75 F=50367 D=2.352 I=-49.089
 DGRF1990@1990.2 F=50282 D=2.476 I=-48.860
Run-1 Mag#51
 02/10/89 wst CEB (UT-magT)=
 mag buried in boab hole previous evening
 22 09 38 ut F=49947 X=-22025 Y=24647 Z=-37445 T=305 V=6512
 22 13 00 ut RMAG
 23 11 16 ut F=50310 D=2.358 I=-48.791
 00 10 31 ut X=-22044 Y=24632 Z= missed T=306 V=6508
 6/4/90 wst CEB Dead, no absolutes
 2307 blocks = 125 days = 22/3/90 (UT-magT)= +01:59
 Corrected variometer record: **der51awb** 1989 322 235 to 1990 81 896 UT
 Apparent crustal anomaly X=-53 Y=-1148 Z= 951
 Time drift correction: 0 to 2 minutes added over the file.
 Reference observatory: LRM

Run-2 Mag#51
 6/4/90 lt CEB (UT-magT)= -00:02
 06 47 50 ut F= 50170 X=-22040 Y=+24856 Z=-37596 T=310 V=6632
 03 42 00 ut Mag= 102 Shadow= 79
 06 49 00 RMAG
 08 52 48 ut F= 50300 D= 2.427 I= -48.758
 09 13 12 ut F= 50300 D= 2.434 I= -48.765
 Jul/Aug90 Recovered by Ron Chillcott (UT-magT)=
 Corrected variometer record: **der51bwb** 1990 96 567 to 1990 208 1 UT
 Apparent crustal anomaly X=0 Y=228 Z=827
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: LRM

EMU Emu-? -28.630 132.198 300 m
 WC85@1989.75 F=56727 D=4.832 I=-61.940
 DGRF1990@1990.2 F=56791 D=4.829 I=-61.837
Run-1 Mag#11
 09/11/89 lt FHC (UT-magT)=
 08 27 42 ut F=56638 X=19051 Y=18437 Z=-50050 T=301 V=6424
 000000 ut Mag= Shadow=
 000000 ut F= D= I=
 000000 lt AAA (UT-magT)= +00:35
 Corrected variometer record: **emu11awb** 1989 322 79 to 1990 26 978 UT
 Apparent crustal anomaly X=-351 Y= 14 Z= 191
 No time correction required.
 Reference observatory: GNA

Run-2 Mag#11
 25/04/90 lt AAA (UT-magT)=
 07 51 33 ut F=56786 X=19254 Y=18643 Z=-50064 302T= V=6484
 000000 ut Mag= Shadow=
 000000 ut F= D= I= -
 Jul/Aug90 Recovered (UT-magT)=
 Corrected variometer record: **emu11bwb** 1990 115 630 to 1990 202 208 UT
 Apparent crustal anomaly X=-86 Y=47 Z=183
 Time drift correction: 0 to 1 minute removed over the file.
 Reference observatory: CNB

ESP Esperance-B -33.685 121.822 150m
 WC85@1989.75 F=59763 D=-0.345 I=-68.085
 DGRF1990@1990.2 F=59836 D=-0.191 I=-67.942
Run-1 Mag#48 -33.686 121.820
 16/10/89 wst EPP (UT-magT)=
 08 03 02 ut F= 58954 X=+9139 Y=-21343 Z=-54190 T=286 V=6392
 06 32 00 ut RMAG
 06 43 00 ut F=59980 D=-0.421 I=-67.779

07 00 58 ut F=59984 D=-0.425 I=-67.782
 07 19 18 ut F=59988 D=-0.434 I=-67.784
 07 38 18 ut F=59992 D=-0.444 I=-67.785
 08 03 02 ut F= 58945 X=9139 Y=-21343 Z=-54190 T=286 V=6392

27/2/90 wst PJG

02 18 50 ut F= 60006 D= -0.634 I= -67.846
 02 34 45 ut F= 60000 D= -0.613 I= -67.841

02 52 00 ut Mag removed, then #41 installed

1877 blocks = 102 days

(UT-magT)= -02:06

Corrected variometer record: **esp48awb** 1989 322 78 to 1990 58 170 UT

Apparent crustal anomaly X=-10 Y=-270 Z=3020

Time drift correction: 1 to 2 minutes removed over the file.

Reference observatory: GNA

Run-2

Mag#41

27/2/90 wst PJG

03 13 39 ut F= 61544 X=-11493 Y=+20451 Z=-56898 (UT-magT)=
T=303 V=6423

No suncompass

05 09 00 ut F= 59965 D= -0.485 I= -67.833

05 22 25 ut F= 59970 D= -0.473 I= -67.843

Jul/Aug90 Recovered

(UT-magT)=

Corrected variometer record: **esp41bwb** 1990 58 274 to 1990 199 170 UT

Apparent crustal anomaly X=858 Y=377 Z=1735

Time drift correction: 0 to 1 minute removed over the file.

Reference observatory: LRM

ETA Etadunna-A

WC85@1989.75 F=56272 D=6.959 I=-61.266 20 m

DGRF1990@1990.2 F=56357 D=7.028 I=-61.225

Run-1

Mag#8

25/10/89 lt AAA

06 11 13 ut F=56751 X=27800 Y=577 Z=-49472 (UT-magT)=
T=301 V=6496

000000 ut Mag= Shadow=

000000 ut F= D= I= -

(UT-magT)=

Corrected variometer record: **eta08awb** 1989 322 79 to 1990 88 378 UT

Apparent crustal anomaly X=706 Y= 26 Z=333

No time correction required.

No spikes/steps > 5 nT to remove.

Reference observatory: CNB

Run-2

Mag#34

000000 lt AAA

000000 ut F= X=+ Y=+ Z=- (UT-magT)=
T= V=0000

000000 ut Mag= Shadow=

000000 ut F= D= I= -

(UT-magT)=

Corrected variometer record: **eta34bwb** 1990 88 572 to 1990 203 1438 UT

Apparent crustal anomaly X=901 Y=90 Z=609

Constant 12 hours 0 mins added to whole file.

Spikes and steps > 5nT removed.

Reference observatory: CNB

Run-3

Mag#

Mag was relocated at Mabel Creek (MAC) for run 3

000000 lt AAA

000000 ut F= X=+ Y=+ Z=- (UT-magT)=
T= V=0000

000000 ut Mag= Shadow=

000000 ut F= D= I= -

(UT-magT)=

Nov/Dec 90 Recovered

EUC Eucla

WC85@1989.75 F=58599 D=3.521 I=-65.426 5 m

DGRF1990@1990.2 F=58686 D=3.571 I=-65.308

Run-1

Mag#53

12/11/89 lt FUSA

03 03 00 ut F= D=5.448 I=-66.125 (UT-magT)=

03 40 39 ut F=57937 X=7656 Y=22565 Z=-52810 T=293 V=6476

000000 ut Mag= Shadow=

(UT-magT)=00:24

Corrected variometer record: **euc53awb** 1989 322 78 to 1990 108 437 UT

Apparent crustal anomaly X=-740 Y=-118 Z= 576

Constant 1 minute removed from whole file.

81 mag steps were removed over the file.

Reference observatory: GNA

Run-2 Mag#33
 28/04/90 ft FUSA
 21 54 09 ut F= X=+ Y=+ Z=- (UT-magT)=
 000000 ut Mag= Shadow= T=288 V=6655
 000000 ut F= D= I= -
 Jul/Aug90 Recovered (UT-magT)=
 Corrected variometer record: **euc33bwb** 1990 119 33 to 1990 200 320 UT
 Apparent crustal anomaly X=1072 Y=47 Z=3688
 No time correction required.
 Reference observatory: LRM

GER Geraldton-C -28.797 114.703 35 m
 WC85@1989.75 F=57204 D=-2.577 I=-64.004
 DGRF1990@1990.2 F=57172 D=-2.214 I=-63.871
Run-1 Mag#12 -28.800 114.702 62m from GER-C
 11/10/89 wst EPP (UT-magT)= -1 sec
 00 55 07 mt F=51413 X=5606 Y=25637 Z=-51043 T=293 V=6412
 01 03 00 mt RMAG
 01 31 18 ut F= 57085 D= -2.290 I= -64.091 big scatters
 02 04 18 ut F= 57081 D= -2.306 I= -63.845 "
 02 40 11 ut F= 57068 D= -2.292 I= -63.842 "
 03 15 31 ut F= 57057 D= -2.280 I= -63.833 "
 20/2/90 wst PJG
 05 43 10 ut F= 57019 D= -2.109 I= -63.895
 06 06 50 ut F= 57023 D= -2.103 I= -63.890
 06 27 55 ut F= 57025 D= -2.083 I= -63.884

Some problems with this mag - sent back to Francois

Corrected variometer record: **ger12awb** 1989 322 79 to 1990 41 378 UT (UT-magT)=
 Apparent crustal anomaly X=1107 Y= 89 Z= 444
 No time correction required.
 There were hundreds of mag steps during 1989 335 1014 to 1989 339 1159.
 Reference observatory: GNA

--- gap --- WHY?

Run-2 Mag#21
 3/4/90 wst BJP
 06 02 01 ut F= 57365 X=-23683 Y=-8406 Z=-51567 (UT-magT)=
 06 06 00 ut RMAG T=301 V=6491
 20/7/90 wst VD Recovered mag
 000000 ut F= X=+ Y=+ Z=- T= V=0000
 02 43 33 ut F= 57053 D= -2.126 I= -63.823
 03 09 48 ut F= 57052 D= -2.136 I= -63.823
 03 30 48 ut F= 57051 D= -2.138 I= -63.827

Corrected variometer record: **ger21bwb** 1990 93 524 to 1990 201 233 UT (UT-magT)=
 Apparent crustal anomaly X=-29 Y=-162 Z=-206
 No time correction required.
 Reference observatory: LRM

GIL Gilles-B -25.035 128.300 609 m
 WC85@1989.75 F=54859 D=3.537 I=-58.410
 DGRF1990@1990.2 F=54852 D=3.517 I=-58.246
Run-1 Mag#17 about 1km from B
 20/09/89 cst CEB (UT-magT)=
 09 00 approx buried mag
 09 50 49 ut F=54552 X=22010 Y=18611 Z=-46316 T=294 V=6397
 21/9/89 cst
 23 19 30 ut F=54866 F(stnB-mag)= 208.6 nT
 23/3/90 cst CEB
 22 13 12 ut F= 54788 D= 3.546 I= -58.491
 23 34 15 ut Mag= 35 Shadow= 212.5
 2161 blocks = 117 days = 14/3/90 ? (UT-magT)= +00 42
 Corrected variometer record: **gli17awb** 1989 322 235 to 1990 73 1134 UT
 Apparent crustal anomaly X=-89 Y=-53 Z= 409
 No time correction required.
 Reference observatory: LRM

Run-2 Mag#22
 24/3/90 cst CEB (UT-magT)=
 23 46 08 ut F= 54626 X=+21960 Y=+18485 Z=-46476 T=296 V=6522
 23 44 00 ut Mag= 37.5 Shadow= 210.5

23 49 00 ut RMAG

02 22 38 ut F= 54752 D= 3.585 I= -58.467

02 50 25 ut F= 54756 D= 3.597 I= -58.459

Jul/Aug90 Recovered by Dare Phillips (UT-magT)=

Corrected variometer record: **gll22bwb** 1990 83 303 to 1990 204 182 UT

Apparent crustal anomaly X=-160 Y=17 Z=718

No time correction required.

Reference observatory: LRM

GLE Glenormiston non-repeat -22.883 138.817 158m

WC85@1989.75 F=52691 D=6.330 I=-54.603

DGRF1990@1990.2 F=52762 D=6.297 I=-54.555

Run-1

23/10/89 lt FUSA (UT-magT)=

07 37 38 ut F=52873 X=13305 Y=27518 Z=-43143 T=308 V=6512

000000 ut Mag= Shadow=

000000 ut F= D= I= 000000 lt AAA (UT-magT)=

Corrected variometer record: **gle29awb** 1989 322 79 to 1990 103 78 UT

Apparent crustal anomaly X=167 Y= 74 Z=-418

No time correction required.

Reference observatory: CTA

Run-2 Mag# Not reinstalled

GFN Grafton-A -29.767 153.020 27m

WC85@1989.75 F= 55197 D=11.604 I=-60.350

DGRF1990@1990.2 F=55167 D=11.832 I=-60.297

Run-1

27/09/89 est APH (UT-magT)=

00 55 45 ut F= 55053 D=11.671 I=-60.325

01 11 36 ut F= 55052 D=11.679 I=-60.335

01 45 41 ut F= 55738 X=22277 Y=16358 Z=-48403 T=291 V=6576

12/3/90 est SS

07 13 22 ut F= 55085 D= 11.836 I= -60.248 DIM very badly adjusted

08 25 00 ut Mag removed, 1cm water inside, not running
1580 blocks = 85.6 days = 10/2/90 (UT-magT)= 36 days???Corrected variometer record: **gfn30awb** 1989 322 235 to 1990 38 1434 UT

Apparent crustal anomaly X=567 Y=-99 Z=-1028

No time correction required.

Reference observatory: CNB

Run-2 Mag#19

12/3/90 est SS (UT-magT)=

08 36 25 ut RMAG

13/3/90 est

23 27 06 ut F= 55063 D= 11.693 I= -60.331

Jul/Aug90 Recovered by City Council (UT-magT)=

Corrected variometer record: **gfn19bwb** 1990 71 596 to 1990 137 595 UT

Apparent crustal anomaly X=-138 Y=-195 Z=-46

No time correction required.

At least 28 mag steps were removed from the file.

Reference observatory: CNB

GOV Gove-B -12.377 136.740 50 m

WC85@1989.75 F=46120 D=4.750 I=-40.160

DGRF1990@1990.2 F=46153 D=4.633 I=-40.017

Run-1

28/09/89 cst CEB (UT-magT)=

21 30 approx buried mag

21 45 30 ut RMAG

00 44 36 ut F=46051 D=4.700 I=-40.103

01 52 55 ut F=29643 X=2547 Y=20263 Z=-21486 T=302 V=6527

mag calibration suspect

2/4/90 cst CEB

20 15 00 ut Running OK

22 52 40 ut F= 46182 D= 4.710 I= -40.106

23 27 41 ut F= 46185 D= 4.706 I= -40.103

00 05 30 ut Mag= 68.5 Shadow= 176

Bad data readout on site (UT-magT)= +00:03

Fixed mag using Croydon A/D board

Corrected variometer record: **gov26awb** 1990 67 1033 to 1990 91 1392 UT

Apparent crustal anomaly X=-14625 Y= -1142 Z= 7768

No time correction required.

Reference observatory: CTA

Run-2 Mag#26 Used suspect AD board from CRO.
 2/4/90 cst CEB (UT-magT)= -00:01
 07 23 40 ut F= 29752 X=+2728 Y=+20167 Z=-21703 T=302 V=6697
 mag calibration suspect
 same orientation as Run-1

07 25 40 ut RMAG
 Jul/Aug90 Recovered by Security (UT-magT)=
 Data overwritten - no record

GRN The Granites-C -20.560 130.355 380 m
 WC85@1989.75 F=51942 D=4.004 I=-52.687
 DGRF1990@1990.2 F=51927 D=3.942 I=-52.516
Run-1 Mag#9 about .8km from C (UT-magT)=
 22/09/89 cst CEB
 06 30 approx mag buried, end of old runway
 06 43 58 ut F=52086 X=5623 Y=-31070 Z=-41423 T=308 V=6505
 06 57 00 ut F=52178.0 at mag after burial
 07 17 00 ut F=52327.5 at Stn. C F(mag-C)= 149.5 nT
 26/3/90 cst CEB
 02 55 00 ut Mag= 162 Shadow= 38
 04 09 47 ut F= 52317 D= 3.590 I= -52.887
 2377 blocks 129 days (UT-magT)= +00:44

Corrected variometer record: gm09awb 1989 322 235 to 1990 85 303 UT
 Apparent crustal anomaly X=128 Y=-32 Z=-469
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: LRM

Run-2 Mag#3 (UT-magT)= -00:02
 26/3/90 cst CEB
 05 25 30 ut Mag= 39 Shadow= 80
 05 32 10 ut F= 52616 X=+24406 Y=+20050 Z=-42081 T=311 V=6419
 07 32 26 ut F= 52304 D= 3.559 I= -52.925
 Jul/Aug90 Recovered by Mal Wyburn (UT-magT)=
 Corrected variometer record: gm03bwb 1990 85 413 to 1990 169 472 UT
 Apparent crustal anomaly X=-104 Y=506 Z=-1392
 No time correction required.
 Reference observatory: LRM

HAL Halls Creek-E -18.233 127.667 440 m
 WC85@1989.75 F=50655 D=3.272 I=-49.866
 DGRF1990@1990.2 F=50595 D=3.269 I=-49.652
Run-1 Mag#43 about 1.5 km from E (UT-magT)= -00:01
 1/10/89 wst CEB buried mag 27 m from edgew of runway, covered using dozer
 02 01 00 ut RMAG
 04 47 47 ut F=50599 D=3.006 I=-49.476
 05 21 19 ut F=50691 X=29152 Y=15658 Z=-38400 T=306 V=6483
 5/4/90 wst CEB Dead, no absolutes
 2407 blocks = 130 days = 27/3/90 (UT-magT)= +01:39
 Corrected variometer record: hal43awb 1989 322 79 to 1990 86 1399 UT
 Apparent crustal anomaly X=500 Y=-40 Z= 34
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: LRM

Run-2 Mag#43 (UT-magT)= -00:01
 5/4/90 wst CEB installed late at night
 14 33 00 ut F= 50919 ?? X=+28935 Y=+16145 Z=-38664? T=303 V=6461
 14 35 00 ut RMAG
 6/4/90 wst
 22 29 27 ut F= 50606 D= 2.914 I= -49.534
 22 57 50 ut F= 50605 D= 2.900 I= -49.540
 Jul/Aug90 Recovered by Stan Tremlett (UT-magT)=
 Corrected variometer record: hal43bwb 1990 95 955 to 1990 198 5 UT
 Apparent crustal anomaly X=515 Y=-42 Z=-152
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: LRM

ISA Mt. Isa-A -20.667 139.490 341 m
 WC85@1989.75 F=51203 D=6.249 I=-51.725
 DGRF1990@1990.2 F=51268 D=6.198 I=-51.678
Run-1 Mag#7 about .3 km from A

25/09/89 est CEB (UT-magT)=
 21 00 approx buried mag
 21 14 25 ut F= 51151 X=31600 Y=4959 Z=-39916 T=301 V=6505
 21 17 33 ut RMAG
 22 21 22 ut F= 51193 D=6.060 I=-51.52 very windy
 23 00 01 ut F= 51146 X=31607 Y=4933 Z=-39906 T=301 V=6493
 28/3/90 est CEB Running OK
 07 02 00 ut Mag= 170.5 Shadow= 287
 07 37 05 ut F= 51147 D= 6.101 I= -51.592
 07 58 09 ut F= 51144 D= 6.091 I= -51.601
 2416 blocks = 131 days = 28/3/90 (UT-magT)= +00:58
 Funny readout - see field diary
 Corrected variometer record: **Isa07awb** 1989 322 79 to 1990 87 392 UT
 Apparent crustal anomaly X=297 Y= 47 Z= 190
 Time drift correction: 0 to 1 minute added over the file.
 142 mag steps were removed from the file.
 Reference observatory: CTA

Run-2 Mag#4 (ex ROB, still recording @ 20s)
 28/3/90 est CEB (UT-magT)= -00:02
 08 49 52 ut F= 51101 X=+7722 Y=+30094 Z=-40571 T=307 V=6494
 08 51 30 ut RMAG
 29/3/90 next am
 22 20 40 ut F= 51168 D= 6.061 I= -51.573
 22 50 15 ut F= 51163 D= 6.062 I= -51.573
 Jul/Aug90 Recovered J. Welk (UT-magT)=
 Corrected variometer record: **Isa04bwb** 1990 87 611 to 1990 198 1407 UT
 Apparent crustal anomaly X=-1544 Y=87 Z=-682
 No time correction required.
 Reference observatory: CTA

KIW **Kiwirrkurra** non-repeat -22.867 127.550 450 m
 WC85@1989.75 F=53582 D=3.325 I=-55.913
 DGRF1990@1990.2 F=53552 D=3.313 I=-55.729
Run-1 Mag#22 BIG GRADIENTS
 21/09/89 lt CEB (UT-magT)=
 02 30 approx buried mag, 150m from apron
 02 50 00 ut F= 54164 X=-3633 Y=29908 Z=-45012 T=298 V=6421
 02 50 55 ut F=54164 X=-3632 Y=29908 Z=-45012 T=298 V=6421
 03 04 00 ut F=54460 above mag
 23/3/90 lt CEB
 02 08 23 ut F= 54512 D= ? I= -56.774 no sunshots
 02 24 21 ut F= 54443 above mag ; F(main-mag)= 67.2 nT
 02 40 30 ut Mag=94.5 Shadow=117
 1619 blocks 87 days (UT-magT)= +00:56
 Corrected variometer record: **kiw22awb** 1989 322 79 to 1990 44 618 UT
 Apparent crustal anomaly X=-45 Y= -1 Z=-390
 No time correction required.
 Reference observatory: LRM

Run-2 Mag#42
 23/3/90 lt CEB (UT-magT)= -00:02
 02 55 31 ut F= 54197 X=+3719 Y=-28423 Z=-45996 T=304 V=6396
 03 03 00 ut Mag= 126 Shadow= 71.7
 06 55 29 ut F= 54524 D= ? I= -56.826 no sunshots
 07 12 30 ut F= 54454 above mag ; F(main-mag)= 69.1 nT
 Jul/Aug90 Recovered by David Morris (UT-magT)=
 Corrected variometer record: **kiw42bwb** 1990 82 258 to 1990 192 1337 UT
 Apparent crustal anomaly X=-2290 Y=-272 Z=-2063
 No time correction required.
 Reference observatory: LRM

LAV **Laverton-C** -28.612 122.422 462 m
 WC85@1989.75 F=57162 D=1.150 I=-63.019
 DGRF1990@1990.2 F=57152 D=1.264 I=-62.844
Run-1 Mag#41
 13/10/89 wst EPP (UT-magT)=
 08 43 00 ut RMAG
 08 56 36 ut F=56990 D=1.891 I=-62.940
 09 14 06 ut F=56991 D=1.880 I=-62.940
 09 32 57 ut F=56991 D=1.876 I=-62.940
 09 50 53 ut F=56990 D=1.706 I=-62.940
 10 18 57 ut F=56650 X=22992 Y=11412 Z=-50501 T=300 V=6449
 25/2/90 wst PJG

08 17 20 ut F= 56981 D= 1.892 I= -62.973
 08 33 20 ut F= 56981 D= 1.888 I= -62.978
 08 49 25 ut F= 56985 D= 1.878 I= -62.972

09 10 00 ut Removed mag#41, installed #45

1860 blocks = 101 days

(UT-magT)= +00:40

Corrected variometer record: **lav41awb** 1989 322 79 to 1990 56 548 UT

Apparent crustal anomaly X=-978 Y=-376 Z= 43

No time correction required.

Reference observatory: GNA

Run-2 Mag#45

25/2/90 wst PJG

09 32 36 ut F= 56788

X=+21772

Y=-13951

Z=-50559

(UT-magT)=

T=306

V=6525

No suncompass

26/2/90 wst

23 58 35 ut

F= 56993

D= 1.770

I= -62.967

00 14 00 ut F= 56992

D= 1.767

I= -62.977

00 28 10 ut

F= 56990

D= 1.766

I= -62.980

(UT-magT)=

Jul/Aug90 Recovered by Laverton Shire

Corrected variometer record: **lav45bwb** 1990 56 730 to 1990 188 1149 UT

Apparent crustal anomaly X=101 Y=52 Z=399

Constant 1 minute removed from whole file.

Reference observatory: LRM

MAC Mabel Creek non-repeat

-28.950

134.316

244m

WC85@1989.75

F=

D=

I=

DGRF1990@1990.2

F=56838

D=5.582

I=-61.951

Run-1

not done

Run-2

not done

Run-3

Mag#18

000000 cst AAA

000000 ut F=

X=+

Y=+

Z=-

(UT-magT)=

T=

V=0000

000000 ut Mag=

Shadow=

000000 ut F=

D=

I= -

(UT-magT)=

Nov/Dec 90 Recovered by ???

Corrected variometer record: **mac18cwb** 1990 224 79 to 1990 345 317 UT

Apparent crustal anomaly X=-828 Y=-474 Z= -960

No time correction required.

At least 32 mag steps were removed from the file.

Reference observatory: CNB

MYB Maryborough-C

-25.523

152.728

10 m

WC85@1989.75

F=52702

D=10.423

I=-55.720

DGRF1990@1990.2

F=52699

D=10.628

I=-55.686

Run-1

Mag#19

19/10/89 est AAA

05 27 00 ut

F=52786

D=?

I=-55.769

(UT-magT)=

05 52 14 ut F=52866

X=29860

Y=6051

Z=-43204

T=298

V=6376

000000 ut Mag=

Shadow=

11/3/90 est SS

No absolutes, no Canon

06 15 00 ut Mag removed

(UT-magT)=00:12.3

mag date incorrectly set?

Corrected variometer record: **myb19awb** 1989 322 79 to 1990 20 438 UT

Apparent crustal anomaly X=919 Y=-26 Z= 545

No time correction required.

Reference observatory: CTA

Run-2

Mag#16

11/3/90 est SS

06 27 55 ut RMAG

(UT-magT)=

No absolutes, no Canon, no suncom

Jul/Aug90 Recovered

Corrected variometer record: **myb16bwb** 1990 70 545 to 1990 130 124 UT

Apparent crustal anomaly X=-149 Y=-181 Z=-254

No time correction required.

Reference observatory: CTA

MEK Meekathara-B

-26.610

118.545

518 m

WC85@1989.75

F=56107

D=-0.093

I=-61.281

DGRF1990@1990.2

F=56046

D= 0.150

I=-61.107

Run-1 Mag#18
 20/9/89 wst CEB (UT-magT)=
 00 00 approx buried mag in tip mound
 00 32 58 ut F= 57896 X=-14749 Y=-25053 Z=-50067 T=289 V=6562
 02 12 35 ut F= 56241 D= 1.175 I=-61.634
 02 48 32 ut F= 57896 X=-14722 Y=-25101 Z=-50052 T=293 V=6519
 10/3/90 wst EPP
 04 20 00 ut F= 56235 D= 1.278 I= -61.538
 04 44 30 ut F= 56239 D= 1.288 I= -61.532
 05 08 00 ut F= 56242 D= 1.298 I= -61.530
 06 00 00 ut mag removed, #15 installed
 2087 blocks = 113 days (UT-magT)= +02:24
 Corrected variometer record: **mek18awb** 1989 322 79 to 1990 69 353 UT
 Apparent crustal anomaly X=2031 Y=-150 Z=-1173
 Time drift correction: 0 to 2 minutes added over the file.
 Reference observatory: GNA

Run-2 Mag#15
 10/3/90 wst EPP (UT-magT)=
 07 08 59 ut F= 52491 ! X=1851 Y=22509 Z=-47384 T=307 V=6428
 07 12 00 ut RMAG
 08 41 00 ut F= 56261 D= 1.300 I= -61.570
 09 10 00 ut F= 56264 D= 1.295 I= -61.572
 09 42 00 ut F= 56264 D= 1.288 I= -61.572
 Jul/Aug90 Recovered (UT-magT)=
 Corrected variometer record: **mek15bwb** 1990 69 511 to 1990 200 182 UT
 Apparent crustal anomaly X=2082 Y=-110 Z=526
 No time correction required.
 At least 19 mag steps were removed from the file.
 Reference observatory: LRM

MEN Menindee non-repeat -32.400 142.417 61m
 WC85@1989.75 F=57991 D=8.810 I=-64.512
 DGRF1990@1990.2 F=58050 D=9.029 I=-64.481
Run-1 Mag#24 adjacent to abs stn
 18/10/89 lt RH+AML (UT-magT)= 00:00
 04:42:06 ut F= 56941 X=+22337 Y=-11890 Z=-51014 T=301 V=6478
 07 23 00 ut RMAG
 07 49 00 ut F= 58097 D= 9.188 I= -64.509
 08 19 29 ut F= 58097 D= 9.163 I= -64.509
 08 46 29 ut F= 56279 X=+22496 Y=-10777 Z=-51014 T=301 V=6469
 6/3/90 lt SS
 mag not level, not securely packed
 04 10 22 ut F= 58084 D= 9.162 I= -64.521 windy
 (UT-magT)= -02:10
 Corrected variometer record: **men24awb** 1989 322 79 to 1990 65 197 UT
 Apparent crustal anomaly X=-21 Y=-397 Z=3935
 Time corrections: removed minutes 907 to 952 of day 044 (data was repeated)
 708 to 732 of day 045
 1256 to 1280 of day 060
 244 to 858 of day 061.
 Reference observatory: CNB

Run-2 Mag#47
 6/3/90 lt SS (UT-magT)=
 04 55 34 RMAG
 06 44 51 ut F= 58090 D= 9.181 I= -64.613
 Jul/Aug90 Recovered by Mr Eglinton (UT-magT)=
 Corrected variometer record: **men47bwb** 1990 65 531 to 1990 203 1367 UT
 Apparent crustal anomaly X=-461 Y=-189 Z=762
 Time drift correction: 0 to 3 minutes removed over the file.
 Reference observatory: CNB

MOR Moree-F -29.498 149.847 230 m
 WC85@1989.75 F=55487 D=10.586 I=-60.564
 DGRF1990@1990.2 F=55483 D=10.819 I=-60.532
Run-1 Mag#31
 26/09/89 est APH (UT-magT)=
 01 51 09 ut F= 55614.6 D=10.770 I=-60.846
 02 06 31 ut F= 55614.4 D=10.785 I=-60.843
 02 27 48 ut F= 55414 X=13806 Y=-23094 Z=-48443 T=288 V=6562
 13/3/90 est SS
 06 08 27 ut F= 55591 D= 10.840 I= -60.940 DIM very badly adjusted
 ? ut F= 51299 X=+23694 Y=+2429 Z=-45434 T= V=0000

06 50 00 ut Removed, overcast (UT-magT)= -00:33
 Corrected variometer record: **mor31awb** 1989 322 78 to 1990 72 406 UT
 Apparent crustal anomaly X=-536 Y=-653 Z=-499
 Constant 1 minute removed from whole file.
 Reference observatory: CNB

Run-2 Mag#31 (UT-magT)=+00:03.7
 13/3/90 est SS
 22 07 00 ut RMAG
 No Canon, no suncom
 23 31 25 ut 14/3 F= 55591 D= 10.805 I= -60.899
 00 05 23 ut 14/3 F= 55598 D= 10.795 I= -60.896
 Jul/Aug90 Recovered by Shire (UT-magT)=
 Corrected variometer record: **mor31bwb** 1990 72 1407 to 1990 199 67 UT
 Apparent crustal anomaly X=-1113 Y=-489 Z=-657
 Time drift correction: 0 to 1 minute removed over the file.
 Reference observatory: CNB

MTD **Mt.Dare** non-repeat -26.067 135.245 62m
 WC85@1989.75 F=55248 D=5.692 I=-59.269
 DGRF1990@1990.2 F=55058 D=5.628 I=-58.705
Run-1 Mag#23 (UT-magT)=
 21/9/89 cst CEB
 08 00 approx buried mag, 1.5km from homestead
 08 00 24 ut F= 55026 X=-17985 Y=+21269 Z=-47456 T=299 V=6523
 08 15 00 ut F=55014.2 only
 25/3/90 cst CEB Running OK
 22 14 51 ut F= 55026 D= 5.926 I= -58.885
 22 37 38 ut F= 55020 D= 5.894 I= -58.891
 2349 blocks 127 days (UT-magT)= +01:59
 Corrected variometer record: **mtd23awb** 1989 322 157 to 1990 83 1283 UT
 Apparent crustal anomaly X=-1173 Y= -309 Z= -580
 Time drift correction: 0 to 1 minute radded over the file.
 At least 28 mag steps were removed from the file.
 Reference observatory: LRM

Run-2 Mag#17 (ex Giles) (UT-magT)=
 25/3/90 cst CEB
 23 28 32 mt F= 55163 X=+25273 Y=+13592 Z=-47112 T=301 V=6461
 23 24 10 ut Mag= 26.5 Shadow= 220
 23 30 50 ut RMAG
 03 31 32 ut F= 54989 D= 5.985 I= -58.836
 000000 lt AAA (UT-magT)=
 Corrected variometer record: **mtd17bwb** 1990 84 128 to 1990 222 323 UT
 Apparent crustal anomaly X=22 Y=8 Z=115
 No time correction required.
 At least 5 mag steps were removed from the file.
 Reference observatory: LRM

Run-3 Mag#49 (UT-magT)=
 000000 cst AAA
 000000 ut F= X=+ Y=+ Z=- T= V=0000
 000000 ut Mag= Shadow=
 000000 ut F= D= I= -
 Nov/Dec 90 Recovered by Phil Hellyer (UT-magT)=
 Corrected variometer record: **mtd49cwb** 1990 224 79 to 1991 1350 1423 UT
 Apparent crustal anomaly X=-1271 Y=-364 Z=2200
 No time correction required.
 Reference observatory: CTA

VER **Mt.Vernon-A** -24.230 118.237 400 m
 WC85@1989.75 F=54761 D=0.256 I=-58.600
 DGRF1990@1990.2 F=54679 D=0.527 I=-58.423
Run-1 Mag#20 (UT-magT)=
 19/9/89 wst CEB
 08:09:00 ut F= 54405 only
 07:46:10 ut F= 54562 X=+06501 Y=+27490 Z=-46680 T=296 V=6534
 12/3/90 wst EPP (VER-B)
 00 53 00 ut F= 54447 D= 0.403 I= -58.427
 01 16 30 ut F= 54447 D= 0.413 I= -58.425
 01 35 00 ut F= 54445 D= 0.420 I= -58.420
 02 20 00 ut mag removed (2 ft north of pile of dirt + cone)
 03 43 00 ut 2111 blocks = 114 days (UT-magT)=+01:17
 Corrected variometer record: **ver20awb** 1989 322 79 to 1990 71 113 UT

Apparent crustal anomaly X=-224 Y=-94 Z=-143
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: LRM

Run-2 VER-B Mag#18
12/3/90 wst EPP (UT-magT)=
 02 50 + ut buried mag
 02 55 01 ut F= 54406 X=-27769 Y=-5627 Z=-46446 T=304 V=6393
 02 58 00 ut RMAG
 05 39 00 ut F= 54439 D= 0.513 I= -58.410
 05 59 00 ut F= 54438 D= 0.515 I= -58.413
 06 20 30 ut F= 54438 D= 0.515 I= -58.415
Jul/Aug90 Recovered by Mr Reich (UT-magT)=
 Corrected variometer record: **ver18bwb** 1990 71 335 to 1990 201 515 UT
 Apparent crustal anomaly X=-491 Y=-197 Z=56
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: LRM

NEW Newcastle-A -32.796 151.836 7 m
 WC85@1989.75 F=57067 D=12.160 I=-63.566
 DGRF1990@1990.2 F=57030 D=12.412 I=-63.505
Run-1 Mag#32
27/09/89 lt APH (UT-magT)=
 23 42 42 ut F= 57218 D= 12.244 I= -63.634
 23 58 32 ut F= 57215 D= 12.246 I= -63.636
 00 54 41 ut F= 57846 X=-25033 Y=-3851 Z=-52007 T=288 V=6511
28/2/90 lt SS
 06 54 46 ut F= 57231 D= 12.427 I= -63.720 (UT-magT)= -00.06
 Corrected variometer record: **new32awb** 1989 322 79 to 1990 59 1278 UT
 Apparent crustal anomaly X=144 Y=-26 Z=1403
 No time correction required.
 Reference observatory: CNB

Run-2 Mag#38
1/3/90 lt SS (UT-magT)=
 000000 ut No canon TT readout
 23 44 42 ut F= 57204 D= 12.238 I= -63.659
Jul/Aug90 Flooding delayed recovery (UT-magT)=
 Corrected variometer record: **new38bwb** 1990 61 56 to 1990 115 715 UT
 Apparent crustal anomaly X=-21 Y=-136 Z=-1687
 No time correction required.
 Reference observatory: CNB

PTA Pt. Augusta non-repeat -32.483 137.750 5m
 WC85@1989.75 F=58461 D=7.089 I=-65.175
 DGRF1990@1990.2 F=58554 D=7.248 I=-65.129
Run-1 Mag#34
26/10/89 lt RW (UT-magT)=
 23 57 07 ut F=59560 X=24932 Y=1347 Z=-54074 T=292 V=6466
 000000 ut Mag= Shadow=
 000000 ut F= D= I=
000000 lt (UT-magT)=
 Corrected variometer record: **pta34awb** 1989 322 79 to 1990 84 78 UT
 Apparent crustal anomaly X=584 Y=-40 Z=-1388
 No time correction required.
 Spikes and steps > 5nT removed.
 9 magnetic steps were removed from the file.
 Reference observatory: CNB

Run-2 Mag#44
000000 lt AAA (UT-magT)=
 000000 ut F= X=+ Y=+ Z=- T= V=0000
 000000 ut Mag= Shadow=
 000000 ut F= D= I= -
000000 lt (UT-magT)=
 Corrected variometer record: **pta44bwb** 1990 91 659 to 1990 224 192 UT
 Apparent crustal anomaly X=47 Y=-87 Z=-922
 Time drift correction: 2 to 12 minutes removed over the file.
 Reference observatory: CNB

Run-3 Mag#45
000000 lt AAA (UT-magT)=
 000000 ut F= X=+ Y=+ Z=- T= V=0000

000000 ut Mag= Shadow=
 000000 ut F= D= I= -
Nov/Dec 90 Recovered (UT-magT)=
 Corrected variometer record: **pta45cwb** 1990 224 363 to 1990 344 1322 UT
 Apparent crustal anomaly X=1289 Y=92 Z=-453
 No time correction required.
 Spikes and steps > 5nT removed.
 Reference observatory: CNB

HED Pt. Hedland-D -20.377 118.630 4 m
 WC85@1989.75 F=52461 D=0.922 I=-53.763
 DGRF1990@1990.2 F=52368 D=1.208 I=-53.575
Run-1 Mag#50 about 2 km from D (UT-magT)=
3/10/89 wst CEB
 23 30 approx buried mag
 23 46 00 ut RMAG
 02 03 50 ut F= 52356 D= 1.199 I=-53.478
 02 57 01 ut F=51857 X=-28661 Y=+10885 Z=-41823 T=298 V=6451
15/3/90 wst EPP
 00 36 00 ut F= 52323 D= 1.233 I= -53.500
 01 06 00 ut F= 52318 D= 1.238 I= -53.470
 01 36 00 ut F= 52312 D= 1.268 I= -53.463
18/3/90 wst 2239 blocks = 121 days (UT-magT)= +00:44
 Corrected variometer record: **hed50awb** 1989 322 79 to 1990 74 19 UT
 Apparent crustal anomaly X=706 Y= -89 Z= 694
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: LRM

Run-2 Mag#20
15/3/90 wst EPP (UT-magT)=
 02 55 00 ut F= 52625 X=+10691 Y=-29332 Z=-42364 T=308 V=6361
 No suncompass
 02 57 00 ut RMAG
 06 05 30 ut F= 52305 D= 1.402 I= -53.447
 07 31 30 ut F= 52311 D= 1.390 I= -53.470
 07 51 00 ut F= 52314 D= 1.385 I= -53.473
Jul/Aug90 Recovered (UT-magT)=
 Corrected variometer record: **hed20bwb** 1990 74 256 to 1990 190 195 UT
 Apparent crustal anomaly X=105 Y=-221 Z=-195
 No time correction required.
 Reference observatory: LRM

POL Portland-C non-repeat -38.313 141.467 93m
 WC85@1989.75 F=61085 D=9.624 I=-69.992
 DGRF1990@1990.2 F=61141 D=9.999 I=-69.938
Run-1 Mag#52
17/11/89 lt FHC (UT-magT)=
 01 57 49 ut F=61043 X=3664 Y=20997 Z=-57201 T=280? V=6400
 000000 ut Mag= Shadow=
 000000 ut F= D=9.437 I=70.063
09/04/90 lt (UT-magT)=
 Corrected variometer record: **pol52awb** 1989 322 78 to 1990 99 300 UT
 Apparent crustal anomaly X=653 Y=-3657 Z= 462
 Constant 1 minute removed over the file.
 Reference observatory: CNB

Run-2 Mag#5
09/04/90 lt AAA (UT-magT)=
 000000 ut F= X=+ Y=+ Z=- T= V=0000
 000000 ut Mag= Shadow=
 15 32 00 ut F= D=9.874 I= -69.967
Jul/Aug90 Recovered (UT-magT)=
 Corrected variometer record: **pol05bwb** 1990 99 635 to 1990 213 62 UT
 Apparent crustal anomaly X=686 Y=-44 Z=969
 No time correction required.
 Reference observatory: CNB

QUI Quilpie-A -26.608 144.253 215 m
 WC85@1989.75 F=54447 D=8.330 I=-58.243
 DGRF1990@1990.2 F=54507 D=8.456 I=-58.232
Run-1 Mag#2 60 m from terminal building
17/10/89 lt FHC (UT-magT)=
 22 09 00 ut F=54496 D=6.983? I= -58.339

23 05 52 ut F=54210 X=1557 Y=28809 Z=-45895 T=301 V=6415
 000000 ut Mag= Shadow=
 9/3/90 lt SS (UT-magT)= +00:10
 05 43 31 ut F= 54462 D= 8.441 I= -58.228
 06 30 00 Removed mag
 Corrected variometer record: **qui02awb** 1989 322 79 to 1990 68 319 UT
 Apparent crustal anomaly X=21 Y=-100 Z=792
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: CTA

Run-2 Mag#39 (UT-magT)=
 9/3/90 lt SS
 06 40 25 ut RMAG
 08 29 00 ut F= 54476 D & I abandoned (no light)
 22 27 08 ut 10/3 F= 54466 D= 8.032 I= -58.258 DIM very badly adjusted
 Jul/Aug90 Recovered (UT-magT)=
 Corrected variometer record: **qui39bwb** 1990 68 558 to 1990 210 1097 UT
 Apparent crustal anomaly X=-449 Y=-555 Z=56
 No time correction required.
 Reference observatory: CTA

ROB Robinson R. non-repeat -16.717 136.950 80m
 WC85@1989.75 F=48886 D=5.241 I=-46.676
 DGRF1990@1990.2 F=48931 D=5.135 I=-46.572
Run-1 Mag#4 (UT-magT)=
 25/9/89 cst CEB
 02 30 approx buried mag
 03:27:00 ut F= 49523 X=+32621 Y=-9030 Z=-36150 T= no V= no
 03:29:12 ut F= 48968 PPM on rod above mag, no sun
 03:29:54 ut F= 49523 X=+32621 Y=-9030 Z=-36151 T= no V= no
 28/3/90 cst CEB Dead, no absolutes
 2691 blocks = 146 days = 12/4/90 ?? (UT-magT)= -00:02
 This mag was recording at 20 sec!!! = 48 days
 Corrected variometer record: **rob04awb** 1989 322 27 to 1990 3 684 UT
 Apparent crustal anomaly X=287 Y=-3228 Z=-1021
 No time correction required.
 Reference observatory: CTA

Run-2 Mag#13 (UT-magT)=
 28/3/90 cst CEB
 23 28 01 ut F= 48814 X=+10197 Y=+32842 Z=-36114 T=302 V=6489
 23 33 00 ut Mag= 71 Shadow= 176
 23 39 10 ut RMAG
 03 03 06 ut F= 48942 D= 4.894 I= -46.685
 Jul/Aug90 Recovered by Community (UT-magT)=
 Corrected variometer record: **rob13bwb** 1990 87 59 to 1990 181 540 UT
 Apparent crustal anomaly X=1183 Y=145 Z=-768
 Time drift correction: 0 to 2 minutes added over the file.
 Reference observatory: CTA

ROM Roma-D -26.550 148.775 308 m
 WC85@1989.75 F=53871 D=9.589 I=-57.527
 DGRF1990@1990.2 F=53892 D=9.779 I=-57.512
Run-1 Mag#16 (UT-magT)=
 18/10/89 lt RW
 07 21 15 ut F=53882 D= I=-57.468 No azimuth for D
 07 56 51 ut F=53579 X=28893 Y=808 Z=-45114 T=303 V=6327
 000000 ut Mag= Shadow=
 10/3/90 lt SS (UT-magT)= -00:18
 06 21 52 ut F= 53891 D= 9.529 I= -57.389 DIM very badly adjusted
 06 54 00 ut Removed mag
 Corrected variometer record: **rom16awb** 1989 322 79 to 1990 59 1278 UT
 Apparent crustal anomaly X=-154 Y=-175 Z= 405
 No time correction required.
 Reference observatory: CTA

Run-2a Mag#2 (UT-magT)=+00:13
 10/3/90 lt SS
 07 08 00 ut RMAG
 22 59 39 ut 11/3 F= 53880 D= 9.419 I= -57.409 DIM very badly adjusted
 4/5/90 lt GRS
 07 14 43 ut F= 53879 D= 9.675 I= -57.398
 Corrected variometer record: **rom02bwb** 1990 69 508 to 1990 122 286 UT
 Apparent crustal anomaly X=-108 Y=-749 Z=737

No time correction required.
Reference observatory: CTA

Run-2b Mag#54
9/5/90 ft GRS
000000 ut F= X=+ Y=+ Z=- (UT-magT)=
06 22 ut F= 53877 D= 9.737 I= -57.419 1st half-set T= V=0000
06 56 ut F= 53873 D= 9.732 I= -57.420 2nd half-set
Jul/Aug90 Recovered (UT-magT)=
Corrected variometer record: rom54cwb 1989 123 386 to 1990 200 296 UT
Apparent crustal anomaly X=727 Y=6 Z=-202
No time correction required.
Reference observatory: CTA

SOX Southern Cross-A -31.239 119.355 345 m
WC85@1989.75 F=58552 D=-0.941 I=-66.007
DGRF1990@1990.2 F=58563 D=-0.741 I=-65.846
Run-1 Mag#45 close to runway (UT-magT)=
12/10/89 wst EPP+BJP
06 33 00 RMAG
06 49 36 ut F=58546 D=-0.187 I=-65.649
07 12 20 ut F=58451 D=-0.191 I=-65.648
07 39 14 ut F=58558 D=-0.198 I=-65.651 very windy
07 55 45 ut F=58719 X=-18244 Y=+16229 Z=-53401 T=293 V=6458
07 59 31 ut F= 58718 X=-18243 Y=+16227 Z=-53401 T=293 V=6458
24/2/90 wst PJG
06 00 00 ut F= 58531 D= -0.187 I= -65.613
06 22 45 ut F= 58532 D= -0.192 I= -65.700
06 41 50 ut F= 58537 D= -0.194 I= -65.688
07 00 00 ut Mag removed
25/2/90 wst PJG 1834 blocks = (UT-magT)= +00:10
Corrected variometer record: sox45awb 1989 322 1 to 1990 555 413 UT
Apparent crustal anomaly X=427 Y=126 Z= 124
No time correction required.
Reference observatory: GNA

Run-2 Mag#12 (ex GER)
24/2/90 wst PJG (UT-magT)=
07 18 23 ut F= X=+ Y=+ Z=- T=304 V=6519
No sunshots
09 10 15 ut F= 58575 D= -0.258 I= -65.695
09 26 10 ut F= 58575 D= -0.262 I= -65.700
07 28 00 ut Left site
Jul/Aug90 Recovered (UT-magT)=
Corrected variometer record: sox12bwb 1990 55 595 to 1990 152 55 UT
Apparent crustal anomaly X=-305 Y=-103 Z=94
Time drift correction: 1 to 0 minutes removed over the file.
Reference observatory: LRM

TCK Tennant Creek-C -19.627 134.183 376 m
WC85@1989.75 F=51032 D=4.870 I=-51.021
DGRF1990@1990.2 F=51053 D=4.775 I=-50.895
Run-1 Mag#13 about .5 km from C (UT-magT)=
23/09/89 cst CEB
02 00 approx buried mag
09 17 56 ut F= 51034 D= 4.672 I= -50.783
10 05 48 ut F= 51644 X=27140 Y=18623 Z=-39796 T=302 V=6524
27/3/90 cst CEB Dead, no absolutes
10 32 00 ut Mag=033 Shadow=223.5
2047 blocks 111 days to 8/3/90 (UT-magT)=
Corrected variometer record: tck13awb 1989 322 80 to 1990 67 439 UT
Apparent crustal anomaly X=1045 Y= 87 Z= -383
Constant 1 minute added to whole file.
No spikes/steps > 5 nT to remove.
Reference observatory: CTA

Run-2 Mag#9 (ex Granites)
27/3/90 cst CEB (UT-magT)=+00:04
00 25 02 ut F= 50956 X=+13710 Y=-29179 Z=-39461 T=302 V=6527
00 20 00 ut Mag= 295 Shadow= 306
07 37 34 ut F= 50999 D= 4.662 I= -50.843
08 17 24 ut F= 51002 D= 4.660 I= -50.836
7/8/90 cst PGC
00 37 00 ut F= 51024 D= 4.598 I= -50.760

01 07 30 ut F= 51020 D= 4.591 I= -50.762
 01 30 00 ut mag retrieved, OK, level
 0058 20/11/89 checked site after heavy rain
 2300 27/6/90 - heavy vehicles near site during emergency exercise
 0415 28/6/90 End of exercise
 2230 01/7/90 - 0230 Cleanup after exercise
 2464 blocks (UT-magT)= +00:14.5
 Corrected variometer record: **tck09bwb** 1990 86 187 to 1990 219 92 UT
 Apparent crustal anomaly X=131 Y=-16 Z=61
 No time correction required.
 At least 10 mag steps removed.
 Reference observatory: CTA

Run-3 Mag#9
 7/8/90 cst PGC (UT-magT)=
 06 ? ut F= 50987 X=+13894 Y=-29114 Z=-39485 T=303 V=6497
 06 44 00 ut RMAG
 F(mag-C)= 50970 - 51026 = -56 nT

8/8/90
 23 20 00 ut F= 51037 D= 4.635 I= -50.770
 23 49 00 ut F= 51036 D= 4.620 I= -50.773
Nov/Dec 90 Collected by Barney Barnett, FAC (UT-magT)=
 Corrected variometer record: **tck09cwb** 1990 219 561 to 1990 339 86 UT
 Apparent crustal anomaly X=79 Y=-7 Z=65
 No time correction required.
 Spikes and steps > 5nT removed.
 Reference observatory: CTA

TEL Telfer-A -21.705 122.228 293 m
 WC85@1989.75 F=53145 D=1.855 I=-55.064
 DGRF1990@1990.2 F=53064 D=1.998 I=-54.856
Run-1 Mag#42 -21.689 122.139 9.15 km from A
 02/10/89 wst CEB (UT-magT)= +00:01 04 00 approx buried mag
 06 11 37 ut F= 52917 D= 1.876 I= -54.688
 06 59 59 ut F= 53259 X=-26690 Y=-14999 Z=-43580 T=306 V=6433
 Bushfire went over mag

22/3/90 wst CEB
 02 41 56 ut F= 65534 D= 1.759 I= -54.812 Bad PPM
 03 43 58 ut F= 65534 D= 1.771 I= -54.815 Bad PPM
 04 32 00 ut mag removed, running OK
 1787 blocks 97 days (UT-magT)= +01:13
 Corrected variometer record: **tel42awb** 1989 322 79 to 1990 53 559 UT
 Apparent crustal anomaly X=-104 Y=-482 Z=-459
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: LRM

Run-2 Mag#30 (ex Grafton)
 22/3/90 wst CEB (UT-magT)=
 09 29 44 ut F= 53821 X=-30587 Y=+5123 Z=-43987 T=308 V=6499
 09 32 00 ut RMAG
 09 41 00 ut Mag= 138 Shadow= 313
 10 47 57 ut F= 65525 D= 1.794 I= -54.815 Bad PPM
Jul/Aug90 Recovered by Timo Nieminen (UT-magT)=
 Corrected variometer record: **tel30bwb** 1990 81 731 to 1990 205 48 UT
 Apparent crustal anomaly X=901 Y=-64 Z=-1024
 Time drift correction: 0 to 2 minutes added over the file.
 Reference observatory: LRM

TIB Tibbooburra-A -29.448 142.053 120 m
 WC85@1989.75 F=56369 D=8.156 I=-61.598
 DGRF1990@1990.2 F=56437 D=8.300 I=-61.575
Run-1 Mag#25 0.9 km from TIB-A
 19/10/89 lt AML (UT-magT)= -00:02
 04 45 00 ut Mag buried
 04 51 56 ut F= 57465 X=-26497 Y=+7234 Z=-50476 T=305 V=6504
 04 54 01 mt F= 57465 X=-26497 Y=+7235 Z=-50476 T=305 V=6504
20/10/89 lt
 22 31 00 F(mag-TIBA)= -27.5 nT
 22 48 00 ut RMAG
 00 33 55 ut F= 56475 D= 8.358 I= -61.637
 01 20 31 ut F= 56461 D= 8.375 I= -61.631
 02:44:30 ut F= 57341 X=-26417 Y=+8072 Z=-50249 T=298 V=6494
7/3/90 lt SS
 03 04 27 ut F= 56444 D= 8.547 I= -61.615

07 04 16 Mag removed (UT-magT)= +01:13
 Corrected variometer record: **tib25awb** 1989 322 79 to 1990 66 246 UT
 Apparent crustal anomaly X=1288 Y= 89 Z= -997
 Time drift correction: 0 to 1 minute added over the file.
 Reference observatory: CNB

Run-2 Mag#24 (UT-magT)=+00:04
 7/3/90 lt SS

No Canon, no suncompass

04 31 00 ut RMAG

06 54 57 ut F= 56473 D= 8.573 I= -61.609

Jul/Aug90 Recovered (UT-magT)=

Corrected variometer record: **tib24bwb** 1990 66 429 to 1990 89 308 UT

Apparent crustal anomaly X=-226 Y=-255 Z=3485

No time correction required.

Reference observatory: CNB

TOO Toolangi -37.533 145.467 457 m

WC85@1989.75 F=60314 D=11.251 I=-68.791

DGRF1990@1990.2 F=60310 D=11.607 I=-68.731

Run-1 Mag#54

xx/9/89 est

23 16 35 ut F=56579? X=14033 Y=1749 Z=-54783 (UT-magT)=

000000 ut Mag= Shadow= T= V=0000

000000 ut F= D= I=

000000 est AAA (UT-magT)=

Corrected variometer record: **too54awb** 1989 323 35 to 1990 81 987 UT

Apparent crustal anomaly X=729 Y= -8 Z=1316

Time drift correction: 1 to 2 minutes removed over the file.

Reference observatory: CNB

Run-2 Mag#52

10/04/90 est SS?

03 52 03 ut F=58844 X=17938 Y=11891 Z=-54767 (UT-magT)=

000000 ut Mag= Shadow= T=296 V=6475

000000 ut F= D= I= -

Jul/Aug90 Recovered (UT-magT)=

Corrected variometer record: **too52bwb** 1990 100 313 to 1990 176 11 UT

Apparent crustal anomaly X=-462 Y=-325 Z=1592

Time drift correction: 0 to 1 minute removed over the file.

Reference observatory: CNB

Corrected variometer record: **too52cwb** 1990 183 54 to 1990 206 1433 UT

Apparent crustal anomaly X=-490 Y=-278 Z=1684

Constant 1 minute removed from whole file.

Reference observatory: CNB

TWO Tennyson-Woods Obs -35.032 138.578 163 m

WC85@1989.75 F=59601 D=7.742 I=-67.238

DGRF1990@1990.2 F=59813 D=7.987 I=-67.419

Run-1 Mag#38

22/11/89 cst FHC

000000 ut F=60718 X=4520 Y=22802 Z=-56092 (UT-magT)=

000000 ut Mag= Shadow= T=298 V=6365

000000 ut F= D= I=

000000 cst FHC (UT-magT)=

Corrected variometer record: **two38awb** 1989 326 379 to 1990 33 18 UT

Apparent crustal anomaly X=-1604 Y=1326 Z=3734

No time correction required.

At least 98 mag steps removed.

Reference observatory: CNB

Run-2 Mag#55

000000 cst FHC

000000 ut F= X=+ Y=+ Z=- (UT-magT)=

000000 ut Mag= Shadow= T= V=0000

000000 ut F= D= I= -

000000 cst (UT-magT)=

Corrected variometer record: **two55bwb** 1990 60 439 to 1990 169 378 UT

Apparent crustal anomaly X=-1797 Y=-4902 Z=-2823

No time correction required.

Reference observatory: CNB

X and Y traces were sign inverted over the whole file.

Corrected variometer record: **two55cwb** 1990 170 558 to 1990 232 257 UT

Apparent crustal anomaly X=-1877 Y=-4897 Z=-2880

Run-2	Mag#7 (ex ISA)				
<u>29/3/90</u> lt CEB				(UT-magT)=-00:01	
05 35 31 ut F= 52501	X=+27016	Y=+16060	Z=-42055	T=306	V=6477
	no sun				
	RMAG				
05 38 00 ut					
08 31 29 ut	F= 51795	D= 8.658	I= -53.399		
<u>Jul/Aug90</u> Recovered by Winton Shire				(UT-magT)=	
Corrected variometer record: wtn07bwb		1990 88 496 to 1990 200 255 UT			
Apparent crustal anomaly	X=586	Y=0	Z=387		

No time correction required.
Reference observatory: CTA

WYN Wyndham-D -15.510 128.147 5 m
 WC85@1989.75 F=48882 D=3.256 I=-45.914
 DGRF1990@1990.2 F=48829 D=3.255 I=-45.685
Run-1 Mag#46 about .8 km from D (UT-magT)=
 30/09/89 wst CEB
 02 45 approx buried mag
 03 02 00 ut RMAG
 08 28 43 ut F=48848 D=3.370 I=-45.612
 09 19 24 ut F=48608 X=+9141 Y=-32403 Z=-35060 T=308 V=6508
Dec 89 Runway lighting cable system was installed, mag strn was run over
 Cables pass 10m from mag, 5m from strn-D (& 1m from C)
 Gradients at Strn-D are only about 1 nT/m
 5/4/90 wst CEB Running OK
 22 23 33 ut F= 48844 D= 3.076 I= -45.625
 22 48 22 ut F= 48845 D= 3.072 I= -45.624
 23 30 30 ut Mag= 253 Shadow= 358
 2557 blocks = 138 days = 4/4/90 (UT-magT)= +03:09
 Corrected variometer record: **wyn46awb** 1989 322 80 to 1990 94 1341 UT
 Apparent crustal anomaly X=-501 Y= 31 Z= -119
 Time drift correction: 1 to 3 minutes added over the file.
 Reference observatory: LRM

Run-2 Mag#46 installed at new site (UT-magT)= -00:02
 5/4/90 wst CEB
 02 53 22 mt F= 49055 X=+9924 Y=+32875 Z=-35031 T=305 V=6600
 02 50 00 ut Mag= 39.5 Shadow= 166
 02 54 40 ut RMAG
 06 45 00 ut F= 48837 D= 3.131 I= -45.599
 07 14 17 ut F= 48835 D= 3.131 I= -45.608
Jul/Aug90 Recovered by Terry Arthur (UT-magT)=
 Corrected variometer record: **wyn46bwb** 1990 95 410 to 1990 199 98 UT
 Apparent crustal anomaly X=102 Y=-86 Z=-79
 No time correction required.
 Reference observatory: LRM

ZAN Zanthus-B -31.037 123.568 267m
 WC85@1989.75 F=58432 D=1.227 I=-65.371
 DGRF1990@1990.2 F=58471 D=1.325 I=-65.215
Run-1 Mag#6 58m from ZAN-B (UT-magT)=
 15/10/89 lt EPP
 00 32 00 ut RMAG
 00 45 30 ut F=58281 D=1.241 I=-65.160
 01 06 54 ut F=58280 D=1.226 I=-65.160
 01 22 51 ut F=58278 D=1.219 I=-65.160
 01 39 58 ut F=58274 D=1.215 I=-65.161
 01 55 19 mt F=58969 X=+24790 Y=+3957 Z=-53359 T=296 V=6484
7/3/90 lt EPP
 23 36 00 lt F= 58265 D= 1.285 I= -65.183
 00 09 00 ut F= 58263 D= 1.280 I= -65.187
 00 32 30 ut F= 58260 D= 1.263 I= -65.193
 2019 blocks = 109 days (UT-magT)= +00:53
 Corrected variometer record: **zan06awb** 1989 322 79 to 1990 66 18 UT
 Apparent crustal anomaly X=705 Y= -2 Z=-697
 No time correction required.
 Reference observatory: GNA

Run-2 Mag#40 (UT-magT)= -00:01
7/3/90 lt EPP
 01 27 01 mt F= 59572 X=-1164 Y=+24855 Z=-54127 T=306 V=6525
 No suncompass
 01 30 00 ut RMAG
 04 12 30 ut F= 58227 D= 1.378 I= -65.185
 04 44 30 ut F= 58228 D= 1.401 I= -65.175
 05 08 00 ut F= 58227 D= 1.410 I= -65.178
Jul/Aug90 Recovered by MGO (UT-magT)=
 Corrected variometer record: **zan40bwb** 1990 66 558 to 1990 216 321 UT
 Apparent crustal anomaly X=-772 Y=-164 Z=-1102
 Time drift correction: 1 to 0 minutes removed over the file.
 Reference observatory: LRM

MAGNETIC OBSERVATORIES

	lat (°N)	long (°E)	Elev (m)
CNB Canberra	-35.315	149.363	853
WC85@1989.75	F=58737	D=12.117	I=-66.282
DGRF1990@1990.2	F=58687	D=12.414	I=-66.221
Crustal anomaly	X=-30.31	Y=29.14	Z=32.69
CTA Charters Towers	-20.088	146.253	370
WC85@1989.75	F=50079	D=7.801	I=-50.003
DGRF1990@1990.2	F=50138	D=7.864	I=-49.997
Crustal anomaly	X=-489.97	Y=-115.29	Z=140.95
GNA Gnangara	-31.780	115.950	60
WC85@1989.75	F=58716	D=-3.169	I=-66.850
DGRF1990@1990.2	F=58735	D=-2.807	I=-66.705
Crustal anomaly	X=-40.51	Y=-118.53	Z=154.7
LRM Learmonth	-22.217	114.100	5
WC85@1989.75	F=53600	D=-0.879	I=-56.629
DGRF1990@1990.2	F=53521	D=-0.438	I=-56.508
Crustal anomaly	X=-58.28	Y=-55.16	Z=201.48
Port Moresby	-9.400	147.150	80
WC85@1989.75	F=43087	D=6.608	I=-33.698
DGRF1990@1990.2	F=43158	D=6.563	I=-33.675

Appendix E - Storm commencements used for time corrections

Year/day	Approximate time (UT)
1989/325	7:30
1989/330	11:00
1989/332	7:50
1989/363	7:00
1990/008	14:30
1990/044	17:10
1990/045	3:15
1990/099	6:50
1990/107	7:20
1990/138	7:45
1990/150	9:05
1990/164	14:10
1990/191	4:50
1990/238	5:45
1990/241	11:30
1990/244	12:45
1990/254	5:40
1990/282	15:00
1990/299	11:40
1990/316	3:10
1990/342	14:30

Appendix F - Reference observatories for the removal of magnetic drift

File	Reference observatory	File	Reference observatory
aby40awb	GNA	kiw22awb	LRM
aby48bwb	LRM	kiw42bwb	LRM
alp49awb	CTA	lav41awb	GNA
alp27bwb	CTA	lav45bwb	LRM
asp03awb	CTA	mac18cwb	CNB
asp23bwb	CTA	mek18awb	GNA
asp32cwb	CTA	mek15bwb	LRM
bal47awb	CNB	men24awb	CNB
bal37bwb	CNB	men47bwb	CNB
bir44awb	CTA	mor31awb	CNB
bir08bwb	CTA	mor31bwb	CNB
buk39awb	CNB	mtd23awb	LRM
buk25bwb	CNB	mtd17bwb	LRM
cdn37awb	CNB	mtd49cwb	CTA
cdn32bwb	CNB	myb19awb	CTA
ced36awb	CNB	myb16bwb	CTA
ckt14awb	CTA	new32awb	CNB
ckt14bwb	CTA	new38bwb	CNB
cne15awb	LRM	pol52awb	CNB
cne06bwb	LRM	pol05bwb	CNB
cro49bwb	CTA	pta34awb	CNB
cvn50bwb	LRM	pta44bwb	CNB
dar28awb	CTA	pta45cwb	CNB
dar28bwb	CTA	qui02awb	CTA
dar28cwb	CTA	qui39bwb	CTA
dar28dwb	CTA	rob04awb	CTA
dar28ewb	CTA	rob13bwb	CTA
der51awb	LRM	rom16awb	CTA
der51bwb	LRM	rom02bwb	CTA
dyw10awb	CTA	rom54cwb	CTA
dyw10bwb	CTA	sox45awb	GNA
dyw10cwb	CTA	sox12bwb	LRM
emul1awb	GNA	tck13awb	CTA
emul1bwb	CNB	tck09bwb	CTA
esp48awb	GNA	tck09cwb	CTA
esp41bwb	LRM	tel42awb	LRM
eta08awb	CNB	tel30bwb	LRM
eta34bwb	CNB	tib25awb	CNB
euc53awb	GNA	tib24bwb	CNB
euc33bwb	LRM	too54awb	CNB
ger12awb	GNA	too52bwb	CNB
ger21bwb	LRM	too52cwb	CNB
gfn30awb	CNB	two38awb	CNB
gfn19bwb	CNB	two55bwb	CNB
gil17awb	LRM	two55cwb	CNB
gil22bwb	LRM	ver20awb	LRM
gle29awb	CTA	ver18bwb	LRM
gov26awb	CTA	wan33awb	GNA
grn09awb	LRM	wei35awb	CTA
grn03bwb	LRM	wtn27awb	CTA
hal43awb	LRM	wtn07bwb	CTA
hal43bwb	LRM	wyn46awb	LRM
hed50awb	LRM	wyn46bwb	LRM
hed20bwb	LRM	zan06awb	GNA
isa07awb	CTA	zan40bwb	LRM
isa04bwb	CTA		

Appendix G - Reference observatories for file base level changes

Station	Reference observatory	Station	Reference observatory
ABY	LRM	ISA	CTA
ALP	CTA	KIW	LRM
ASP	CTA	LAV	LRM
BAL	CNB	MAC	CNB
BIR	CTA	MEK	LRM
BUK	CNB	MEN	CNB
CDN	CNB	MOR	CNB
CED	CNB	MTD	LRM
CKT	CTA	MYB	CTA
CNE	LRM	NEW	CNB
CRO	CTA	POL	CNB
CVN	LRM	PTA	CNB
DAR	CTA	QUI	CTA
DER	LRM	ROB	CTA
DYW	CTA	ROM	CTA
EMU	CNB	SOX	LRM
ESP	LRM	TCK	CTA
ETA	CNB	TEL	LRM
EUC	LRM	TIB	CNB
GER	LRM	TOO	CNB
GFN	CNB	TWO	CNB
GIL	LRM	VER	LRM
GLE	CTA	WAN	GNA
GOV	CTA	WEI	CTA
GRN	LRM	WTN	CTA
HAL	LRM	WYN	LRM
HED	LRM	ZAN	LRM

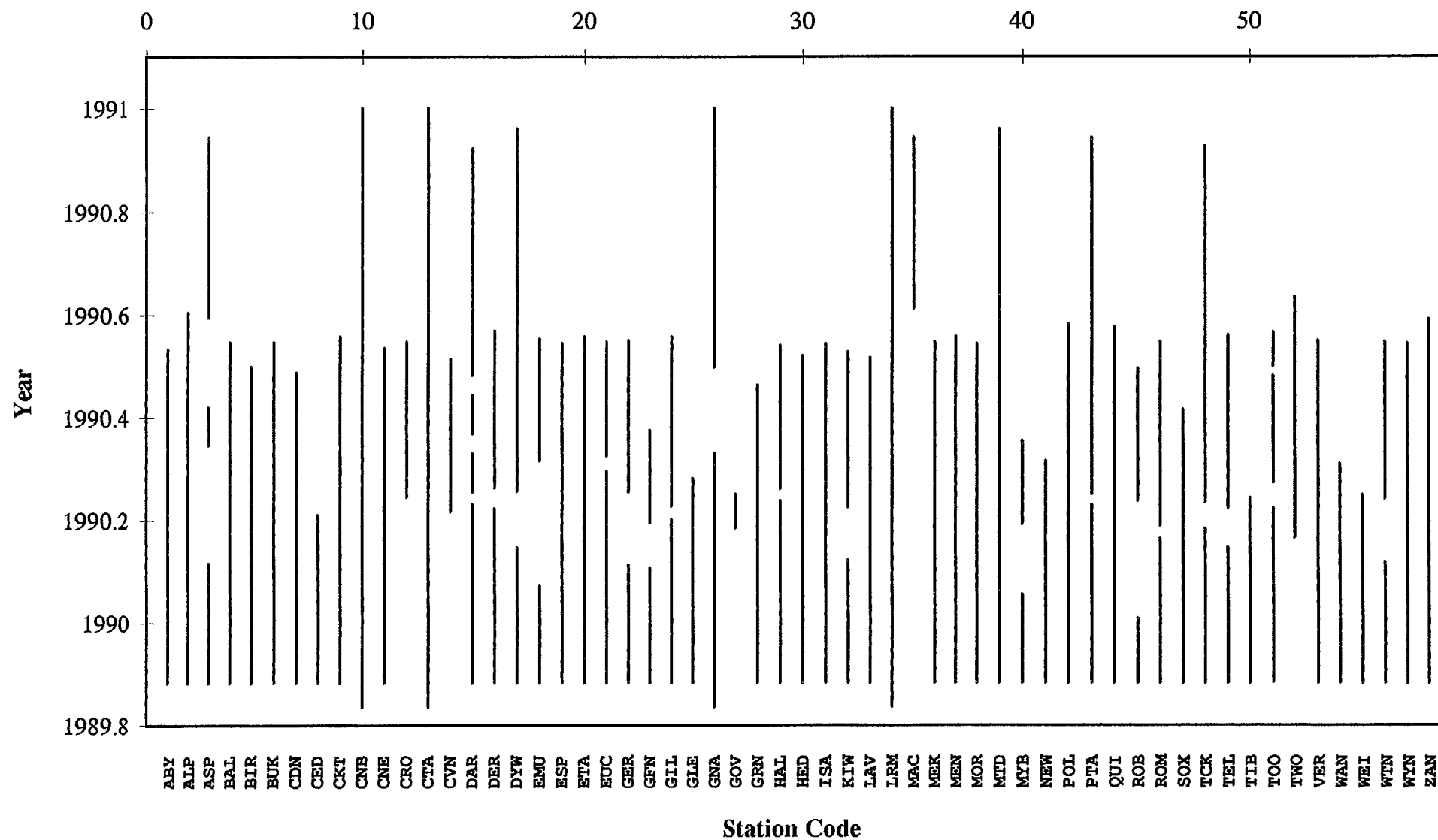


Figure 1: AWAGS data recovery

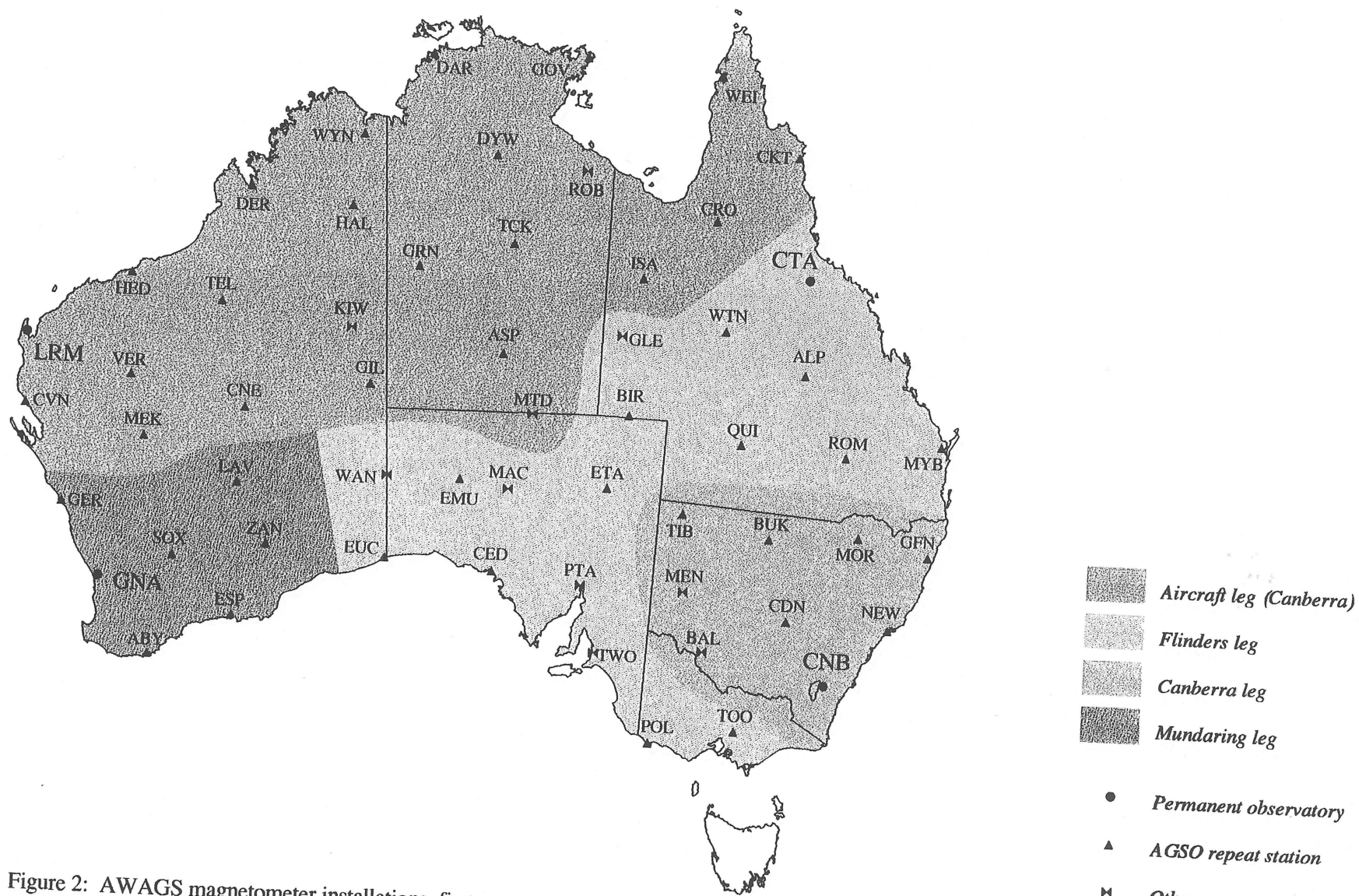


Figure 2: AWAGS magnetometer installations, first run

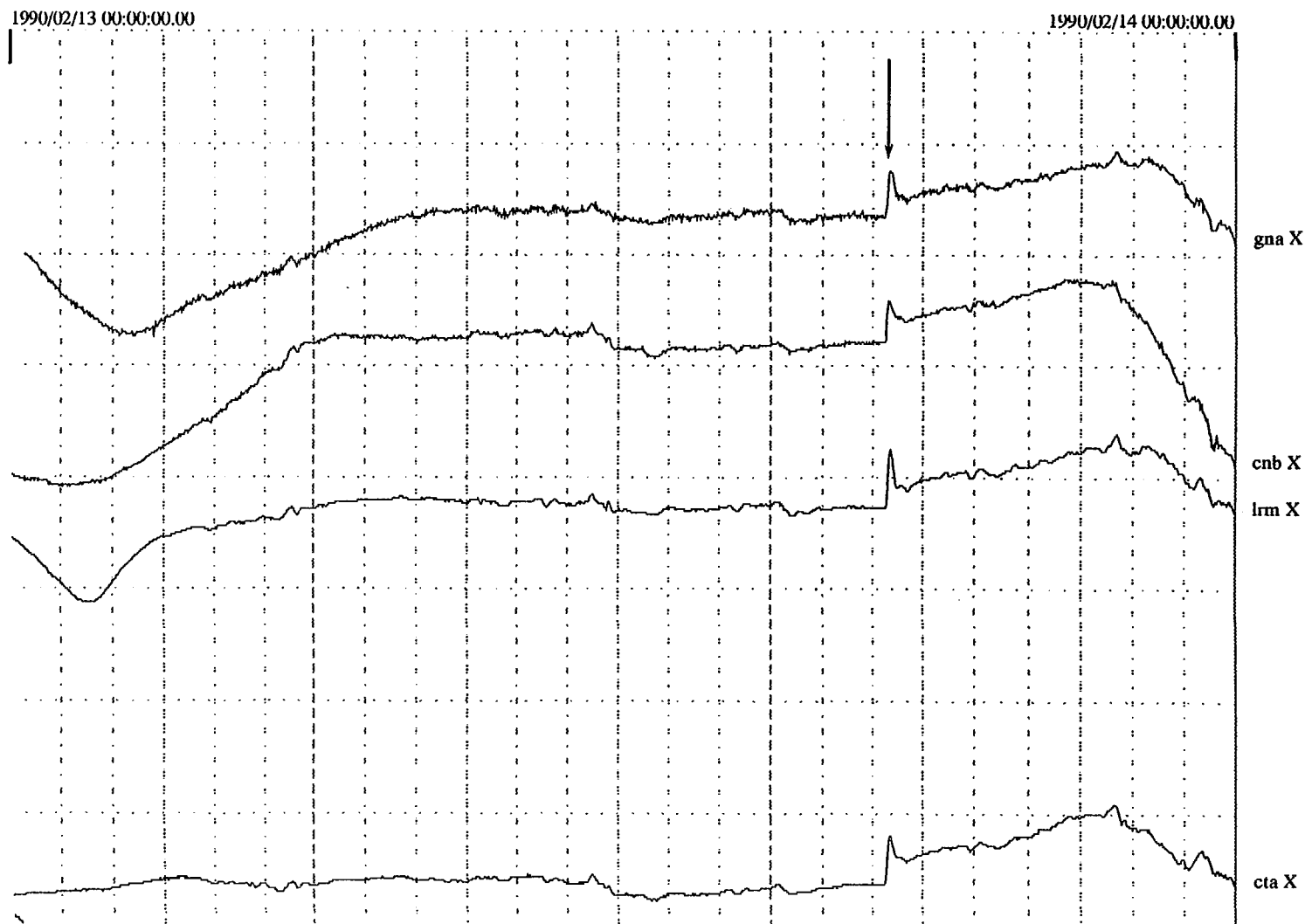


Figure 4: A typical Sudden Storm Commencement (SSC), shown arrowed, used to determine time corrections. Record length displayed is 24 hours. Vertical scale is 50 nT between gridlines. Horizontal scale is 1 hour between gridlines.

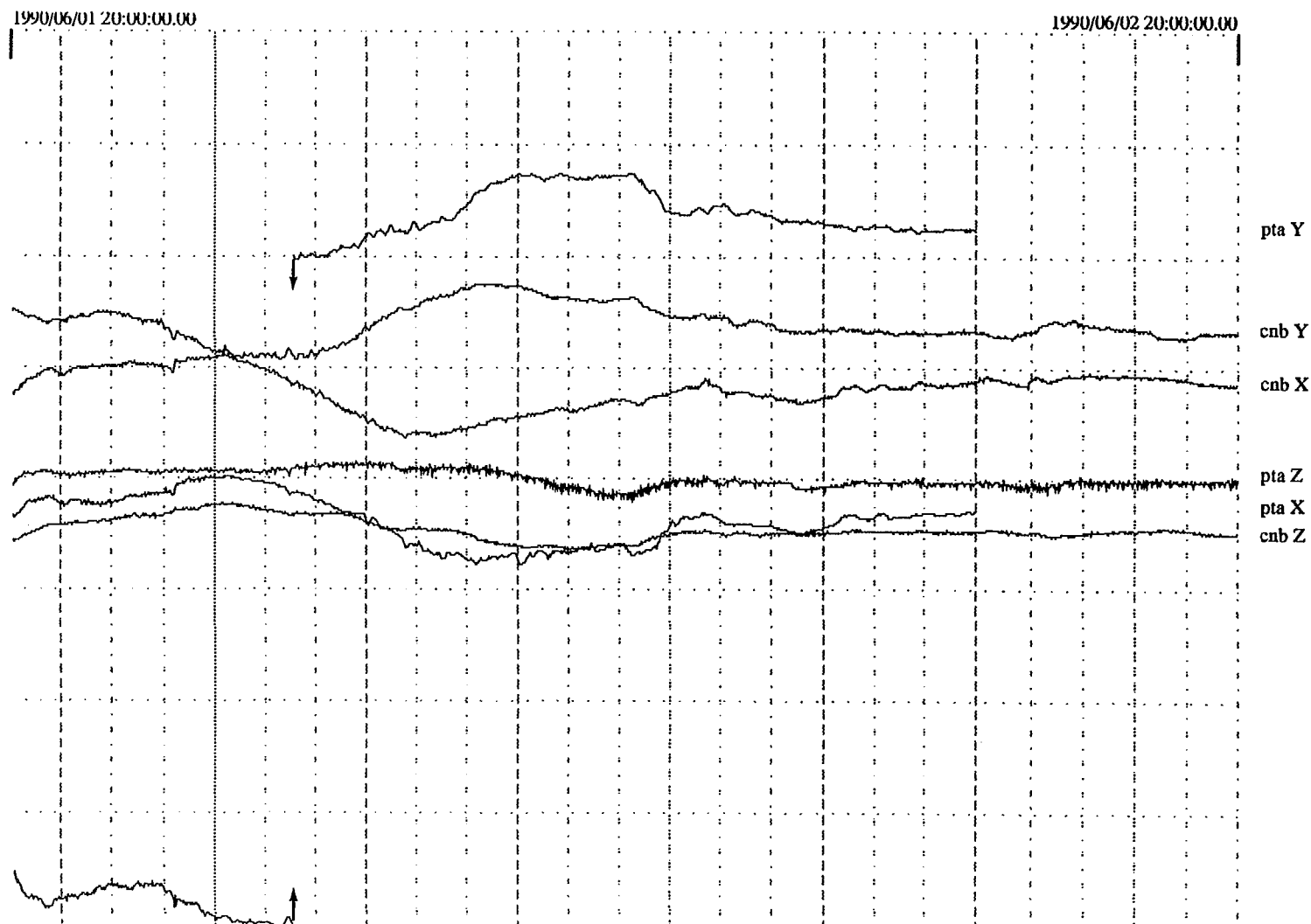


Figure 5: Low amplitude (2-3 nT) noise on one component (Z) during the second run at Port Augusta (pta44b) with the Canberra Observatory magnetogram for comparison. Record length displayed is 24 hours. Vertical scale is 50 nT between gridlines. Horizontal scale is 1 hour between gridlines.

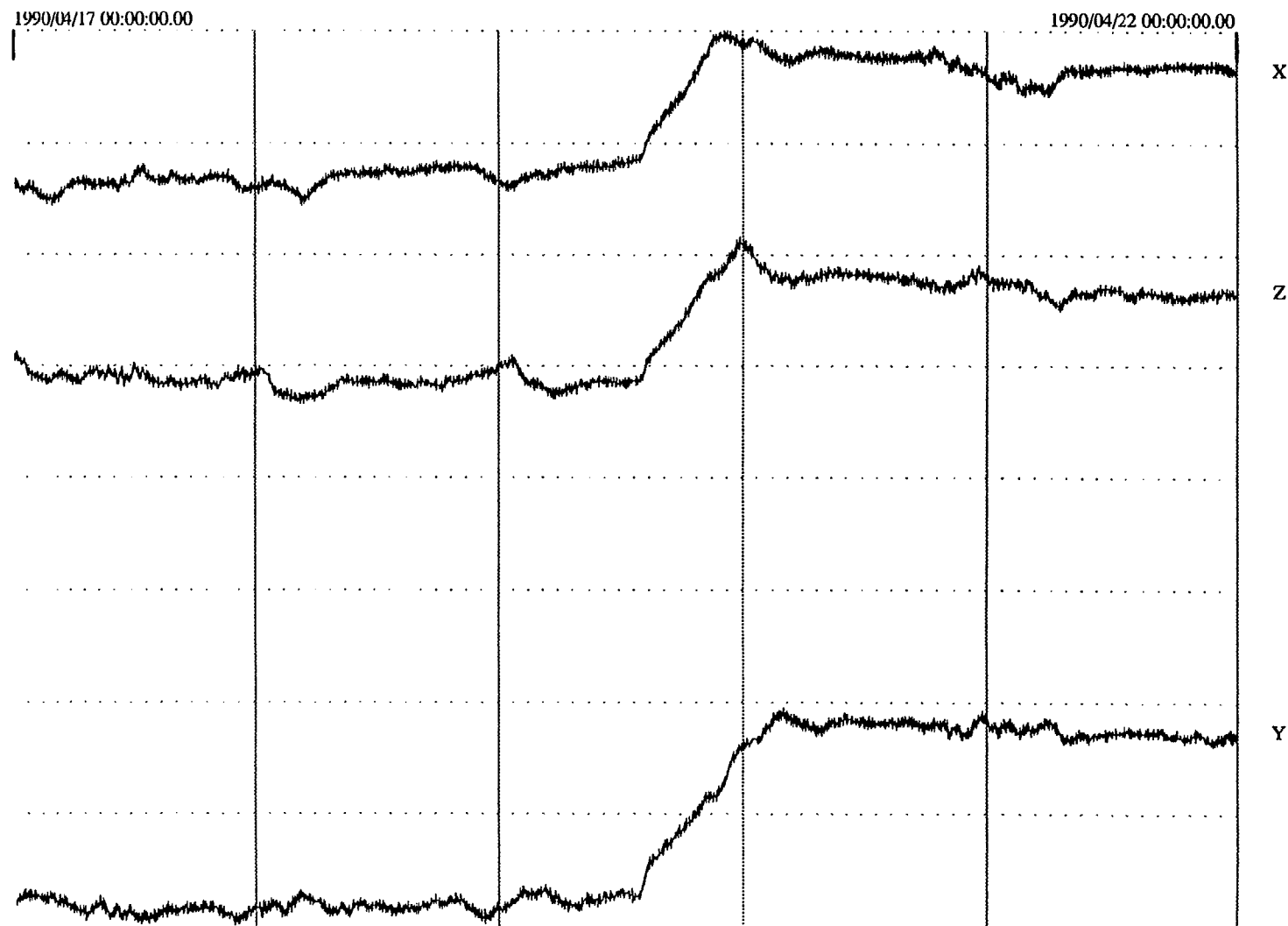


Figure 6: Coherent short-duration drift during the second run at Croydon (cro49b). The plot represents 5 days of 1-minute differences between Croydon and Charters Towers Observatory. Vertical scale is 50 nT between gridlines. Horizontal scale is 1 day between gridlines.

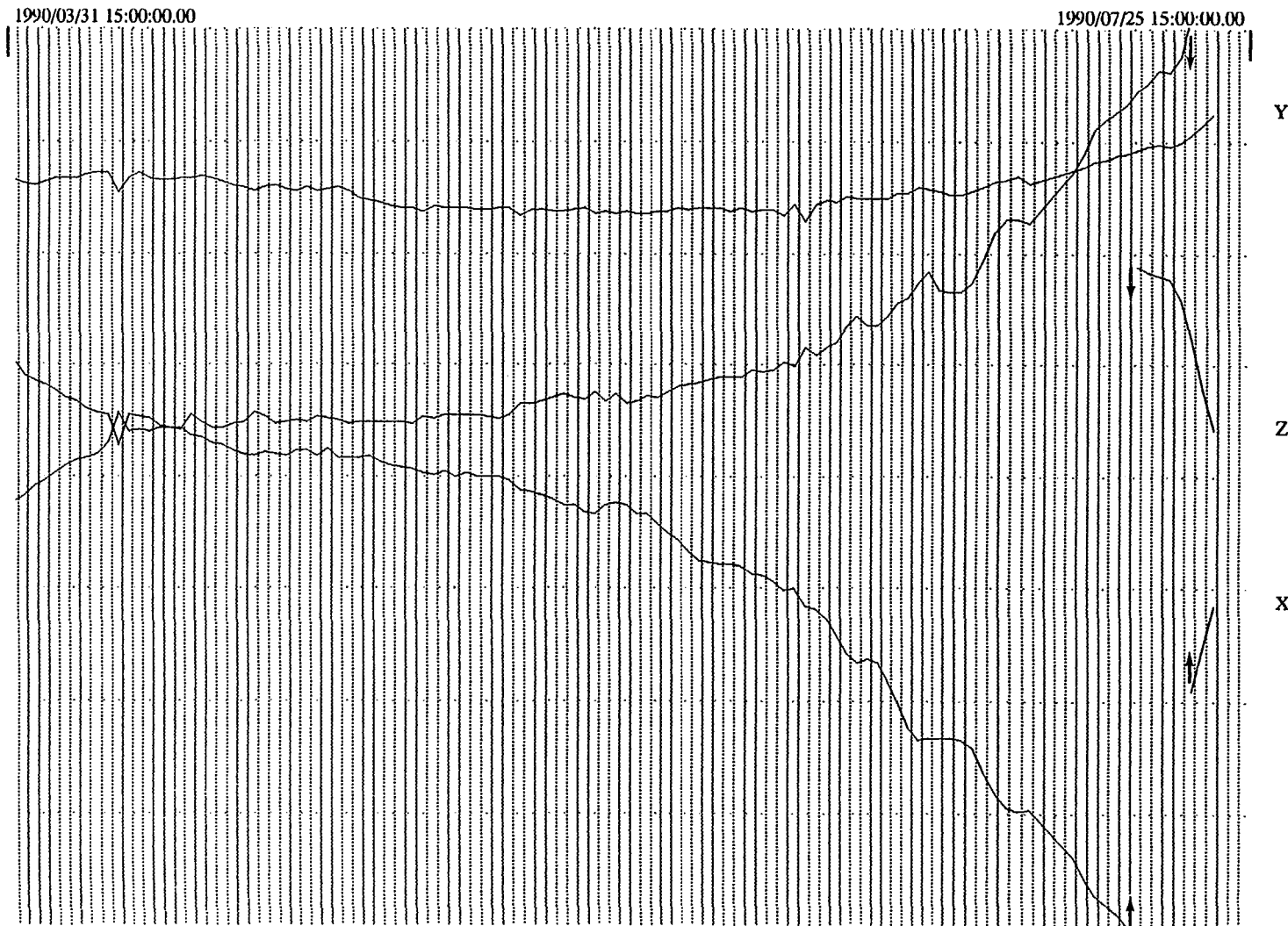


Figure 7: Steep drift and coherence between the X, Y, and Z components during the second run at Cooktown (ckt14b). The plot represents 113 days of local midnight mean (1400-1600 UT) differences between Cooktown and Charters Towers Observatory. Vertical scale is 50 nT between gridlines. Horizontal scale is 1 day between gridlines.

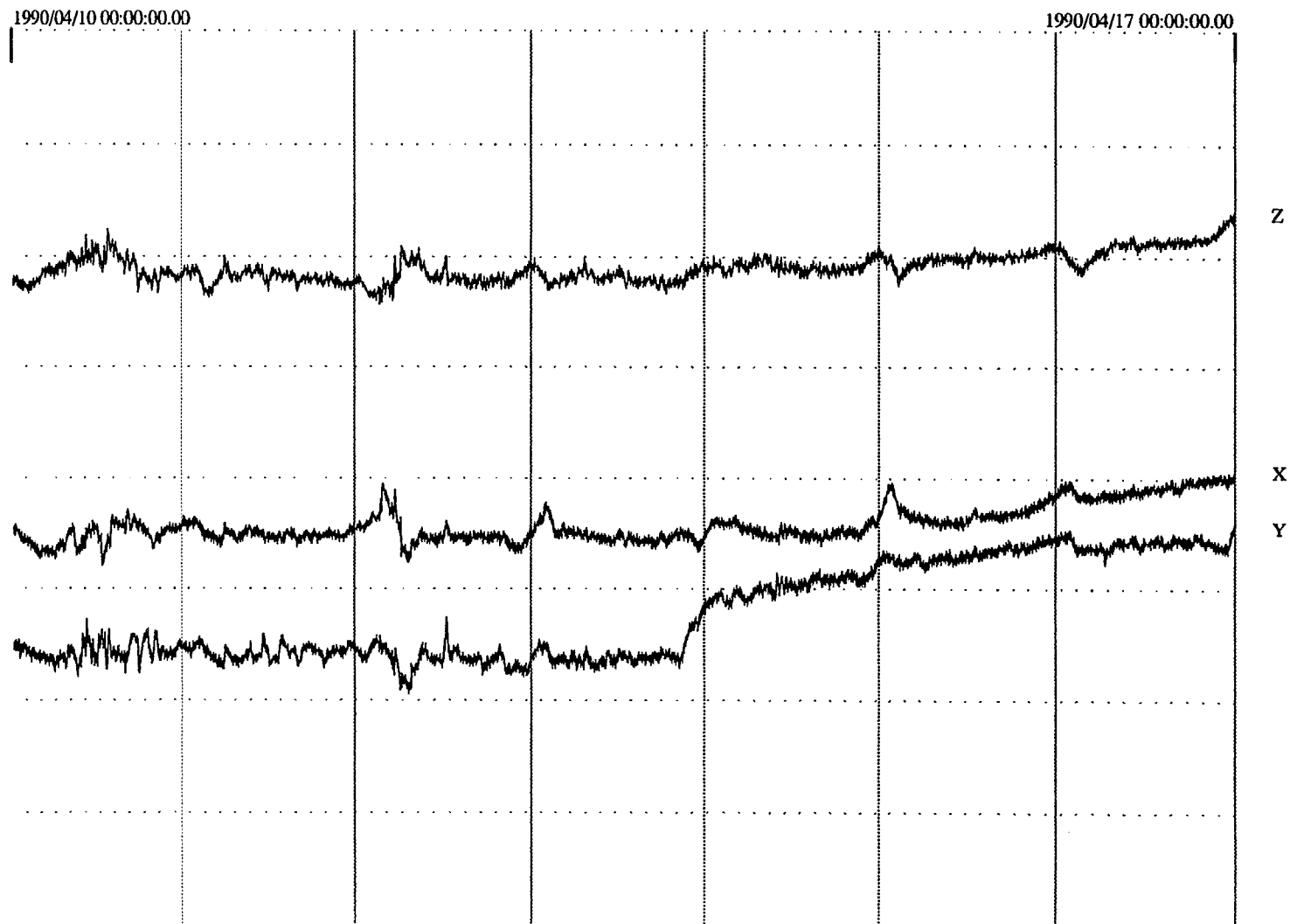


Figure 8: Incoherent short-duration drift during the second run at Winton (wtn07b). The plot represents 7 days of 1-minute differences between Winton and Charters Towers Observatory. Vertical scale is 50 nT between gridlines. Horizontal scale is 1 day between gridlines.

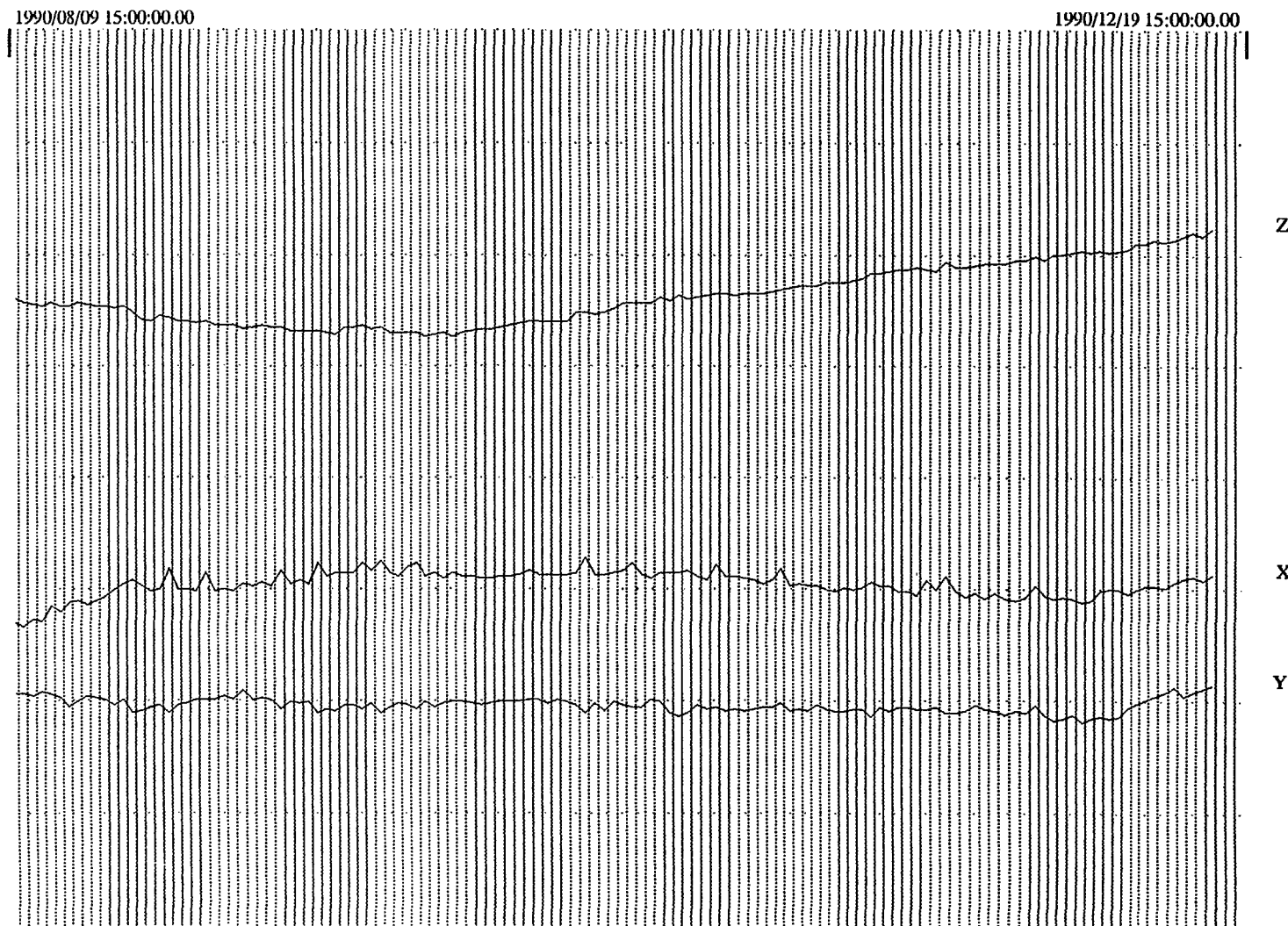


Figure 9: Mild drift during the third run at Daly Waters (dyw10c). The drift in Z does not seem related to the drift in X and Y. The plot represents 129 days of local midnight mean (1400-1600 UT) differences between Daly Waters and Charters Towers Observatory. Vertical scale is 50 nT between gridlines. Horizontal scale is 1 day between gridlines.

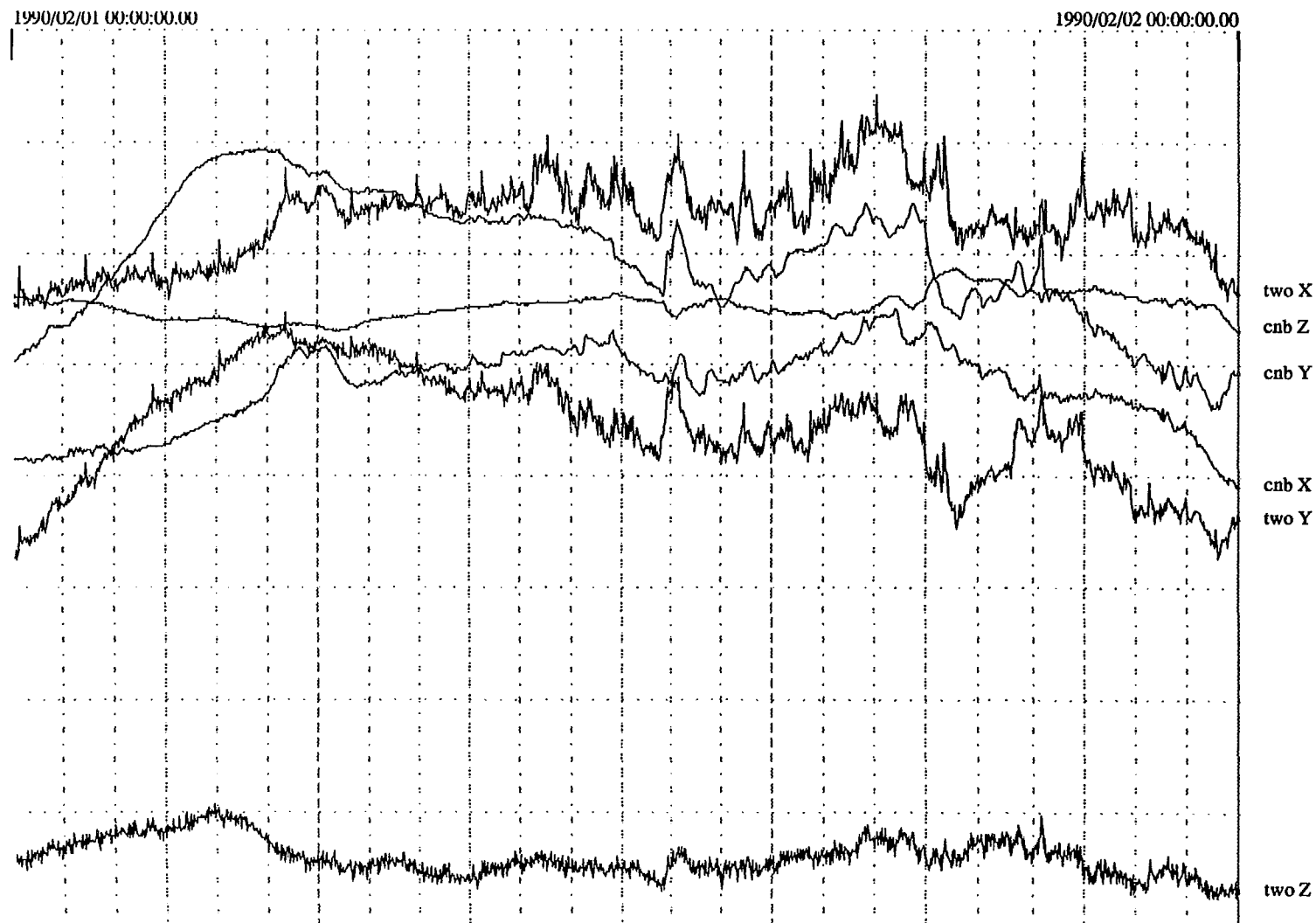


Figure 10: One day of rogue data during the first run at Tennyson-Woods (two38a) with the Canberra Observatory magnetogram for comparison. Record length displayed is 24 hours. Vertical scale is 50 nT between gridlines. Horizontal scale is 1 hour between gridlines.