

Meteorological Data recorded at Armagh Observatory: Vol 3 - Meta-data, 1796-2003.

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1 Introduction

Armagh Observatory has the longest series of meteorological records from any single site in Ireland and one of the longest in the British Isles. Pressure and air temperature readings commenced in 1795, to be joined in 1838 by rainfall and wet and dry temperatures and in 1843 by maximum and minimum temperatures. Records of bright sunshine from a Campbell-Stokes sunshine recorder commenced in 1880 and soil temperatures at one foot and four foot depth in 1904. In the late 18th century and early 19th century, readings were made thrice daily, in the morning, at midday and in the evening. Later, this was reduced to twice daily morning and evening readings and finally from 1966, to just morning readings.

Up until June 2000, the data have been entered into the manuscript meteorological record books (M117, Butler and Hoskin, 1987) with monthly returns to the UK Met Office since 1868. These manuscript books have been scanned electronically and the images made available to the general public via the World-Wide Web. Later data is available in digital format.

In addition, the main data series, namely: air pressure, air temperature, sunshine, humidity and soil temperatures have been entered into computer file and, where possible, calibrated and corrected for instrumental error and exposure. These data sets (see list in references below) are to be made available over the Internet at <http://climate.arm.ac.uk> for scientific research and educational purposes and will be updated as new data accumulates. Printed versions for limited circulation are available on request from *The Librarian, Armagh Observatory*.

2 Metadata

In order to make the required corrections for instrumental error and exposure, detailed knowledge is required of the history of the instruments and any tests on their accuracy before and during their period of use. Such information is termed *meta-data*. It encompasses all information relevant to the instruments, their location and use, and includes such items as: letters to and from observers, details of observation times and practices, vouchers and receipts, details of procedures, inspection reports, maps, drawings and photographs. Some of these documents (assigned the prefix M) have been previously listed in the more general catalogue of historical Observatory documents by Butler and Hoskin (1987).

Table 1: Key for the contents or topics in the documents.

Topic No.	Topic	Topic No.	Topic
1	Barometric pressure	21	Photographs of met. site and instruments
2	Temperature	22	Publications
3	Wind	23	Tornadoes and waterspouts
4	Rainfall	24	Solar link and sunspots
5	Sunshine	25	Flooding
6	Cloud	26	List of inspectors
7	Humidity	27	Funding of meteorological work
8	Fog	28	War correspondence 1939-1945
9	Visibility	29	Staff
10	Thunder and lightning	30	Obituaries
11	Snow, hail, frost	31	Observers, contributors
12	Recording forms and instructions	32	Phenological data
13	Reports on station	33	Stationery
14	Instrument list	34	List of inspectors reports
15	Plans of observatory met. station	35	Requests for publications
16	Request for information	36	Statistics
17	Newspaper articles	37	Summary/outline of project
18	Reference to old/missing data	38	Data, codes, format, files
19	Questionnaire	39	Validation of data, calibration, etc
20	Self recording station (hourly)	40	Climatology, weather

In Table 3, the documents listed are in chronological order. Column 1 gives the document reference number, column 2 the number in the list by Butler and Hoskin (1987) if it appears there, column 4 the date if known, column 5 code numbers relevant to the context of the document and lastly, column 6 a short description of the contents. Currently the catalogue contains over a thousand documents and many more will be included in future revisions. Though each document has only a single reference number in this list, they vary widely in size from a single page to over 10,000 pages. In Table 1 we give the list of code numbers and the context in which the documents are useful as metadata for the meteorological data series. Table 2 gives some examples. In Table 4, we give the same information as in Table 3, but in document numerical order.

A document can be searched in a number of ways in the catalogue: by catalogue number, by date and/or by code number (following the key listed in Table 1). Note that each document can have several code numbers. For example, the document ARM/MET/000140 (in 1952) is an inspector's report which lists corrections and the equipment for several meteorological parameters. The code numbers are: 1, 2, 3, 4, 5, 6, 13, 14 which refer to barometric pressure, temperature, wind, rainfall, sunshine, cloud, reports on station and an instrument list respectively.

Table 2: Structure of the catalogue and some examples

Document Code	B&H Code	Date	Content	Description
ARM/MET/000590		2001	14 13 15	Armagh Obs. records and index. Met books at the library
ARM/MET/000591	M120	1910-1919	1-10 22 36-40	M120 documents (copy) miscellaneous letters
ARM/MET/000592		27/10/1999	13 12	Letter inspection of Armagh climate site 1999.
ARM/MET/000593		8/4/2002	18 2 1-16	Letter to D. Campbell and answer

B&H Code is the Butler and Hoskin Code (in Butler and Hoskin, 1987).

3 Acknowledgements

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4 References.

Butler, C. J. and Hoskin, M. A. 1987. The archives of Armagh Observatory, *J. Hist. Astron.* 18, 295-307.

Armagh Observatory Climate Papers: Meteorological Data Recorded at Armagh Observatory

Vol 1 - Daily, Monthly and Annual Rainfall, 1838-2001. García-Suárez' A.M., Butler, C.J., Cardwell, C.J., Coughlin, A.D.S., Donnnelly, A., Fee, D.T., Hickey, K.R., Morrow, B. and Taylor, T. (2002)

Vol 2 - Daily, Mean Monthly and Annual Maximum and Minimum Temperatures 1844-2002, Butler, C.J., García-Suárez A.M., Coughlin, A.D.S., and Cardwell, D. (2005)

Vol 3 - Meta-data concerning Armagh Observatory Meteorological Records, 1796-2003. García-Suárez, A.M., Park, E., Butler, C.J., Hickey, K.R. and Grant, A. (2005)

Vol 4 - Daily, Mean Monthly and Annual Soil Temperatures, 1904-2001. García-Suárez, A.M., Butler, C.J. and Morrow, B. (2005)

Vol 5 - The storminess record from Armagh Observatory, 1796-2002. Hickey, K. (2005)

Vol 6 - Twice-Daily, Mean Monthly and Annual 'Spot Temperatures', 1796-1883. Butler, C.J. and Morrell, C. (2005)

Vol 7 - Twice Daily, Mean Monthly and Annual Wet and Dry Temperatures and Relative Humidity. 1844-2003. García-Suárez, A.M. and Butler, C.J., Coughlin, A.D.S., Cardwell, D., Boyle, E., Ryan, G. and Dougan, L. (2005)

Vol 8 - Hourly temperatures for the Self-Recording Thermograph of the Automatic Weather Station at Armagh Observatory, 1874-1883. Grant, A., García-Suárez, A.M. and Butler, C.J. (2005)

Vol 9 - Temperatures recorded at Dunsink Observatory, 1818-1850. Butler, C.J., Morrow, B. and Morrell, C. (2005)

Vol 10 - Daily, Monthly and Annual Hours of Bright Sunshine, 1882-2003. Butler, C.J., Emerson, M., García-Suárez, A.M., Palle, E. and Kelly, S.T. (2005)

Vol 11 - Twice-daily, Mean Monthly and Annual Pressure, 1796-2003. Butler, C.J., Emerson, M., Allen, R., Ansell, T., García-Suárez, A.M. (2005)

Vol 12 - Unusual atmospheric phenomena recorded at Armagh Observatory, 1833-1941. Butler, C.J., Speers, J., Fee, D. and Dunne, E. (2006)

