National Meteorological Library and Archive

Fact sheet No. 12 – National Meteorological Archive material

Figure 1. Signage to the National Meteorological Archive, Great Moor House, Exeter.

A brief history of the National Meteorological Archive

The Meteorological Office, then located at its Headquarters at South Kensington, London, at a meeting of the Meteorological Committee on 29 April 1914, accepted the responsibility of custodian of appropriate Public Records as follows:

- **Records of scientific observations at the Met Office and its observatories dating back to 1868**
- **Meteorological registers from stations in the British Isles and British Possessions**
- **Meteorological logs specially prepared on board certain ships of the Royal Navy and the Board of Trade**
- **Charts and schedules of the Daily Weather Service back to 1860**

The minutes of this meeting also stated that:

'The Office at South Kensington contains a museum and scientific library accessible to students...'

Between 1914 and the 1950's the Office experienced considerable expansion and the records were stored in a rather haphazard manner at various locations in London, Dunstable (see figure 2) and Harrow. Originally the records were the responsibility of the different Divisions or Branches. When the proposed move to a centralised location was first discussed in the 1950's the idea was for a main 'store' on one site with each Branch having control over its own particular records in a designated area of the store.

Figure 2. National Meteorological Archive, Dunstable during the 1950's.

The first proposal in 1954 had a storage space of 7000 square feet for the Library and Archives. In 1955 the Director-General of the Met Office, Sir Graham Sutton, C.B.E., F.R.S., stated that Bracknell, with a population of no more than 25000, would be an 'ideal' new location for the Headquarters.

The 1958 Public Record Act changed the original concept of the store. This Act made a Minister of the Crown, the Lord Chancellor, responsible for the selection, preservation, and methods and places of preservation, whether in the Public Record Office or not.

Meetings of the Working Group on Archives were held during 1961, at Assistant Director level, to discuss the implications of the Act upon meteorological records. It was decided that 'records' should be divided into 'administrative' and 'technical', and that they should be under the control of the Support Services Department of the Met Office. Technical records were then subdivided as follows:

- **Synoptic charts and ancillary diagrams**
- **Original observations (including autographic records)**
- **Climatological data**
- **Research and investigation papers**
- **Station histories**
- **Telecommunications records**

During the spring of 1962, the National Meteorological Archive opened at Eastern Road in Bracknell. On 3 May 1962 a letter was received from the Public Record Office stating that the Lord Chancellor had indicated his willingness for the Met Office's at Bracknell, Edinburgh and Belfast to be ***Places of Deposit*** for records, with Bracknell having the responsibility for England, Wales and overseas. On 7 December 1962, the Public Record Office gave the formal approval from the Lord Chancellor that the Met Office was to be a Place of Deposit.

In 1989, the building in Eastern Road was beginning to look its age and a decision was taken to relocate the Archive to a new site in Bracknell at the Stirling Centre on a new development, a site adjacent to Eastern Road. The National Meteorological Archive moved during September and October 1991. The new building to house the National Meteorological Archive was called ***Scott Building***, named in memory of Robert Henry Scott, the second Director of the Met Office, between 1866 to 1900.

With the relocation of the Met Office to Exeter in 2003, the National Meteorological Archive followed 18 months later and opened to the public in ***Great Moor House***, a building it shares with the Devon Records Office, in March 2005.

Figure 3. National Meteorological Archive, Exeter.

Weather information at the National Meteorological Archive 1939 to 1945

A greater number of weather records were compiled in the United Kingdom during the period of the Second World War than at probably any other time. Many airfields sprang up, as the battle for supremacy in the skies was waged, and frequent bombing raids occurred over Germany.

Accurate weather information is particularly important for aircraft, and weather records were meticulously kept at many airfields. These observations, often made hourly and around the clock, include details of visibility, cloud (amount, type and height of base), temperature, wind (speed and direction) and pressure. The values were written in a ***Register of Weather Observations***, usually in a standard coded form, for easy transmission via teleprinter to the Meteorological Office Headquarters at Dunstable. Those original Registers are now housed at the National Meteorological Archive where they may be consulted by visiting members of the public.

Weather observers at the larger airfields also compiled **C*limatological Returns*** – monthly sheets consisting of the elements which make up the daily climatological observation. All climatological stations reported daily maximum and minimum air temperature, grass minimum temperature, rainfall and snow depth. Additionally, some stations also included daily sunshine, soil temperature, concrete minimum temperature, mean wind speed and a weather diary (a brief summary of the general weather conditions each day).

At Dunstable, one of the duties of the Meteorological Assistant was to plot the weather observations received onto a s*ynoptic chart*, using the internationally accepted 'station circle' format. The observations consisted of the weather elements noted in the Register of Weather Observations (see above). Once all the received observations for a particular hour had been plotted, it was the task of the duty forecaster to analyse the general weather situation by pencilling in isobars and weather fronts. From these and other charts, weather forecasts were produced for up to twenty-four hours ahead (sometimes longer). The original, plotted charts are stored in the National Meteorological Archive in a continuous run from 1867 until August 2003 when an electronic storage facility was established.

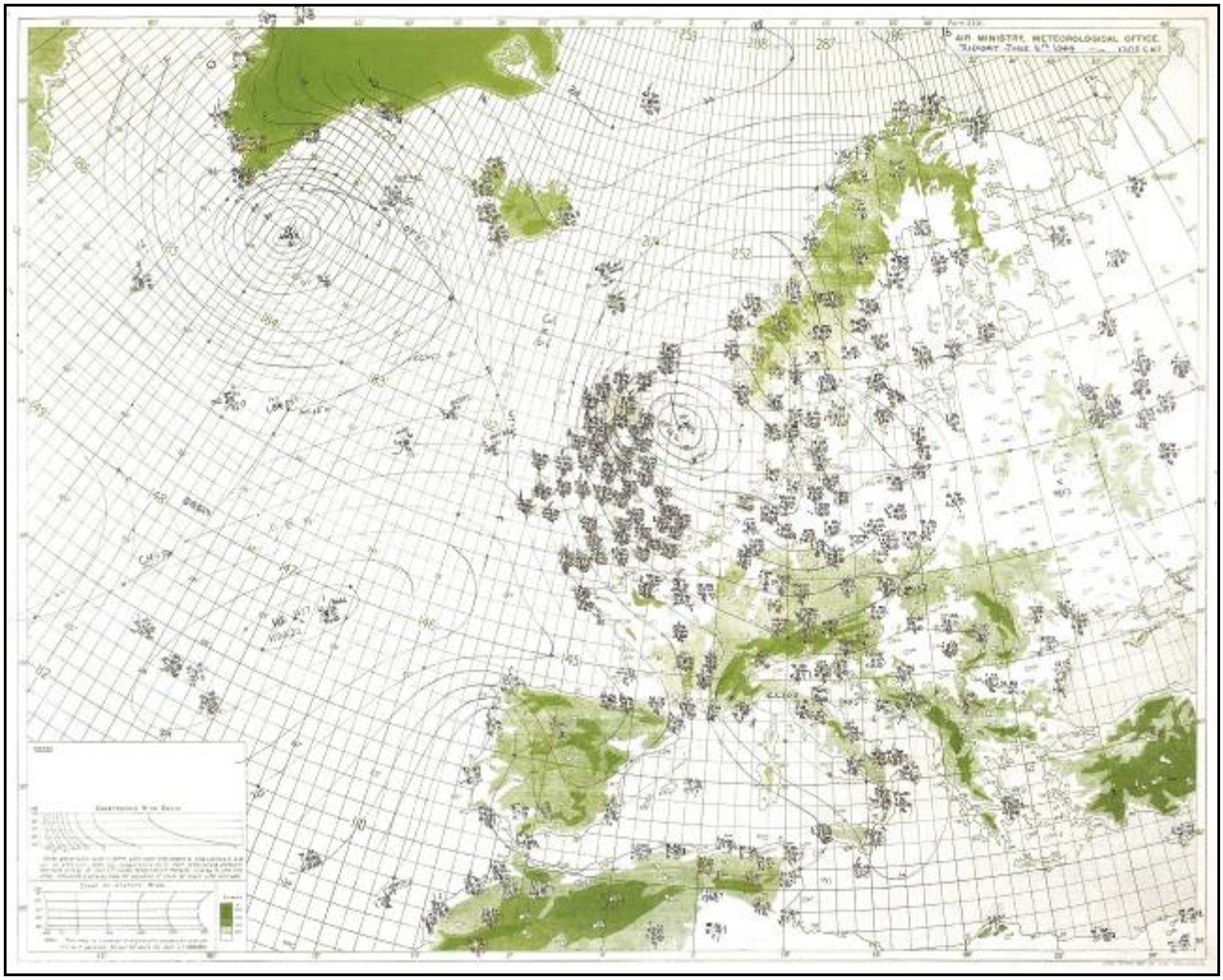


Figure 4. Synoptic chart for 1300z on 6 June 1944 (D-Day).

A surprisingly large proportion of the charts during the Second World War include plotted weather reports from Occupied Europe. Code-breakers devised a method of intercepting and deciphering the Enigma-encrypted weather observations.

Similar charts were plotted from about 1943, for various levels in the upper atmosphere. Radio-sonde balloons were released, which transmitted wind and temperature information, as they ascended through the atmosphere. Data at certain fixed pressure levels was plotted onto a chart and then analysed by the forecaster.

Another very useful source of weather information during the Second World War, is the ***Daily Weather Report***. This is a daily summary of the general weather conditions experienced across the United Kingdom. The series commenced in 1860 when 9 a.m. weather observations were listed each day from a small number of stations around the British Isles and near-Continent. Over the years the amount of information contained in these reports increased, so that the following information was included during the period 1939-45:

a) Weather observations 4 times per day (pressure, cloud, wind etc.) plus daily climatological data (sunshine, rainfall, max/min temps.) from a selection of stations around the British Isles

b) Simplified daily synoptic chart covering Europe, the North Atlantic Ocean and North America

c) A more detailed daily synoptic chart covering the British Isles

d) A general weather forecast for the British Isles for the following 24 hours (ceased at the end of 1943)

The National Meteorological Archive also holds a set of German Daily Weather Reports, which include the war period. These contain valuable weather information from Occupied Europe which was, not surprisingly, difficult to obtain during the conflict.

Examples of some of the material held in the Archive

Barograms

Normally weekly charts with continuous pen mark, indicating the air pressure, corrected to mean sea-level, recorded continuously at the station.

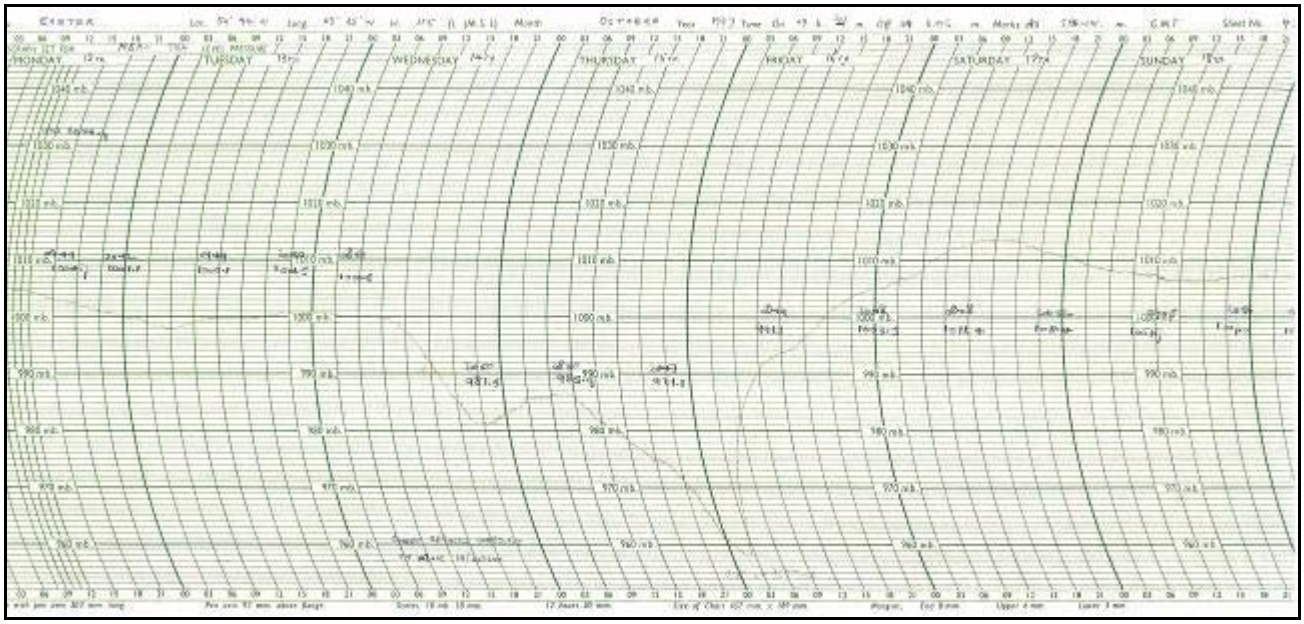


Figure 5. Barograph trace for Exeter - week beginning 12 October 1987.

Anemograms

Monthly chart rolls with continuous pen markings, indicating the actual wind speed and wind direction, recorded continuously at the station.

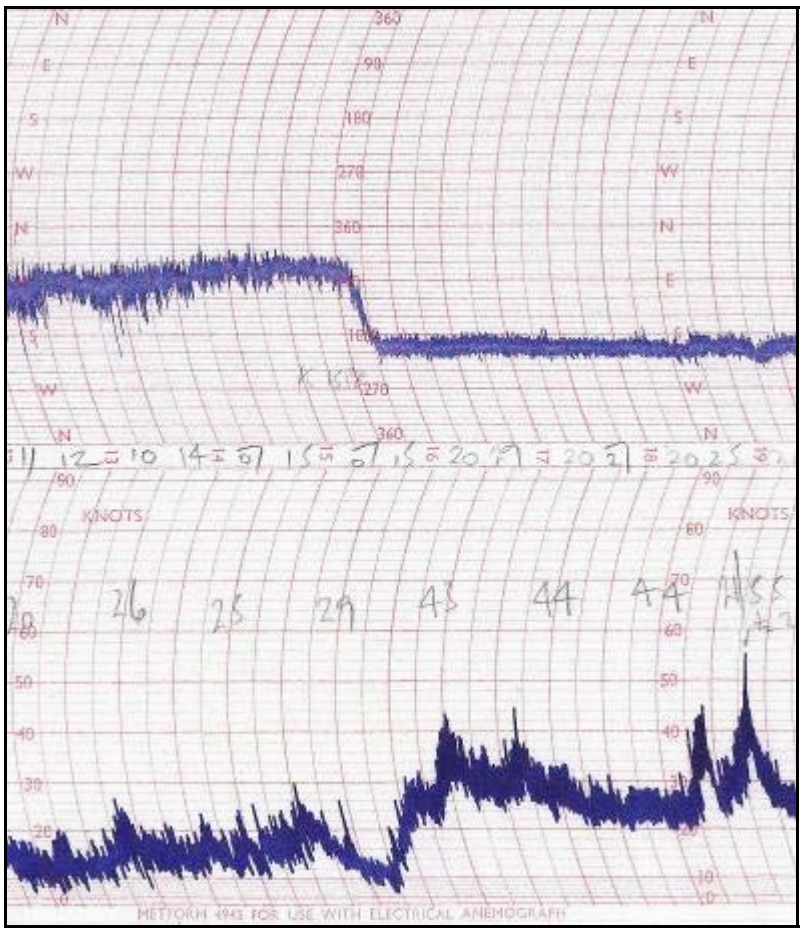


Figure 6. Anemogram trace for Shoreham dated 15 October 1987.

Wind tabulations

Hourly values of wind speed and direction recorded at the station.

Snow and water equivalent

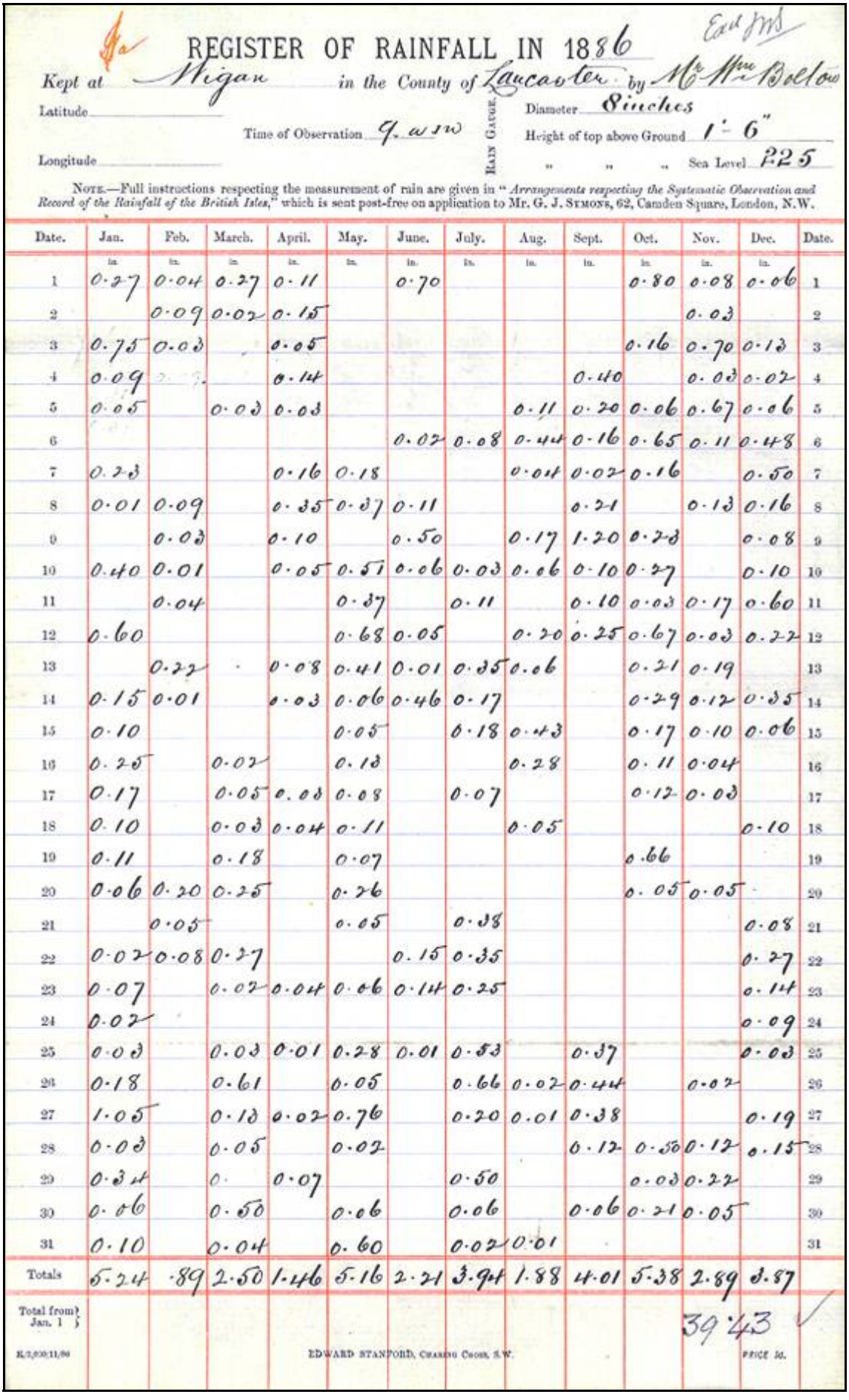
Daily snow depth and the equivalent daily rainfall amount, obtained by melting representative snow samples at the station.

Rainfall tabulations

Mainly hourly values of rainfall amount and duration. Some stations also record rainfall intensity.

Rainfall data

Daily or monthly (sometimes weekly) rainfall amounts recorded at the station. From 1963 the values are on monthly cards, pre-1963 on annual sheets.



REGISTER OF RAINFALL IN 1886

Kept at Wigan in the County of Lancaster by Mr Wm Bolton

Latitude

Longitude

Time of Observation 9. a m

RAIN GAUGE

Diameter 8 inches

Height of top above Ground 1' 6"

" " " Sea Level 225

NOTE.—Full instructions respecting the measurement of rain are given in "*Arrangements respecting the Systematic Observation and Record of the Rainfall of the British Isles*," which is sent post-free on application to Mr. G. J. SYMONS, 62, Camden Square, London, N.W.

Date.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Date.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
1	0.27	0.04	0.27	0.11		0.70				0.80	0.08	0.06	1
2		0.09	0.02	0.15							0.03		2
3	0.75	0.03		0.05						0.16	0.70	0.13	3
4	0.09			0.14					0.40		0.03	0.02	4
5	0.05		0.03	0.03				0.11	0.20	0.06	0.67	0.06	5
6						0.07	0.08	0.44	0.16	0.65	0.11	0.48	6
7	0.23			0.16	0.18			0.04	0.02	0.16		0.50	7
8	0.01	0.09		0.35	0.37	0.11			0.21		0.13	0.16	8
9		0.03		0.10		0.50		0.17	1.20	0.28		0.08	9
10	0.40	0.01		0.05	0.51	0.06	0.03	0.06	0.10	0.27		0.10	10
11		0.04			0.37		0.11		0.10	0.03	0.17	0.60	11
12	0.60				0.68	0.05		0.20	0.25	0.67	0.03	0.22	12
13		0.22		0.08	0.41	0.01	0.35	0.06		0.21	0.19		13
14	0.15	0.01		0.03	0.06	0.46	0.17			0.29	0.12	0.35	14
15	0.10				0.05		0.18	0.43		0.17	0.10	0.06	15
16	0.25		0.02		0.13			0.28		0.11	0.04		16
17	0.17		0.05	0.03	0.08		0.07			0.12	0.03		17
18	0.10		0.03	0.04	0.11			0.05				0.10	18
19	0.11		0.18		0.07					0.66			19
20	0.06	0.20	0.25		0.26					0.05	0.05		20
21		0.05			0.05		0.38					0.08	21
22	0.02	0.08	0.27			0.15	0.35					0.27	22
23	0.07		0.02	0.04	0.06	0.14	0.25					0.14	23
24	0.02											0.09	24
25	0.03		0.03	0.01	0.28	0.01	0.53		0.37			0.03	25
26	0.18		0.61		0.05		0.66	0.02	0.44		0.02		26
27	1.05		0.13	0.02	0.76		0.20	0.01	0.38			0.19	27
28	0.03		0.05		0.02				0.12	0.50	0.12	0.15	28
29	0.34		0.	0.07			0.50			0.03	0.22		29
30	0.06		0.50		0.06		0.06		0.06	0.21	0.05		30
31	0.10		0.04		0.60		0.02	0.01					31
Totals	5.24	.89	2.50	1.46	5.16	2.21	3.94	1.88	4.01	5.38	2.89	3.87	
Total from Jan. 1											39.43		

K.7,000:11,86 EDWARD STANFORD, CHARING CROSS, S.W. PRICE 5d.

Figure 7. Rainfall card for Wigan for 1886.

Hyetograms

Usually daily charts with continuous pen mark, indicating the amount and intensity of rainfall, recorded continuously at the station.

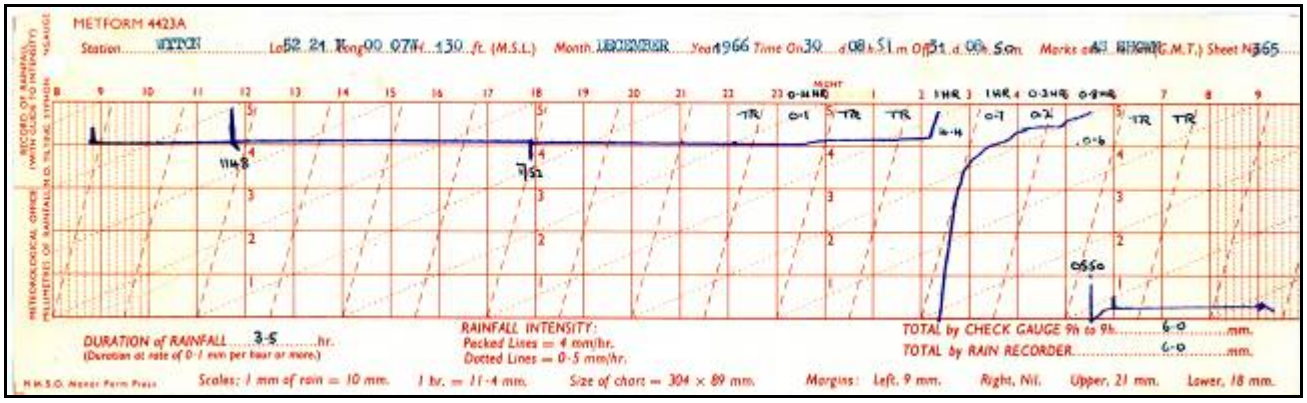


Figure 8. Hyetogram from Wyton – December 1966.

Hygrograms

Weekly charts with continuous pen mark, indicating the actual relative humidity, recorded continuously at the station.

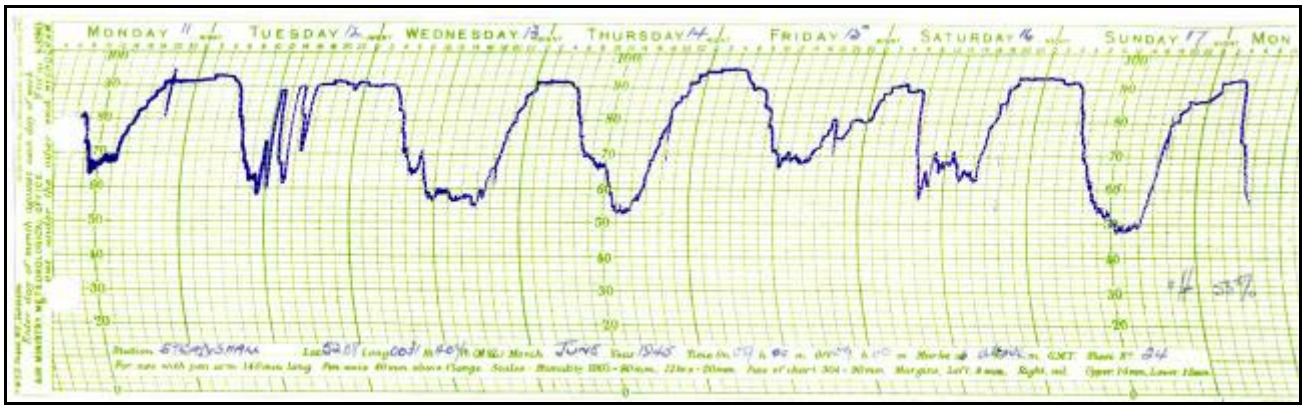


Figure 9. Hygrogram from Stradishall – June 1945.

Thermograms

Usually weekly charts with continuous pen mark, indicating the air temperature, recorded continuously at the station.

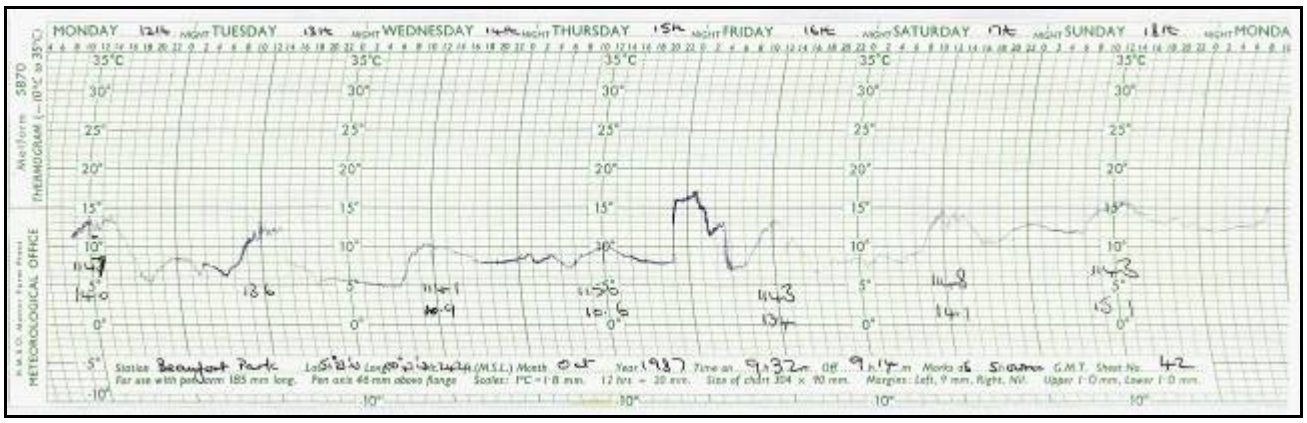


Figure 10. Thermogram record for Bracknell, Beaufort Park for the week beginning 12 October 1987.

Climatological Returns

Monthly sheets consisting of the elements which make up the daily climatological observation. All stations report daily maximum and minimum air temperature, grass minimum temperature, rainfall and snow depth. Additionally, some stations also include daily sunshine, soil temperature, concrete minimum temperature, mean wind speed and a weather diary (brief summary of the general weather conditions).

Monthly data only are known as ***lustrum forms***.

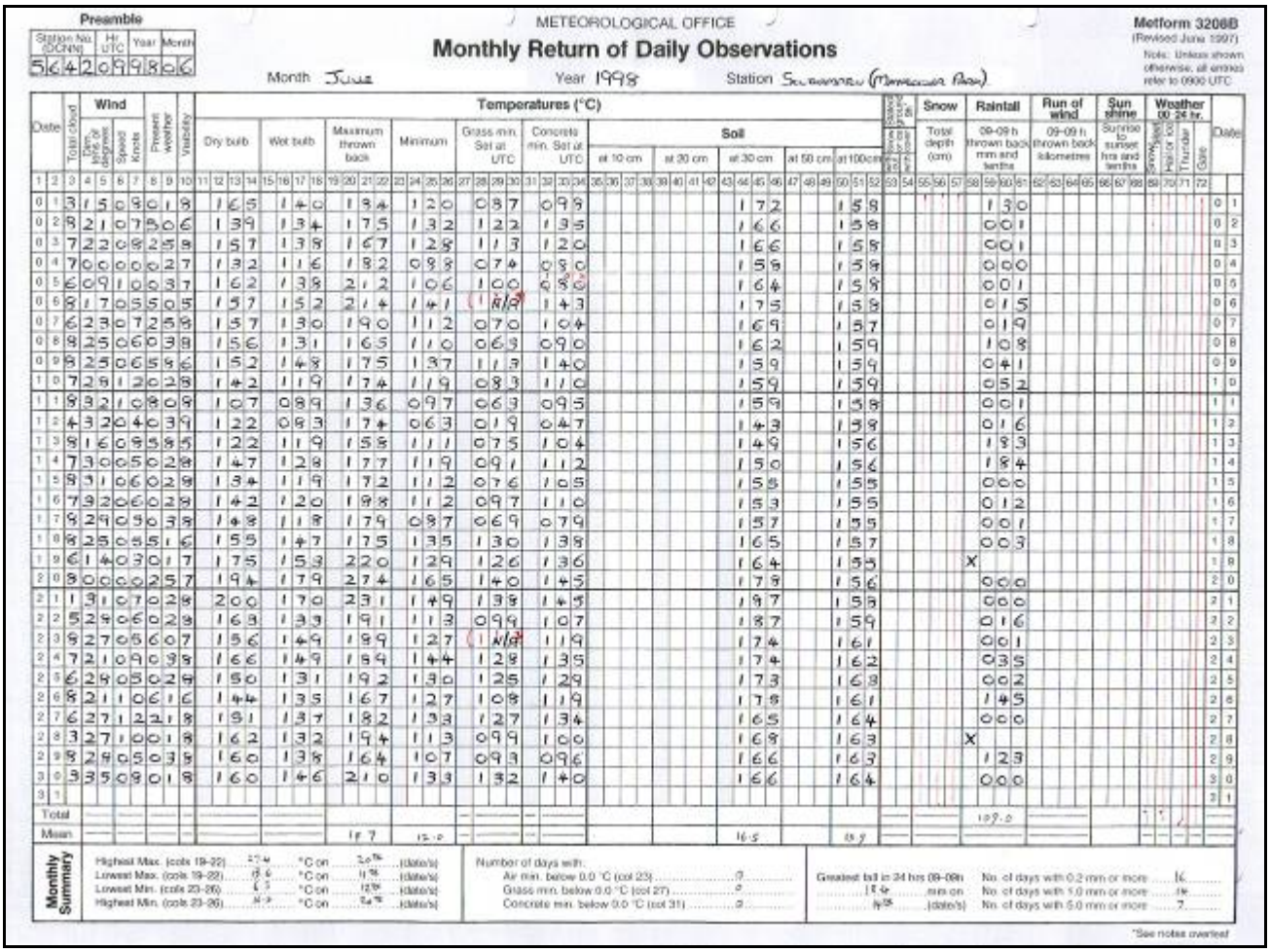


Figure 11. Climatological return for Southampton (Mayflower Park) – June 1998.

Private Weather Diaries

Daily or monthly record of weather observations by a private individual, rather than as part of the official observing networks of the Met Office or the Royal Meteorological Society. Such records were subsequently donated to the Met Office or Royal Meteorological Society for permanent retention in the National Meteorological Archive. The detail and variety of elements observed differs widely and the accuracy of the data cannot always be relied upon.

Oldest and most useful daily diaries include: Rye (Sussex) 1730-33; Rutland 1736-37; Exeter 1755-75; Stroud 1771-1813; London 1771-1822; Gordon Castle (Scotland) 1781-1821; Modbury (South Devon) 1788-1822.

Figure 12. Cover of a private weather diary compiled by Orlando Whistlecroft, circa 1850.

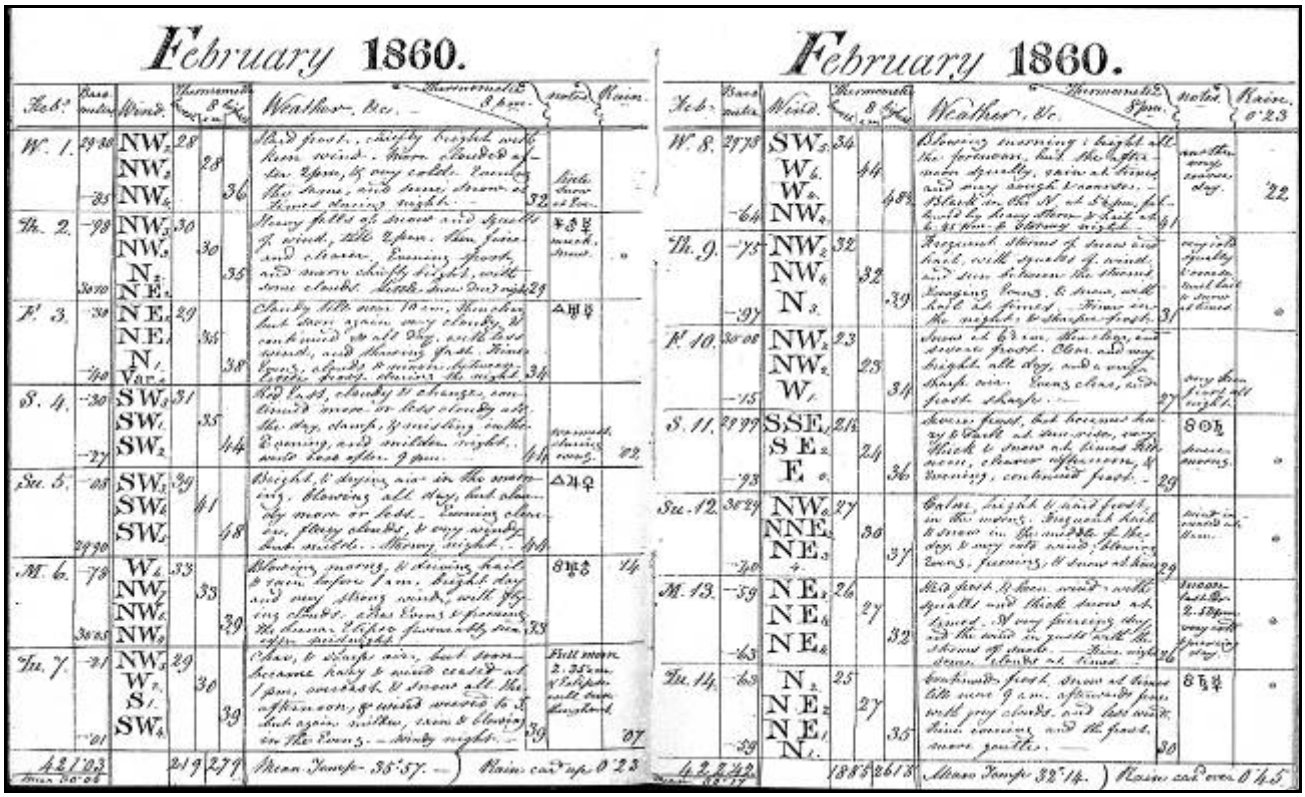


Figure 13. Private weather diary dated February 1860.

Register of Weather Observations

Also known as the Daily Register, these contain weather observations made at continuously manned stations e.g. airfields, harbour authorities, coastguard stations. Observations are made frequently - every hour or three hours, sometimes every half-hour. Elements include wind speed and direction, pressure, temperature and dew point, visibility, cloud type and amount and height of base.

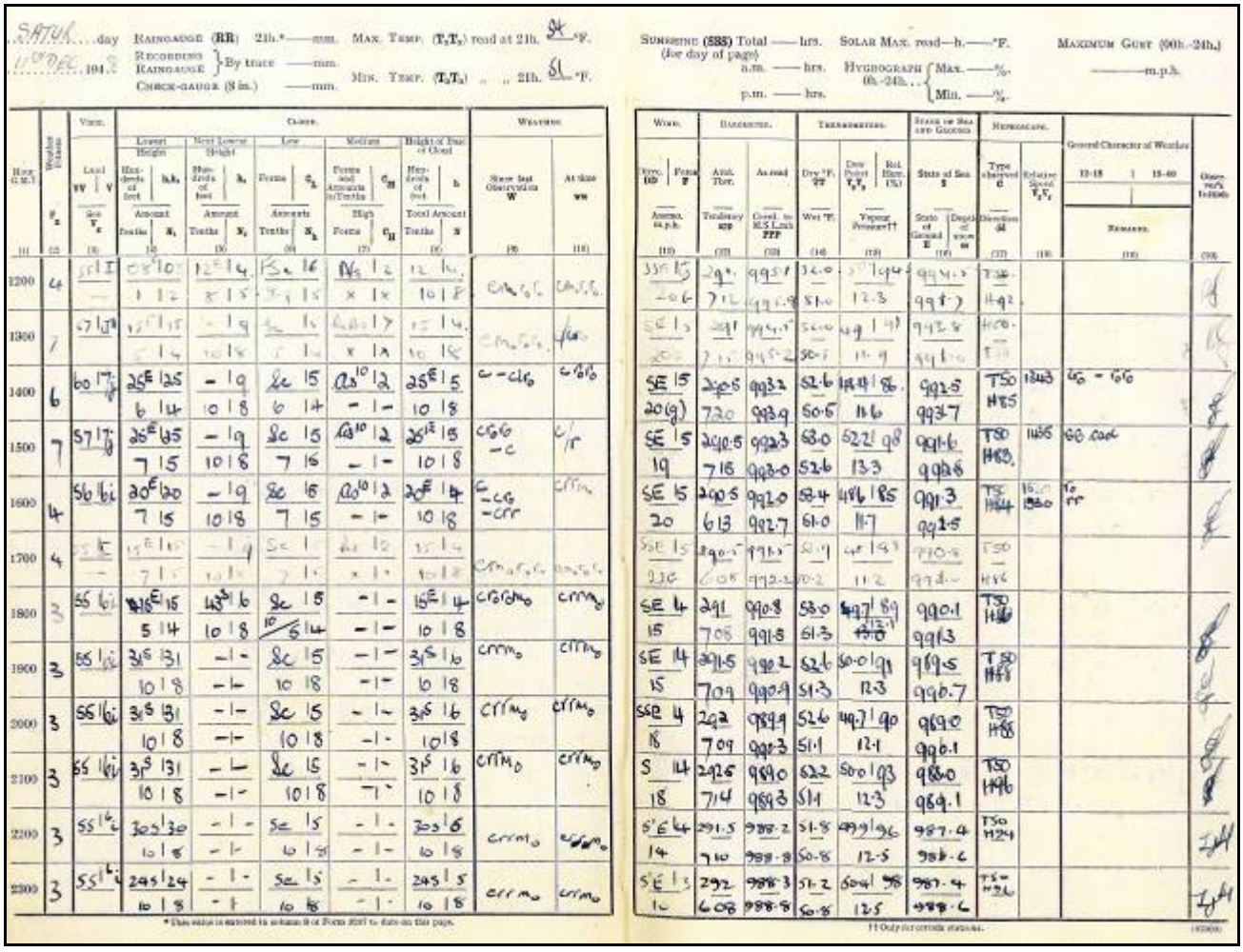


Figure 14. Example of a register of weather observation for Southampton (Eastleigh) Airport– dated Saturday 11 December 1948.

Sunshine tabulations

Hourly values of sunshine recorded at the station.

Sunshine Cards

Daily cards from a Campbell-Stokes sunshine recorder. The amount of sunshine is indicated by burn marks on the card, as the sun's rays are focussed through a glass sphere.

There are three types of card; the type to be used varies with the season of the year, but otherwise any card is appropriate to any latitude and to any Mark of recorder.

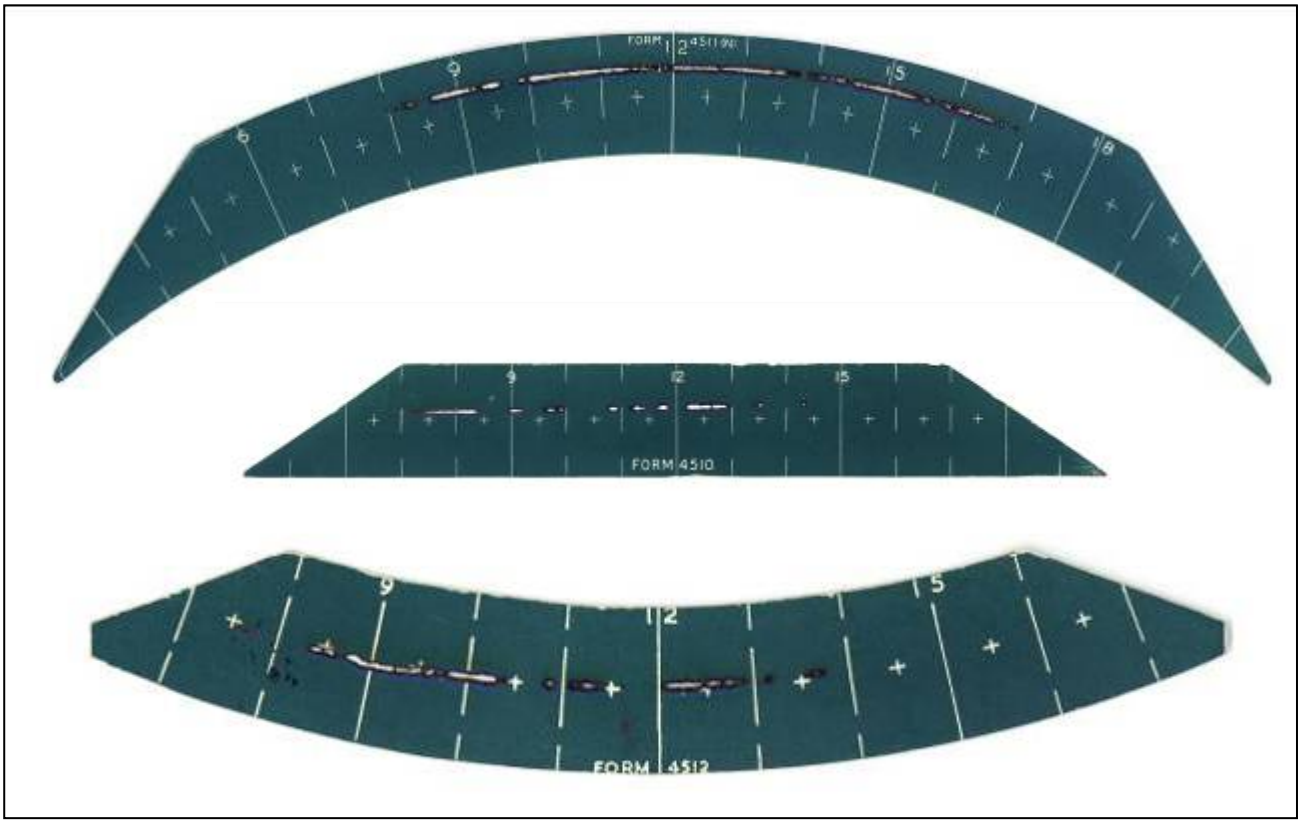


Figure 15. Sunshine cards from Waddington.

In the northern hemisphere the cards are used as follows:

- Long curved cards (upper image) during the summer, from 12 April to 2 September inclusive.
- Straight cards (middle image) about the times of the equinoxes, from 1 March to 11 April and again 3 September to 14 October inclusive.
- Short curved cards (lower image) during the winter, from 15 October to the last day of February inclusive.

Other items held in the Archive

- **Station History Files** - mainly station inspection reports, with details of instruments used, observing site layout and photographs, some administrative correspondence.
- **Rare Books** - including a 15th century edition of Aristotle's Meteorologica, held on behalf of the Royal Meteorological Society.
- **Marine weather Log books** – ships log books.
- **Daily Weather Reports** – reports of the daily weather conditions from the United Kingdom from 1861 to the present, and from around the world.
- **Artefacts** – records and charts of historical interest; for example, a chart detailing the weather conditions for the D-Day landings, and weather records of Captain Scott's Antarctic expedition from 1911.

Synoptic Weather Charts

Stored in the National Meteorological Archive is a selection of synoptic weather charts. In 1867, the first synoptic chart was produced showing the weather conditions around our coast.

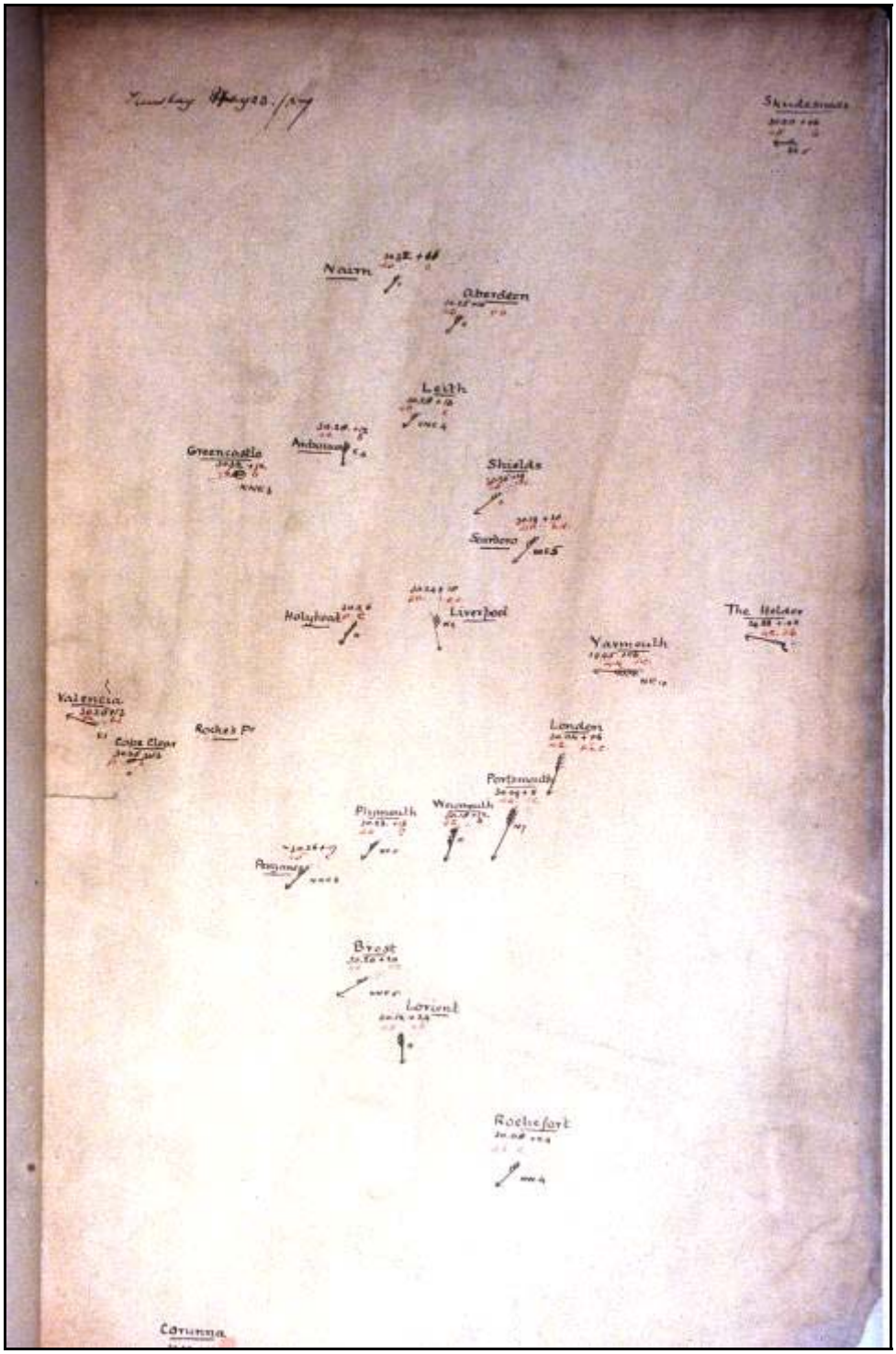


Figure 16. First synoptic chart produced by the Met Office – Dated 31 May 1867.

Over the years the variety of weather charts has grown substantially. Today charts are produce covering the weather across the entire world. Charts are stored in their original paper format. However, during August 2003, an electronic archive of weather charts was established by the Met Office. Since then charts produced by the Met Office are only available from the electronic archive.

Examples of some of the charts stored in the National Meteorological Archive

- **British Isles Charts**

Period Held: **1 October 1940 to 27 August 2003**
Format: **Original Paper Chart**
Note: **Charts for 28 August 2003 onwards now only available electronically**

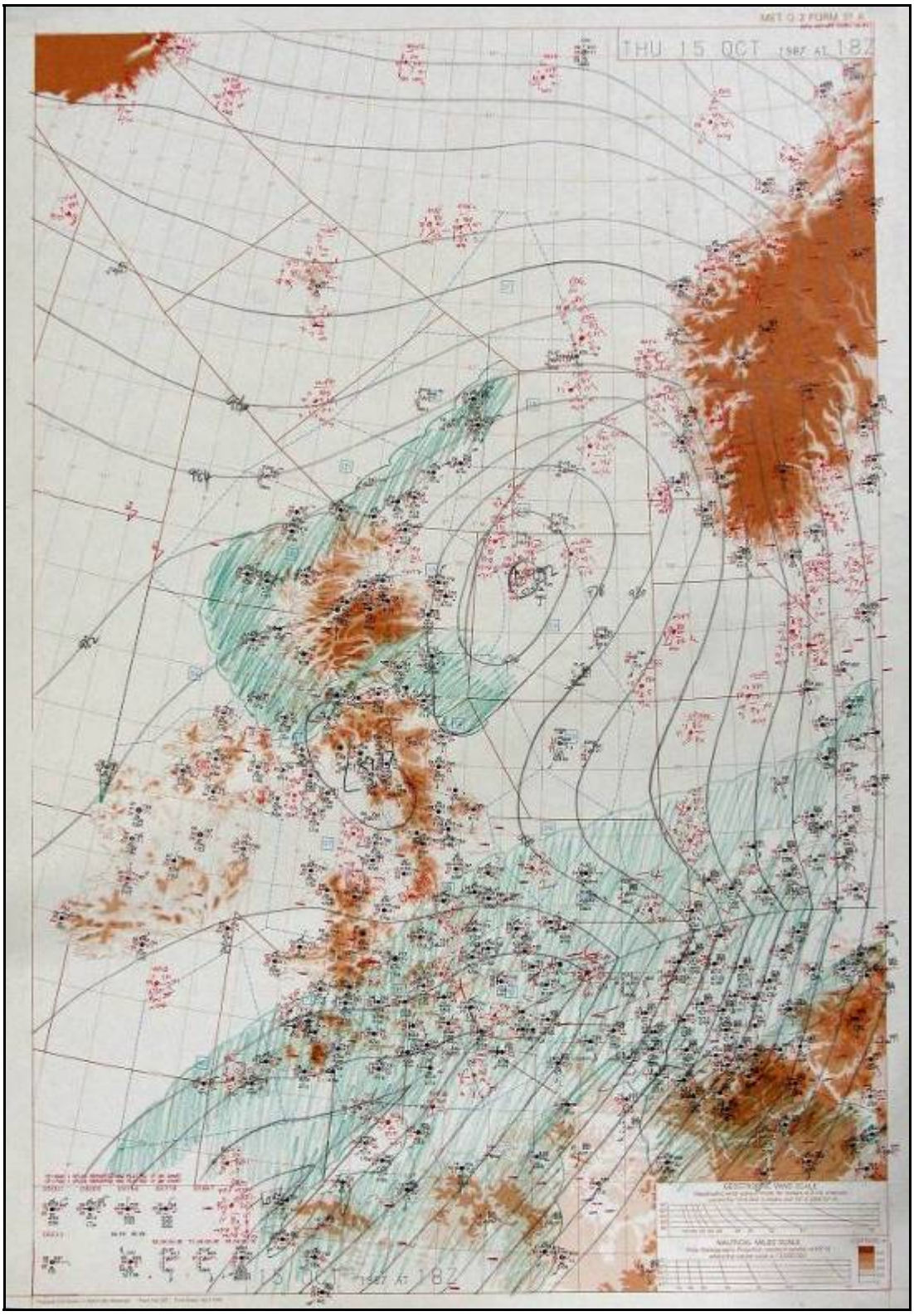


Figure 17. British Isles chart for 1800Z on 15 October 1987.

- **North Atlantic Surface Synoptic Chart**

Period Held: **31 May 1867 to 27 August 2003**
Format: **Original Paper Chart**
Note: **Charts for 28 August 2003 onwards now only available electronically**

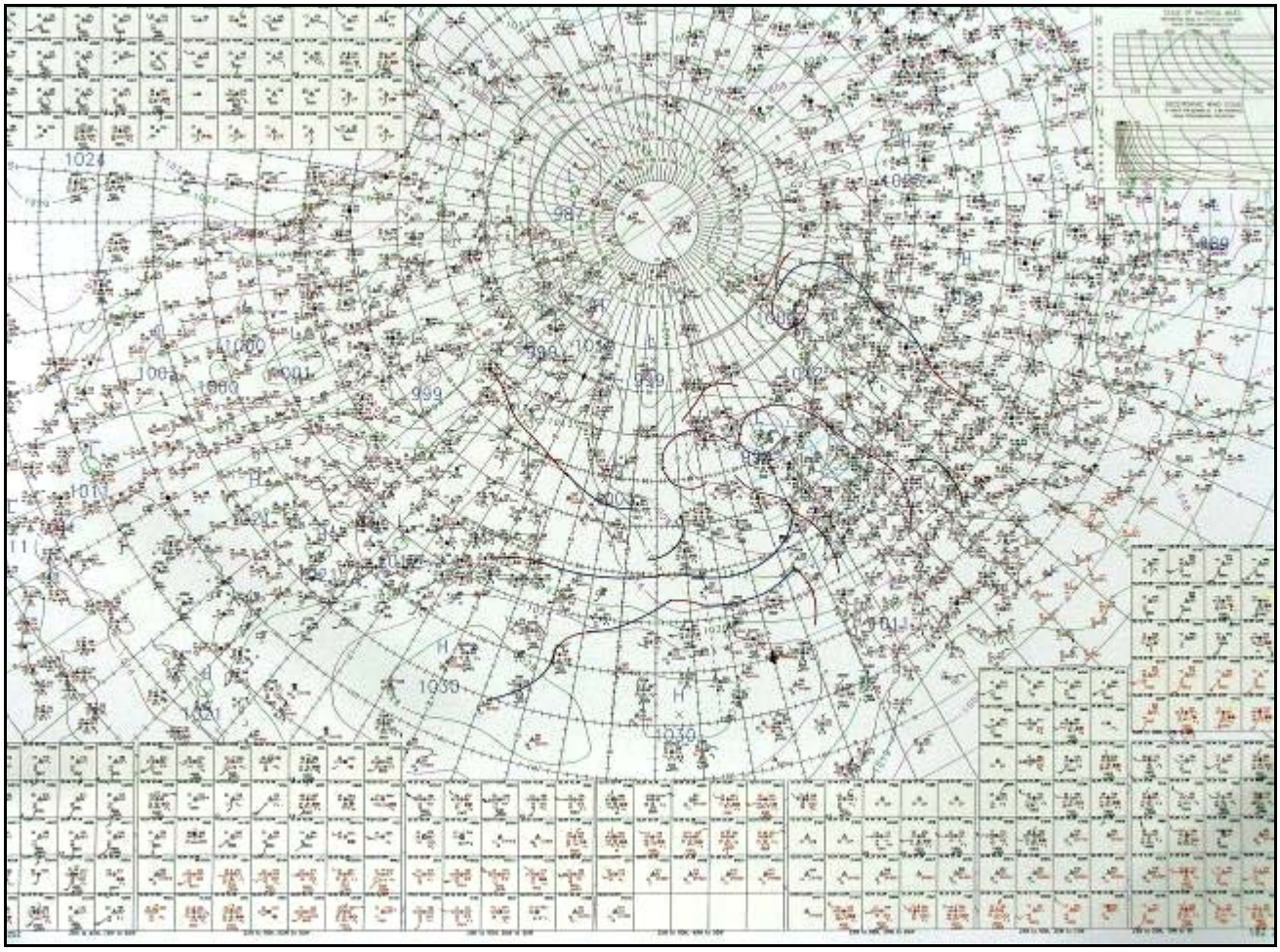


Figure 18. North Atlantic surface chart for 1800Z on 24th July 2003.

- **North Atlantic 010mb Upper Air Chart**

Period Held: **1 April 1962 to 30 November 1972**
Format: **Microfilm**

- **North Atlantic 030mb Upper Air Chart**

Period Held: **1 January 1964 to 25 March 1973**
Format: **Microfilm**

- **North Atlantic 050mb Upper Air Chart**

Period Held: **1 January 1961 to 31 December 1981**
Format: **Microfilm**

- **North Atlantic 070mb Upper Air Chart**

Period Held: **1 January 1974 to 31 December 1981**
Format: **Microfilm**

- **North Atlantic 100mb Upper Air Chart**

Period Held: **15 April 1951 to 30 April 1970**
Format: **Microfilm**

- **North Atlantic 200mb Upper Air Chart**

Period Held: **3 November 1948 to 1 January 1983**
Format: **Microfilm**

- **North Atlantic 250mb Upper Air Chart**

Period Held: **1 November 1972 to 28 August 2003**
Format: **Microfilm**
Note: **Charts for 28 August 2003 onwards now only available electronically**

- **North Atlantic 300mb Upper Air Chart**

Period Held: **1 April 1943 to 1 January 1983**
Format: **Microfilm (Original charts retained for the period 1943 to 1945)**

- **North Atlantic 500mb Upper Air Chart**

Period Held: **1 April 1943 to 28 August 2003**
Format: **Microfilm (Original charts retained for the period 1943 to 1945)**
Note: **Charts for 28 August 2003 onwards now only available electronically**

- **North Atlantic 700mb Upper Air Chart**

Period Held: **1 January 1945 to 30 November 1982**
Format: **Microfilm (Original charts retained for 1945)**

- **North Atlantic 750mb Upper Air Chart**

Period Held: **14 January 1943 to 31 December 1944**
Format: **Microfilm (Original charts retained)**

- **North Atlantic 850mb Upper Air Chart**

Period Held: **29 September 1966 to 26 April 1970**
Format: **Microfilm**

- **North Atlantic Tropopause/Maximum Wind Upper Air Chart**

Period Held: **1 November 1972 to 28 August 2003**
Format: **Microfilm**
Note: **Charts for 28 August 2003 onwards now only available electronically**

- **North Atlantic 1000-500mb Thickness Upper Air Chart**

Period Held: **1 January 1963 to 28 August 2003**
Format: **Microfilm**
Note: **Charts for 28 August 2003 onwards now only available electronically**

- **Northern Hemisphere Circumpolar Surface Chart**

Period Held: **1 July 1922 to 28 August 2003**
Format: **Original Paper Chart**
Note: **Charts for 28 August 2003 onwards now only available electronically**

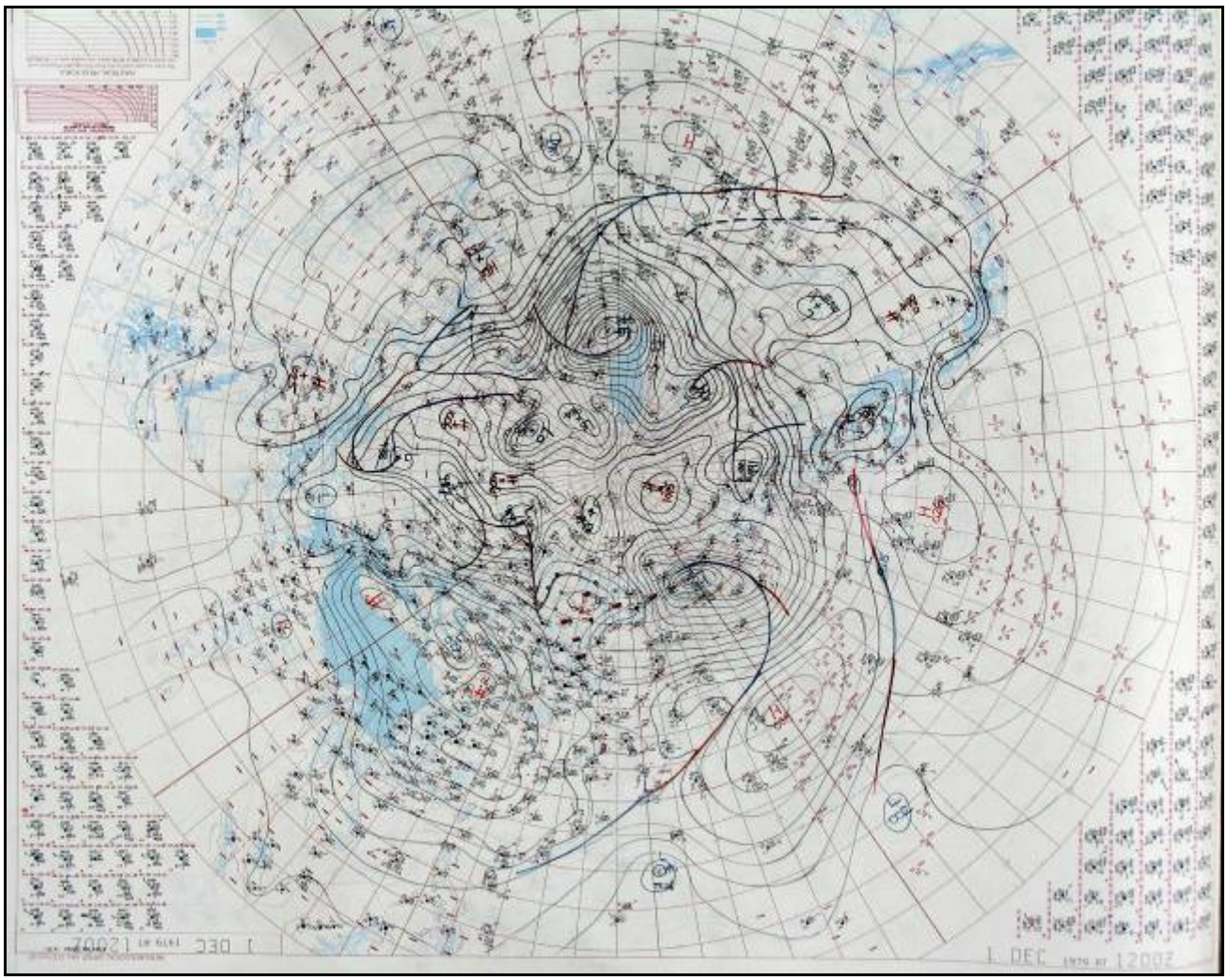


Figure 19. Northern Hemisphere circumpolar chart for 1200Z on 1 December 1979.

- **Northern Hemisphere Circumpolar 010mb Upper Air Chart**

Period Held: **1 December 1971 to 26 April 1981**
Format: **Microfilm only**

- **Northern Hemisphere Circumpolar 020mb Upper Air Chart**

Period Held: **1 April 1974 to 30 April 1981**
Format: **Microfilm only**

- **Northern Hemisphere Circumpolar 050mb Upper Air Chart**

Period Held: **1 April 1974 to 30 April 1981**
Format: **Microfilm only**

- **Northern Hemisphere Circumpolar 100mb Upper Air Chart**

Period Held: **27 May 1970 to 27 March 1993**
Format: **Microfilm only**

- **Northern Hemisphere Circumpolar 200mb Upper Air Chart**

Period Held: **1 January 1968 to 31 July 1972**
Format: **Microfilm only**

- **Northern Hemisphere Circumpolar 250mb Upper Air Chart**

Period Held: **12 November 1982 to 24 May 2000**
Format: **Microfilm only**

- **Northern Hemisphere Circumpolar 300mb Upper Air Chart**

Period Held: **1 September 1948 to 30 September 1949 and 1 January 1972 to 1 November 1982**
Format: **Microfilm only**

- **Northern Hemisphere Circumpolar 500mb Upper Air Chart**

Period Held: **29 August 1948 to 30 March 1995**
Format: **Microfilm only**

- **Northern Hemisphere Circumpolar 1000-500mb Thickness Upper Air Chart**

Period Held: **1 September 1946 to 30 September 1972 and October 1985 to 24 May 2000**
Format: **Microfilm only**

- **Southern Hemisphere Circumpolar Surface Chart**

Period Held: **1 March 1982 to 28 August 2003**
Format: **Original Paper Chart**
Note: **Charts for 28 August 2003 onwards now only available electronically**

- **Southern Hemisphere Circumpolar 100mb Upper Air Chart**

Period Held: **1 March 1982 to 27 March 1993**
Format: **Microfilm only**

- **Southern Hemisphere Circumpolar 250mb Upper Air Chart**

Period Held: **1 November 1982 to 24 May 2000**
Format: **Microfilm only**

- **Southern Hemisphere Circumpolar 300mb Upper Air Chart**

Period Held: **1 March 1982 to 1 November 1982**
Format: **Microfilm only**

- **Southern Hemisphere Circumpolar 500mb Upper Air Chart**

Period Held: **3 March 1982 to 15 February 1994**
Format: **Microfilm only**

- **Southern Hemisphere Circumpolar 1000-500mb Thickness Upper Air Chart**

Period Held: **1 March 1982 to 24 May 2000**
Format: **Microfilm only**

This fact sheet has been produced in conjunction with the National Meteorological Archive.

- Meteorological Records for England and Wales are held in Exeter.

  Contact the Exeter Archive: **The National Meteorological Archive**
  Great Moor House
  Sowton Industrial Estate
  Exeter
  EX2 7XZ
  Tel: +44 (0)1392 360987
  Fax: +44 (0)1392 885681
  Email: metarc@metoffice.gov.uk

- Meteorological Records for Scotland are held in Edinburgh.

  Contact the Edinburgh Archive: **Met Office**
  Saughton House
  Broomhouse Drive
  Edinburgh
  EH11 3XQ
  Tel: +44 (0)131 528 7311
  Fax: +44 (0)131 528 7345

- Meteorological Records for Northern Ireland are held with the Public Record Office, Northern Ireland (PRONI).

  Contact the PRONI: **PRONI**
  66 Balmoral Avenue
  Belfast
  BT9 6NY
  Tel: +44 (0)28 9025 5905
  Fax: +44 (0)28 9025 5999
  Email: proni@dcalni.gov.uk

All of the images used in this fact sheet along with many others covering all aspects of meteorology can be obtained from the National Meteorological Library's Visual Aids section.

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