**A brief guide to the observations in the University of Reading pocket registers**

1. **Weather station location and observation times**

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|  | **Period of observations** | **Notes** |
| Location of weather station | Jan 1908- Dec 1967 | London Road campus |
| Location of weather station | Jan 1968 onwards | Whiteknights campus; the site was moved a small distance on 1 Jan 1971. |
| Observation times | All | Observations were made at 0900 GMT, even during periods of summer time or double summer time. If stated otherwise, some other observations were made at other times during the day. |
| Missing pocket register observations | Pre-December 1910, January-July 1918. Some of these observations are available in monthly reports submitted to, and now held at, the Met Office. |

1. **Atmospheric pressure**

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| **Register heading** | **Period of observations** | **Notes** |
| Attached Therm. | Dec 1910-Oct 1959 | The temperature of the thermometer attached to the mercury barometer (°F). |
| Barometer / Barometer as read | Dec 1910-Oct 1959 | Pressure reading of the Fortin mercury barometer (inches). When the ‘whole inches’ part of the reading (e.g. ’28.’, ’29.’, ’30.’ or ’31.’ does not change between successive days, then only the decimal part of the reading is sometimes shown on subsequent days. This pressure reading is not the MSL pressure but the station level pressure. |

1. **Current air temperature and humidity**

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| **Register heading** | **Period of observations** | **Notes** |
| Dry | Dec 1910-Dec 1971 | Dry bulb temperature using a thermometer exposed in thermometer screen (°F). This is the ordinary air temperature. |
| Wet | Dec 1910-Dec 1971 | Wet bulb temperature using a thermometer exposed in thermometer screen (°F). This is used, in conjunction with the dry bulb temperature, to determine humidity quantities such as the dew point, vapour pressure and relative humidity. |
| Vapour pressure | Jan 1960-Sep 1978 | Calculated by the observer from the dry and wet bulb readings (mb). |
| Dew point | Jan 1960-Dec 1971 | Calculated by the observer from the dry and wet bulb readings (°F). |
| Relative humidity | Jan 1960-Feb 1972 | Calculated by the observer from the dry and wet bulb readings (%). |
| Dry | Jan 1972- | Dry bulb temperature using a thermometer exposed in thermometer screen (°C). This is the ordinary air temperature. |
| Wet | Jan 1972- | Wet bulb temperature using a thermometer exposed in thermometer screen (°C). This is used, in conjunction with the dry bulb temperature, to determine humidity quantities such as the dew point, vapour pressure and relative humidity. |
| Dew point | Jan 1972-Feb 1972 | Calculated by the observer from the dry and wet bulb readings (°C). |

Temperature observations (dry and wet) were made with sheathed thermometers in a small Stevenson screen or a large thermometer screen. It is possible that the wet bulb readings are too high in conditions of freezing temperatures as the wick may remain dry.

1. **Temperature extremes**

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| **Register heading** | **Period of observations** | **Notes** |
| Max | Dec 1910-Dec 1971 | Maximum temperature using a thermometer exposed in thermometer screen (°F); the reading is for the period since the observation at 0900 GMT on the previous day. |
| Min | Dec 1910-Dec 1971 | Minimum temperature using a thermometer exposed in thermometer screen (°F); the reading is for the period since the observation at 0900 GMT the previous day. |
| Additional columns headed MAX and MIN | Jul 1912-Nov 1912 | Maximum and minimum temperatures (°F) – not sure what these refer to and how they differ to the values in the main columns although they may refer to observations made with a large screen (rather than a small Stevenson screen that was probably used for the standard maximum and minimum temperatures). |
| Additional column with no heading | May 1913-Mar 1914 | This appears to be a set of maximum temperatures – not sure what they relate to. |
| Grass/Grass min | Jan 1920-Dec 1971 | Grass minimum temperatures using a thermometer exposed at grass tip level (°F). |
| Bare soil min. | Jun 1961-Dec 1971 | Minimum temperature registered by a thermometer exposed in contact with a bare soil surface (°F). |
| Max | Jan 1972- | Maximum temperature using a thermometer exposed in thermometer screen (°C); the reading is for the period since the observation at 0900 GMT on the previous day. |
| Min | Jan 1972- | Minimum temperature using a thermometer exposed in thermometer screen (°C); the reading is for the period since the observation at 0900 GMT the previous day. |
| Grass min | Jan 1972- | Grass minimum temperatures using a thermometer exposed at grass tip level (°C). |
| Bare soil min. | Jan 1972-Feb 1972 | Minimum temperature registered by a thermometer exposed in contact with a bare soil surface (°C).  |
| Concrete min. | Jan 1972- | Minimum temperature registered by a thermometer exposed in contact with a concrete slab (°C). |

Note that the maximum temperature as read is assigned to the previous day – as usually the highest temperature occurs in the early afternoon, and at 09 GMT (the time of measurement) this means that ‘early afternoon’ occurred during the previous day. The maximum temperature reading is said to be ‘thrown back’. The measurement shown in the register corresponds to the date the reading was made. All thermometers are of the sheathed pattern with the air maximum and minimum values being taken inside a small Stevenson or large thermometer screen. All thermometers were reset at 0900 GMT.

1. **Calendar**

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| **Register heading** | **Period of observations** | **Notes** |
| Week number | May 1960-Feb 1972 | Shaw week number, with day 1 of week 1 being 6 November. |

1. **Precipitation totals**

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| **Register heading** | **Period of observations** | **Notes** |
| Rain Amount | Dec 1910-Dec 1970 | Rainfall (strictly the water equivalent of precipitation, any solids having been melted) since the observation at 0900 GMT the previous day (inches). ‘-‘ or ‘ ‘ denotes no precipitation. A trace is sometimes denoted by ‘tr’ – a trace denotes less than 0.005 inches of rain. The use of ‘w’ and ‘f’ denote that the precipitation was the result of dew or fog. |
| Rain Amount | Jan 1971-Sep 1978 | Rainfall (strictly the water equivalent of precipitation, any solids having been melted) since the observation at 0900 GMT the previous day (mm). ‘-‘ or ‘ ‘ denotes no precipitation. A trace is sometimes denoted by ‘tr’ – a trace denotes less than 0.05 mm) of rain. Sometimes there is an indication that rime, dew (w) hoar frost (x) or wet fog (fe) caused the trace. |
| Rain Amount | Oct 1978- | Rainfall (strictly the water equivalent of precipitation, any solids having been melted) since the observation at 0900 GMT the previous day (inches). ‘-‘ or ‘ ‘ denotes no precipitation. A trace is sometimes denoted by ‘tr’ – a trace denotes less than 0.05 mm) of rain. Use of an ‘X’ symbol as part of the record denotes that the precipitation was the result solely of rime, dew, hoar frost or fog. After 2009 there was sometimes a tendency for the ‘trace’ measurement to be ignored – and to be replaced as a ‘0’. |

Note that the precipitation measurement at 0900 GMT is assigned to the previous day – as 15 of the previous 24 hours will have occurred on the previous day. The precipitation is said to be ‘thrown back’. The measurement shown in the register corresponds to the date the reading was made. Measurements were made with a standard Snowdon raingauge exposed with the rim 30 cm above the surrounding grass.

1. **Cloud**

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| **Register heading** | **Period of observations** | **Notes** |
| Cloud Amt | Dec 1910-Dec 1958 | Cloud amount (tenths). A ‘-‘ usually denotes no cloud but is also used to indicate the presence of fog (possibly the sky being obscured). |
| Cloud form | Dec 1910-Oct 1959 | Cloud type (Ni – nimbostratus, StCu – stratocumulus, CiSt – cirrostratus so that abbreviations may differ to those in use in 2013). Fog is often denoted by the fog symbol (three horizontal parallel lines). ‘b’ is used to denote a clear sky. |
| Whence coming | Dec 1910-Oct 1959 | Direction (compass point) from where the cloud is approaching. |
| Cloud Amt / Total cloud | Jan 1959- | Cloud amount (oktas (i.e. eighths)). An entry of 9 (or of 8 with an ‘x’ above it) denotes sky obscured. |

1. **Sunshine**

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| **Register heading** | **Period of observations** | **Notes** |
| Sunshine (\*) | Aug 1951-Nov 1955 | The column is being used for the specification of a wind speed (in mph) – how this differs to the ‘standard wind speed’ entry is unknown. The two may be equivalent although this column is not used when the main observer is on leave in the summer. |
| Sun hours and tenths / Total sunshine for the day | Apr 1956- | The duration of bright sunshine (h) measured using a Campbell-Stokes sunshine recorder. ‘-‘ is used to denote a value of 0.0 h. The measurements refer to the date on which they occur (the sunshine card is changed at the morning observation time (say 0900 GMT) and the reading from the card is apportioned to the previous and current days |

Sunshine observations were made with a Campbell-Stokes sunshine recorder.

1. **Wind**

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| **Register heading** | **Period of observations** | **Notes** |
| Wind direction | Dec 1910-Jun 1916 | Compass point from where the wind is blowing. |
| Force | Dec 1910-Oct 1958 | Wind speed, Beaufort force. A ‘-‘ is sometimes used to denote calm. |
| Wind direction | Aug 1918-Oct 1959 | Direction from where the wind is blowing (in degrees). However, at times there is a tendency to revert back to using the compass point (e.g. N, NE etc.). A ‘-‘ is sometimes used to denote calm. |
| Wind direction | Nov 1959-Sep 1978 | Wind direction (degrees) is obtained by multiplying the entry by 10. An entry of 00 indicates calm. In some years the entry is the actual direction in degrees. |
| Wind speed | Nov 1959- | Wind speed in knots at observation time. |
| Wind direction | Oct 1978- | Wind direction (degrees) is obtained by multiplying the entry by 10. An entry of 00 indicates calm. On occasions after 2008 the entry was made in whole degrees (e.g. 090 rather than 09 for a wind from the east). |

Note – see also the sunshine table (\*) for additional wind information during 1951-1955 and the state of the ground table (\*\*) for additional wind information during 1951-1955. Currently the instruments used for the observations are not accurately known.

1. **State of the ground**

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| **Register heading** | **Period of observations** | **Notes** |
| State of ground | Jan1939-Jun 1960 | When the snow cover exceeds 50% of the ground the snow symbol ‘\*’ is reported inside a square to denote the fact. Later (December 1950 for example) snow cover is indicated by its depth in inches). |
| State of ground (\*\*) | Aug 1951-Nov 1955 | The column is being used for the specification of a wind direction – how this differs to the ‘standard wind direction’ entry is unknown. The two may be equivalent although this column is not used when the main observer is on leave in the summer. |
| State of ground | Jul 1960-May 1978 | State of ground using code table 1. |
| State of ground | May 1978-Dec 1981 | State of ground using code table 2. |
| State of ground | Jan 1982-Oct 1982 | State of ground using code table 3 and 4. Entries with the former table are of the form ‘5/code’ while those with the latter are of the form ‘6/code’. |
| State of ground without snow or ice cover | Nov 1982- | State of ground using code table 3. Not used if code table 4 is applicable. |
| State of ground with snow or ice cover | Nov 1982- | State of ground using code table 4. Not used if code table 3 is applicable. |

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| --- | --- |
| Code | Description |
| 00 | Bare plot dry |
| 01 | Bare plot dry with cracking soil |
| 03 | Bare plot dry but dew on nearby grass |
| 10 | Bare plot moist/wet with no standing water |
| 11 | Bare plot moist/wet but not muddy |
| 12 | Bare plot soft or muddy but no pools of water |
| 20 | Wet ground with small pools of water |
| 21 | Flooded, e.g. by river banks bursting |
| 30 | Bare plot frozen |
| 31 | Bare plot frozen to a depth of less than 5cm |
| 32 | Bare plot frozen to a depth of more than 5cm |
| 40 | Glaze/ice on ground without snow |
| 50 | Snow/melting snow/hail covering less than 50% of ground |
| 60 | Snow/melting snow/hail covering more than 50% of ground but not completely |
| 70 | Snow/melting snow/hail covering 100% of the ground |
| 71 | 100% snow cover to a depth of under 15cm; ground underneath not frozen |
| 72 | 100% snow cover to a depth of under 15cm; ground underneath being frozen |
| 73 | 100% snow cover to a depth of 15cm or more; ground underneath being frozen or unfrozen |
| 80 | Loose dry snow, sand or dust covering half or more of ground, but not completely |
| 90 | Loose dry snow, sand or dust covering ground completely |

*Table 1: state of ground codes (2 digits).*

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| --- | --- |
| Code | Description |
| 0 | Bare plot dry |
| 1 | Bare plot moist/wet with no standing water |
| 2 | Bare plot wet with some standing pools of water |
| 3 | Bare plot frozen |
| 4 | Glaze/ice on ground without snow |
| 5 | Snow/melting snow/hail covering less than 50% of ground |
| 6 | Snow/melting snow/hail covering more than 50% of ground but not completely |
| 7 | Snow/melting snow/hail covering 100% of the ground |
| 8 | Loose dry snow, sand or dust covering half or more of ground, but not completely |
| 9 | Loose dry snow, sand or dust covering ground completely |

*Table 2: State of ground codes using from May 1978.*

|  |  |
| --- | --- |
| 0 | ground dry (no cracks or appreciable amounts of dust/loose sand)  |
| 1 | ground moist  |
| 2 |  ground wet (standing water in small or large pools on surface)  |
| 3 | flooded  |
| 4 | ground frozen  |
| 5 | glaze on ground  |
| 6 | loose dry dust or sand not covering ground completely  |
| 7 | thin cover of loose dry dust or sand covering ground completely  |
| 8 | mod/thick cover of loose dry dust/sand covering ground completely  |
| 9 |  extremely dry with cracks  |

*Table 3: State of ground code used without snow or ice cover from January 1982.*

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| --- | --- |
| 0 | ground predominantly covered by ice  |
| 1 | compact/wet snow (with or without ice) covering less than 1/2 the ground  |
| 2 | compact/wet snow (with or without ice) covering at least 1/2 the ground  |
| 3 | even layer of compact or wet snow covering ground completely  |
| 4 | uneven layer of compact or wet snow covering ground completely  |
| 5 | loose dry snow covering less than 1/2 the ground  |
| 6 | loose dry snow covering at least 1/2 the ground (not completely)  |
| 7 | even layer of loose dry snow covering ground completely  |
| 8 | uneven layer or loose dry snow covering ground completely  |
| 9 | snow covering ground completely; deep drifts  |

*Table 4: State of ground code used with snow or ice cover from January 1982.*

1. **Snow depth**

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| --- | --- | --- |
| **Register heading** | **Period of observations** | **Notes** |
| 9h snow depth – total | Jan 1960-Dec 1970 | Total depth of lying snow at 0900 GMT (inches). |
| 9h snow depth - fresh | Jan 1960-Dec 1970 | Fresh depth of lying snow at 0900 GMT (inches) – i.e. snow that has fallen since 0900 GMT the previous day. |
| 9h snow depth – total | Jan 1971- | Total depth of lying snow at 0900 GMT (cm). |
| 9h snow depth - fresh | Jan 1971-Oct 1982 | Fresh depth of lying snow at 0900 GMT (cm) – i.e. snow that has fallen since 0900 GMT the previous day. |

1. **Weather, present and past**

| **Register heading** | **Period of observations** | **Notes** |
| --- | --- | --- |
| Weather At. | Dec 1910-Oct 1921 | Weather at observation time using Beaufort notation (note that some differences exist between the early notation and that applicable in 2013). This ‘dr’ denotes drizzle, ‘h’ haze and ‘\*’ snow on occasions. |
| Weather since last observation | Dec 1910-Oct 1921 | Weather since the previous observation time using Beaufort notation (note that some differences exist between the early notation and that applicable in 2013). The use of uppercase letters does not necessarily mean ‘heavy’ phenomena. |
| Remarks | Dec 1910-Oct 1959 | Additional comments, including references to thunderstorms, gales and optical phenomena for example. In 1918 a more complete description of the weather starts to appear on some dates. |
| Weather since midnight or previous observation (A) | Nov 1921-Oct 1959 | Beaufort notation – it not always clear that (A) and (B) are used to specify the weather in different time periods, especially before about 1930. |
| Weather from last observation of the day to midnight (B) | Nov 1921-Oct 1959 | Beaufort notation – it not always clear that (A) and (B) are used to specify the weather in different time periods, especially before about 1930. In addition, comparing the observation to the remarks column (in the case of evening thunderstorms, for example) it seems that the observation needs to be thrown back to the previous day (i.e. it is written at the time of the morning observation). |
| Weather at time of observation | Nov 1921-Oct 1959 | Weather at observation time using Beaufort notation (note that some differences exist between the early notation and that applicable in 2013). Thus ‘dr’ denotes drizzle, ‘h’ haze and ‘\*’ snow on occasions. |
| Present weather | Nov 1959-Jun 1978 | Specified using Beaufort notation. Intermittently, but daily towards the end of 1977, the description is amplified by use of the two-digit SYNOP code form for current weather (table 5). |
| Present weather | Jun 1978- | Specified using the two-digit SYNOP code form for current weather (table 5). |
| Weather diary and remarks | Nov 1959- | A description of the weather during the calendar day. |
| Day of snow sleet | Jan 2009- | An entry of 5 indicates that snow (and maybe also sleet) was seen to fall during the day (00-24 GMT) while an entry of 1 indicates that sleet (but no snow) was observed in the same period. |
| Day of hail | Jan 2009- | The largest applicable entry for the day is shown, the entry being one of 4 (ice pellets/hail of less than 5 mm diameter), 5 (hail of 5 to 9 mm diameter), 6 (hail of 10 to 19 mm diameter), or 7 (hail of more than 20 mm diameter). The entry refers to the period 00-24 GMT. |
| Day of gale | Jan 2009- | An entry of 1 indicates that the 10-min average wind speed at 10 metres reached (or was estimated to have reached) 34 knots during the period 00-24 GMT. |
| Day of thunder | Jan 2009- | An entry of 1 indicates that thunder was heard in the period 00-24 GMT. No entry is made if lightning was seen, but no thunder was heard. |



*Table 5: SYNOP code representation of current weather conditions; in the event that two codes apply, the higher value is used.*

1. **Soil and earth temperatures**

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| **Register heading** | **Period of observations** | **Notes** |
| Earth thermometers 6” | Dec 1910-Dec 1911 | Soil temperature at a depth of 6 inches (15 cm). It is assumed this is under bare soil. |
| Earth thermometers 12” | Dec 1910-Oct 1921 | Soil temperature at a depth of 12 inches (30 cm). It is assumed this is under a grass surface. |
| Earth thermometers 24” | Jan 1911-Oct 1921 | Soil temperature at a depth of 24 inches (60 cm). It is assumed this is under a grass surface. |
| Temperature in ground 1 foot | Nov 1921-Dec 1970 | Soil temperature at a depth of 1 foot (30 cm). It is assumed this is under a grass surface. |
| Temperature in ground 2 feet | Nov 1921-May 1924 | Soil temperature at a depth of 2 feet (61 cm). It is assumed this is under a grass surface. |
| Temperature in ground 4 feet | Jun 1924-Dec 1970 | Soil temperature at a depth of 4 feet (122 cm). It is assumed this is under a grass surface. |
| Temperature in ground 2 feet | Jan 1961-Dec 1970 | Soil temperature at a depth of 2 feet (61 cm). It is assumed this is under a grass surface (°F). |
| Temperature in ground at depth 30 cm | Jan 1971-Dec 1971 | Soil temperature at a depth of 30 cm. It is assumed this is under a grass surface (°F). |
| Temperature in ground at depth 50 cm | Jan 1971-Dec 1971 | Soil temperature at a depth of 50 cm. It is assumed this is under a grass surface (°F). |
| Temperature in ground at depth 100 cm | Jan 1971-Dec 1971 | Soil temperature at a depth of 100 cm. It is assumed this is under a grass surface (°F). |
| Temperature in ground at depth 10 cm | Mar 1972- | Soil temperature at a depth of 10 cm. It is assumed this is under a bare soil surface (°C). |
| Temperature in ground at depth 20 cm | Mar 1972-Jan 2009 | Soil temperature at a depth of 20 cm. It is assumed this is under a bare soil surface (°C). |
| Temperature in ground at depth 30 cm | Jan 1972- | Soil temperature at a depth of 30 cm. It is assumed this is under a grass surface (°C). |
| Temperature in ground at depth 50 cm | Jan 1972-Jan 2009 | Soil temperature at a depth of 50 cm. It is assumed this is under a grass surface (°C). |
| Temperature in ground at depth 100 cm | Jan 1972- | Soil temperature at a depth of 100 cm. It is assumed this is under a grass surface (°C). |

Temperatures at a depth of 10 cm and 20 cm were made with right-angled bent stem thermometers, while those made at depths of 30 cm/1 foot or more were made using Symons-type thermometers on a chain suspended in a tube.

1. **Visibility**

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| **Register heading** | **Period of observations** | **Notes** |
| Visibility | Jun 1960-Jun 1978 | Visibility represented by code values in code table 2. In Jan 1978 the visibility is also shown using code table 6. |
| Visibility | Jun 1978-  | Visibility represented by code values in code table 7. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Visibility | Code |  | Visibility | Code |
| 25 m | A |  | 4 km | H |
| 50 m | B |  | 7 km | I |
| 100 m | C |  | 10 km | J |
| 200 m | D |  | 20 km | K |
| 400 m | E |  | 30 km | L |
| 1 km | F |  | 40 km | M |
| 2 km | G |  |  |  |

*Table 6: Visibility codes used prior to June 1978.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Visibility | Code |  | Visibility | Code |
| < 20 m | X |  | 1000-1900 m | 4 |
| 20-39 m | E |  | 2-4 km | 5 |
| 40-90 m | 0 |  | 5-9 km | 6 |
| 100-190 m | 1 |  | 10-19 km | 7 |
| 200-390 m | 2 |  | 20-39 km | 8 |
| 400-900 m | 3 |  | >=40 km  | 9 |

*Table 7: Visibility codes used from January 1978.*

1. **Run of the wind**

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| --- | --- | --- |
| **Register heading** | **Period of observations** | **Notes** |
| 9h-9h run of wind: cup counter reading | Nov 1960-Jul 1971 | Run of wind at a height of 25 feet (miles). |
| 9h-9h run of wind: diff from previous day | Nov 1960-Jul 1971 | The value of today’s run of wind minus yesterday’s value (miles) at a height of 25 feet. Also shown is the hourly-mean value. From October 1969 to January values are estimated from a Munro wind recorder record and the cup counter reading is, therefore, not specified. |
| 9h-9h run of wind: cup counter reading | Mar 1968-Apr 2003 | Run of wind at a height of 2 metres (miles). From Nov 1977 the daily run of wind in units of kilometres is also shown in this column. |
| 9h-9h run of wind: diff from previous day | Mar 1968-Apr 2003 | The value of today’s run of wind minus yesterday’s value (miles) at a height of 2 metres. Also shown is the hourly-mean value. |
| 9h-9h run of wind: cup counter reading | Jul 1971-Feb 1972 | Run of wind at a height of 25 feet (nautical miles). |
| 9h-9h run of wind: diff from previous day | Jul 1971-Feb 1972 | The value of today’s run of wind minus yesterday’s value (nautical miles) at a height of 25 feet. Also shown is the hourly-mean value in knots (black) and miles (red). |
|  | 16Feb1972-29Feb1972 | There are no registers available for this period – instead the daily observation sheets are shown. These include some observations that are not shown in the pocket registers. |
| 9h-9h run of wind: cup counter reading | Apr 2003-Dec 2008 | This is not specified as the instrument in use could be reset at observation time – the reading is shown as the run of wind difference in the next column. The daily run of wind at a height of 2 metres in units of kilometres is shown in this column. |
| 9h-9h run of wind: diff from previous day | Apr 2003-Dec 2008 | The value of the run of wind read today at a height of 2 metres converted to units of miles is shown. Also shown is the hourly-mean value (miles per hour). |

Note that the run of wind, when reported as the difference between 09 GMT on successive days, is said to occur on the date of the starting 09 GMT time, not the ending 09 GMT time as most of the intervening 24-hour period occurs on the former day.