Index

Absolute humidity, 184
Access and security, 163
Accuracy, 47, 63
Accuracy versus precision
  Humidity, 190
  Precipitation measurements, 162
  Sunshine and solar radiation sensors, 266
  Wind sensors, 208
Air conditioning - and pressure sensors, 171
Air frost, 222, 344
  Definition, 300
Air temperature
  See Temperature
Alter wind shield, 154
Altitude. *See* Metadata
American Meteorological Society, 423
Analogue input, 286
Analogue output, 409
Analysis and presentation of AWS data, 337
Anemometer, 196
  Cup, 196
  Distance constant, 414
  Effective height, 214
  Handheld, 203
  Propeller or windmill type, 199
  Response length λ, 415
  Sonic, 200
  Starting speed, 201
  System description, 410
Aneroid barometer, 169
APRSWXNET, 381. *See* Citizen Weather Observer Program
Archive interval, 284, 335, *See* Logging interval
Archiving data to e-mail, 346
Armagh Observatory, Northern Ireland, 22
ASCII format files, 336
ASOS – Automated Surface Observing System, 97
Aspirated screens, 93, 106
  Advantages, 107
  Davis Instruments FARS shield, 111
Atmospheric pressure. *See* Pressure
Australia, 128
  Bureau of Meteorology, 374
  Bureau of Meteorology voluntary observer network, 387
  Bureau of Meteorology website, 374, 392
  Climate data, 374
  Meteorological and Oceanographic Society, 424
  Satellite estimation of solar radiation, 241
  World record wind speed, 207
Automatic weather stations. *See* AWS
Averages and extremes, 351
  Long-period climate data, 374
AWEKAS (Automatisches WEtterKArten System), 382
AWS
  Accuracy and precision, 46
  Advanced systems, 72
  Advantages and disadvantages, 34
  Archiving records, 336
  Backup, 345
  Backup systems, 39
  Battery backup, 41
  Best-selling systems, 60
  Budget categories, 32
  Budgeting, 52
  Cairn Gorm, Scotland, 205
  Categories, 55
  Choice of, 32
  Climatological continuity, 51
  Collecting and storing data, 335
  Computing facilities and expertise, 51
  Connections – cabled or wireless?, 42
  Data analysis and presentation, 337
  Data file sizes, 337
  Data volumes, 336
  Definition, 7
  Degree of automation sought, 46
  Development in 20th century, 14
  Ease of setting up, 51
  Elements to be measured, 39
  Expansion options, 41
  Export data function, 336
  Exposure considerations, 38
  Hardware survey, 75
  Hooke's weather-clock of 1679, 9
  Legality of altering records, 338
  Logging interval, 48

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-02681-0 — The Weather Observer's Handbook
Stephen Burt
Index
More Information

AWS (cont.)
Longevity, 64
Portable, 69, 70, 71
Power, 52
Purchasing, 55
Radiation shield, 93, 105
Reliability measures, 40, 48
Sampling interval, 48
School weather studies, 29
Schools, colleges and universities, 5
Selection and decision criteria, 37
Sensor accuracy, 67
Sensor choice, 42
Sensor exposure, 39
Single-element systems, 61
Software, 283
Cumulus, 290
Most popular (2011 survey), 289
Virtual Weather Software, 289
Weather Display, 291
Weather Link, 292
Weather Underground, 292
Software suppliers, 434
Software survey, 75, 282, 289, 336
Software comparison, 290
Support options, 56
Transition from traditional instruments, 26
User profiles, 56
Uses of, 33
Website, 378
Working lifetime, 48
AWS datasets
Hourly, daily and monthly examples, 338

Backup, 337, 344, 345, 346, 353
Backup software, 345
Bare soil minimum temperature, 226
Barograph, 11, 169, 171
Barometric pressure. *See* Pressure
Battery backup, 41, 283, 288
Beaufort wind scale, 203, 204, 358
Wind speed equivalents, 203
Belfort Instrument Company, 151
Binary coded input to datalogger, 286
Blank cells. *See* Missing data convention
Blogs and newsgroups, 383
Blue Hill Observatory, Massachusetts, 25, 257
British Rainfall, 376, 392
Bubbling (of spirit minimum thermometers), 226
Budget, 52
Budget systems, 64
Buying a weather station, 55
One-minute summary, 74

Cabled connections
Cable specifications, 45
Screened cable, 45
Cadiz Royal Observatory, Spain, 258
Cairn Gorm AWS, 205
Calibration, 304
Absolute and comparative methods, 307
Anemometer, 320
Drift, 304, 318, 415
Humidity sensors, 188–189
Pressure sensors, 319
Earth temperature sensors, 229
Humidity sensors, 189, 318
Inclusion in archived files, 338
Interval, 309
One-minute summary, 320
Other sensors, 320
Portable calibration reference units, 69
Pressure sensors, 176, 180, 319
Raingauge, 304
Raingauge measuring cylinder, 306
Solar radiation and sunshine sensors, 258
Temperature, 310
Temperature sensors, 307
Multiple points, 309
Tipping-bucket raingauge
Variation with rainfall intensity, 305
Wind sensors, 208
Calibration check, 64, 69
Calibration table, 309
Calibration table, thermometer, 310, 314, 315
Calibration thermometer, 309
Calm, 202
Campbell Scientific, 33, 57–58, 70–73, 105, 429
Campbell-Stokes sunshine recorder, 245, 246, 249, 258
Disadvantages, 247
Canada, 128
Climate data, 374
Canadian Meteorological and Oceanographic Society, 423
CD-ROM. *See* Backup
Celsius (unit of temperature), 89
Celsius, Anders, 17
Central England Temperature (CET) series, 15
Central European Time (CET), 271
Central Park, New York, 25, 375
Chilterns Observatory Trust, 336, 346, 428
Chinese Meteorological Society, 424
Choosing a weather station
One-minute summary, 53
Citizen Weather Observer Program (CWOP), 381
Civil day, 273, 278
Class sizes. *See* Microsoft Excel
Climatological continuity, 51
Climatological Day, 274, 294
Climatological Observers Link
Forum, 384
Climatological Observers Link (COL), 81, 280, 336, 344, 376, 384, 392, 428
Web Forum, 384
Shelter assessment, 83
Site grading scheme, 81, 82
Cloud amount and type/s, 296

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-02681-0 — The Weather Observer's Handbook
Stephen Burt
Index
More Information

Cloud storage, 346
CoCoRaHS, 385
Collecting and storing data, 335
  One-minute summary, 346
Comma Separated Variable (CSV) files, 336
Communication options (datalogger), 288, 289
Components of a measurement system, 409
Computer connection. *See* PC connection
Concrete minimum temperature, 226
Conditional formatting. *See* Microsoft Excel
Cooperative Observer Program (COOP), 388
Coordinated Universal Time (UTC), 271
Cotton Region Shelter, 94
Cumulus AWS software, 289, 290
Cup anemometer, 196. *See* Anemometer
CWOP, 291, 381. *See* Citizen Weather Observer Program

Daily dataset layout and format, 342
Daily observational routine, 295
Data archiving. *See* Collecting and storing data
Data display, 289, 409
Data loss risks from datalogger failure, 288
Data management and analysis, 348
Data storage, 409
Data transmission, 409
Data volumes. *See* AWS: Data volumes
Datalogger, 282
  Alternatives to, 287
  Battery backup, 283
  Communication options, 288
  Dedicated, or PC, 45
  Download interval vs memory capacity, 285
  Download schedule, 289
  Event-based, 284
  Input types, 286
  Memory, 73, 284
  Physical capacity, 73
  Power supply, 283
  Programming, 287
  Risks, 288
  System design, 410
  Time-based, 284
  Tinytag, 285
Datalogger basics, 282
Dataloggers and AWS software
  One-minute summary, 292
Date
  Formatting options, 340
Date conventions, Europe and US styles, 290
Davis Instruments, 33, 60, 66, 429
  Anemometer and Hurricane *Andrew*, 1992, 207
  Estimation of sunshine duration, 256
  Fan-assisted radiation shield (FARS), 111
  Passive radiation screen, 105
  Solar radiation sensor, 238
  Vantage Connect, 292
  Vantage Pro2, 57–58, 60, 66, 75, 220
    Raingauge calibration, 306
  Vantage Vue, 57–58, 65, 75
  WeatherLink software, 292, 337, 345
Davis Instruments FARS shield, 111
Day maximum / night minimum, 275
Daylight Savings Time, 271
  Advantages of consistent regional time, 272
Days with, 298, 343
  Definitions, 299
Dependent variables, 357
Dew point
  Electrical sensors, 188
Dew point and human comfort, 187
Dew point temperature, 183, 184
Dewfall in raingauge, 300
Diamond dust. *See* Ice crystals
Diffuse solar radiation, 235
Digital or pulse inputs to datalogger, 286
Direct solar radiation, 235
Distance constant. *See* Anemometer
Distilling observations, 339
Dropbox, 346
Dry bulb temperature, 116, 183
Dynamic performance, 412

Earliest weather observations, 7
Earth temperatures
  Logging interval, 230
  One-minute summary, 230
  Standard depths and measurement methods, 228
Effective height (anemometer), 214
Electronic sunshine sensor, 245, 249
  Operating principles, 249
E-mail as data archive, 346
Entry-level systems, 61
Environment Canada, 374
Error checking, 338
European Meteorological Society, 425
Event-based datalogger, 284
Event-based rainfall logging, 157
Exporting AWS data, 336
Exposure, 76, 415
  Air temperature and rainfall, 77
  Assessing and grading, 81
  Assessing shade impact on solar radiation sensors, 261
  Definition, 76
  Differing requirements by sensor, 76
  Earth temperature sensors, 229
  Shelter ratio, 81
  Site survey, 78
  Solar radiation and sunshine sensors, 260
  Summary requirements by element, 79
  Sunshine, 77
  Urban profile, 81, 84
  Website information, 380
  Wind instruments, 77, 195, 208

Fahrenheit (unit of temperature), 89
Fine Offset, 57–58, 60, 430
Fischer & Porter weighing raingauge, 151
Five-inch raingauge, 391
Float raingauge, 148

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-02681-0 — The Weather Observer's Handbook
Stephen Burt
Index
More Information

Fog
  Definition, 296, 301
  Thick (definition of), 301
Foster-Foskett sunshine switch, 245, 250, 257
  Cessation of records, 251
  Threshold, 250
France
  Raingauge network, 130
  Société Météorologique, 426
Franklin, Benjamin, 388

Gale
  Definition, 299
Gemini Instruments, 69, 430
Geonor weighing-bucket raingauge, 151
Germany
  Deutsche Meteorologische Gesellschaft, 426
  Raingauge network, 130
Gifts - weather stations as gifts, 59
Global solar radiation, 235
GMT, 271
Google Earth, 323
Grass minimum, 222
  Daytime exposure, 226
  Depression, 224
  Exposure, 223
  Logging interval, 227
  One-minute summary, 230
  Sensor requirements, 223
  Terminal hours, 273, 278
Greenwich Mean Time (GMT), 271
Ground frost, 222, 344
  Definition, 222, 300
Gust ratio, 198
Gust speeds, 194
Gusts
  Archiving gust speeds, 343
  Corrections for height, 213
  Definition, 198
  Measurement, 198
  Sampling interval, 48, 198

Hail
  Definition, 300
Hailgauge, 300, 301
Hair hygrograph. *See* Hygrograph
Handheld anemometer, 203
Heat index formulae, 187
Height corrections
  Wind sensors, 213
Hohenpeißenberg, Germany, 20
Holm, John Campanius – weather records 1644–5, 7
Hong Kong
  Meteorological Society, 424
  Observatory, 109–110
Hooke, Robert, 8, 9
  Weather clock of 1679, vi, 151
Hot days, 344
Hourly data spreadsheet, 339
Hourly dataset layout and format, 340
Howard, Luke, 9
Humidity, 183
  Accuracy versus precision, 190
  Calculation by datalogger, 191
  Comfort levels, 186
  Definition, 183
  Electrical sensors, 187
  Hygroscopic effects on sensors, 189
  Hysteresis, 414
  Logging requirements, 189
  Measurement, 185
  Mixing ratio, 184
  One-minute summary, 190
  Online calculator, 185, 191
  Sensor filter, 188, 189
  Sensors
    Calibration drift, 188–189
  Site and exposure requirements, 188
  Terms, 183
  Tracking airmasses, 186
  Variation with temperature, 184
  Ventilation effects, 191
Hygrograph, 186
Hysteresis, 414

Ice crystals, 300
Ice days, 344
Ice needles. *See* Ice crystals
Ice pellets, 299
Ice prisms. *See* Ice crystals
Ice/water calibration, temperature sensors, 308
Ice-bulb, 186
Ice-point calibration, 225
iDrive, 346
Illuminance, 236
India
  Raingauge network, 130
Indian Meteorological Society, 424
Information exchange, 384
Infrared radiation, 234
Installation
  Safety, 78
Instromet sunshine recorder, 251
Instromet Weather Systems, 431
Ireland
  Met Éireann co-operating observer network, 391
  Irish Meteorological Society, 427
  Raingauge network, 130
Irradiance, 236

Japanese Meteorological Society, 424
Jefferson, Thomas, 388
Jordan photographic sunshine recorder, 245, 257

Kestrel 4000 portable AWS, 71
Kestrel portable AWS, 203
Kipp & Zonen, 240, 431
  CMP3 pyranometer, 240
  CSD sunshine recorder, 249, 253
Knot, 194
Koninklijk Nederlands Meteorologisch Instituut (KNMI), 374

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-02681-0 — The Weather Observer's Handbook
Stephen Burt
Index
More Information

La Crosse, 33, 56–58
Lag. *See* Sensor lag
Latitude and longitude. *See* Metadata
Legal isues when altering AWS data, 338
Lightning risks, 80, 212, 288
Linear system, 411
Linux software, 283
Liquid-in-glass thermometers, 115
Local Apparent Time (LAT), 266
Local time, 271
Logging interval, 48, 284
  Earth or soil temperature, 227, 230
  Grass minimum, 227
  Multiple, 335
Logging requirements
  Solar radiation and sunshine sensors, 265
  Wind sensors, 217
London Grid for Learning (LGfL), 382
Long-period weather records, 14
  Armagh Observatory, Northern Ireland, 22
  Blue Hill Observatory, Massachusetts, 25
  Central England Temperature (CET) series, 15
  Central Park, New York, 25
  Chapel Hill, North Carolina, 24
  Des Moines, Iowa, 24
  Hohenpeißenberg, Germany, 20
  Milan, Italy, 19
  Minneapolis, Minnesota, 24
  Padua, Italy, 17
  Philadelphia, Pennsylvania, 24
  Prague, Czech Republic, 19
  Radcliffe Meteorological Station, Oxford, England, 23
  San Francisco, California, 24
  Stockholm, Sweden, 17
  Subiaco Abbey, Arkansas, 26
  Uppsala, Sweden, 16
Lookup table. *See* Microsoft Excel
Louvred screen
  Stevenson screen and Cotton Region Shelter, 94

Manley, Gordon, 15, 26
Mannheim hours, 21
Manual observations, 294
  Inclusion in datasets, 342
  Storing, 336
Maplin Electronics AWS, 33, 57–58
Maring-Marvin thermoelectric sunshine sensor, 250, 257
Marvin sunshine sensor. *See* Maring-Marvin
Maximum air temperature, 342
Maximum and minimum air temperatures, 118
  Terminal hours, 273
Maximum and minimum thermometers
  Calibration, 313, 314
Maximum Minimum Temperature System (MMTS). *See* MMTS
Maximum temperature
  Day maximum, 276
  Period of, 274
Maximum thermometer, 116
  Resetting, 117
Medici network, 14
Memory
  Datalogger, 284
Memory stick. *See* Backup
Memory, non-volatile, 282
Mercury
  Safety restrictions, 169
Mercury barometer, 169
Merle, William – weather diary 1337–44, 7
Met Éireann, 391
Met Office
  Archives and National Meteorological Library, 376
  Data Policy, 375–376
  Weather Observations Website (WOW), 291, 382
Metadata, 322, 323
  Definition, 322
  Elements to include, 322
  Example documentation, 322
  Examples, 326, 327
  Format, 323
  Importance, 322
  Observing hours, 323
  One-minute summary, 326
  Site location details, 323
  Website information, 379
  WMO guidelines, 322
METAR, 381
Metrology, 409
Metspec, 96, 431
Microsoft Excel, 337, 348, 349
  Autosave, 353
  Class sizes, 360
  Climatological functions, 351
  Conditional formatting, 358, 359
  Dataset sizes, 356
  Examples of climatological analyses, 361
  Filtering, 356
  Functions, 355
  Graphing, 351
  Lookup table, 357, 358
  Pivot tables, 361
  Sorting, 353
  Tips, 351, 353, 360
Mid-range AWS systems, 66
Milan, Italy, 19
Minimum temperature
  Air or screen minimum, 114, 342
  Bare soil minimum, 226
  Concrete minimum, 226
  Grass minimum, 222
  Night minimum, 276
  Tarmac minimum, 226
Minimum thermometer, 116
  Resetting, 117
Missing data convention, 338
Mission-critical systems, 50
MMS – Meteorological Monitoring System, 99

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-02681-0 — The Weather Observer's Handbook
Stephen Burt
Index
More Information

MMTS – Maximum-Minimum Temperatures System, 97
Monthly data spreadsheet, 344
Monthly Weather Report, 376
Morning observation, 294
Mount Washington Observatory, New Hampshire, 207
Mt Everest AWS, 3

National Climatic Data Center (NCDC), 375, 388
National Weather Service (NWS), 388
Netherlands
  Climate data, 374
  Raingauge network, 130
New Zealand
  Climate data, 375
New Zealand Meteorological Society, 425
Nielsen-Kellerman, 33, 60, 432
Nipher wind shield, 153
Non-instrumental weather observing, 294
  One-minute summary, 302
Non-volatile memory, 282
North – finding True North, 216
North wall exposure, 63

Observations at set times, 294
Observing hours and time standards, 271–272
  Air temperatures, 120
  Metadata, 324
  One-minute summary, 280
Occurrence frequencies, 298
Okta, 296
One-minute summary
  All chapters combined, 393
Optical raingauges, 152
Oregon Scientific, 33, 57–58, 60, 432
Overlapping traditional and AWS records, 51
Oxford, Radcliffe Meteorological Station, 23, 258

Padova (Padua), Italy, 17
PC connection, 62
Percentage of maximum possible sunshine, 234, 245
Period of record, 324. *See* Metadata
Photographic weather records, 298
Photographs. *See* Metadata
  Site and instruments, 323
Photometric measures, 236
Pivot tables. *See* Microsoft Excel
Planning permission (wind instruments), 211
Platinum resistance thermometer (PRT), 117, 118, 411
  Calibration, 309
Portable calibration reference units, 69
Portable weather stations, 69
Power supply for dataloggers, 283
Prague, Czech Republic, 19
Precipitation
  Accuracy of measurements, 125
  Accuracy versus precision, 162
  Australia, 128
  Canada, 128
  Definition, 125
  Ireland, 128
  Long-period rainfall records, 128
  Measurement, 124
  Measurement and observing standards, 163
  Observation times, 127, 163
  Shelter effects, 125
  Site and exposure requirements, 130
  Snowfall equivalents, 160
  Splash height, 126
  Terminal hours, 279
  'Throwing back', 163
  Traces, 136
  United Kingdom, 128
  United States, 128
  Units, 125
    Litres per square metre, 125
  Variability, 124
  Worldwide raingauge networks, 127
Precipitation gauges. *See* Raingauges
Precipitation measurement
  One-minute summary, 164
  Reference method, 304
Precision versus accuracy, 47, 180, 304
Present weather
  WMO code, 297
Present weather sensors. *See* Optical raingauge
Preserving your observations, 344
Pressure, 167
  Altitude corrections for aviation, 180
  Aneroid barometer, 169
  Aviation Q codes, 173
  Barometer correction table, 175, 177, 179
  Calibration, 180
  Calibration drift, 171, 319
  Correction for altitude, 173
  Definition, 167
  Electronic pressure sensor, 170
  Hours of observation, 180
  Logging requirements, 172
  London records, 1692 onwards, 169
  Mean Sea Level (MSL), 167
  Measurement, 168
  Mercury barometer, 169
  One-minute summary, 181
  Paris records, 1670 onwards, 169
  Precision versus accuracy, 180
  Semi-diurnal cycle, 180
  Sensor exposure and restrictions, 170
  Sensors, 171
  Static port, 171
  Station level pressure (SLP), 173
  Terminal hours, 273
  Units, 169
  Wind effects, 172
Privacy, in metadata descriptions, 323
Programming dataloggers, 287
Providing observations to official bodies, 385
Psychrometer (dry- and wet-bulb), 185
Pulse inputs to datalogger, 286
PWSweather, 382

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-02681-0 — The Weather Observer's Handbook
Stephen Burt
Index
More Information

Pyranometer, 237, 258
  Estimates of sunshine duration, 255, 417
  Exposure, 261
  Key specifications, 239
  Performance in darkness, 241
Pyrheliometer, 236, 244, 258

Q codes, 173
  QFE, 173
  QFF, 174
  QNH, 174

Radcliffe Meteorological Station, Oxford, England, 23
Radiation shield. *See* Thermometer screen
Radio frequency interference (RFI), 288
  RFI choke, 288
Radiometric measures, 236
Rain day
  Definition, 300
Rain days, 344
Raingauge
  Accessories required, 156
  Aerodynamic, 156
  Agreement between raingauges, 143
  Calculating funnel capacity, 306
  Calibration, 156, 304
  Capacity, 140
  Combination tipping-bucket – weighing models, 151
  Country densities, 130
  Design, construction and materials, 127
  Eight-inch, 305
  Event-based rainfall logging, 157
  Five-inch, 138, 305
  Float gauges - Dines tilting-siphon gauge, 149
  Ground-level or pit gauge, 126, 130, 153
  Height above ground, 126
  Height of the raingauge rim, 133
  Importance of level rim, 127
  Logging requirements, 157
  Manual, 136
  Measuring cylinder, 139
  Optical, 152
  Recording, 141
  Shallow-funnel type, 139
  Shelter height-distance ratio, 133
  Tipping-bucket, 42, 141, 411
    Common problems, 144
    Loss in high-intensity rainfall events, 146
    Snowfall, 144
    Stray pulses, 148
  Types, 128, 135
  U.S. plastic model, 137
  U.S. standard, 136
  UK and Ireland standard, 138
  Vibrating-wire, 151
  Weighing, 150
  Wind effects, 153
  Wind shield, 153
    Alter, 154
    Nipher, 153
    Small Double Fence Intercomparison Reference, 155
    Tretyakov, 155
    Turf wall, 156
    WMO Double Fence Intercomparison Reference, 155
Raingauge suppliers. *See* Appendix 4
Raspberry Pi PC, 283
Relative Humidity (RH), 183, 184
Resistance Temperature Devices (RTDs), 117
Response length λ, 415
Response time, 412, 413. *See also* Time constant
  Thermometer screens, 412
  Wet bulb thermometer, 186
Responsiveness
  In air temperature measurements, 114
Riming, 205
Robinson, Thomas Romney, 22
Roughness length z_0, 213
Royal Meteorological Society, 385, 428

Safety, 78, 264, 265
  Installing and maintaining weather instruments, 209
Sample Excel data templates, 340
Sampling and logging intervals, 335
Sampling interval, 48, 284
  Budget systems, 65
  Mid-range systems, 68
  Wind gusts, 48, 199, 217
Sandaysoft, 383
Satellite estimation of solar radiation, 241
Scalar wind speed. *See* Wind speed
Screen. *See* Thermometer screen
Screened cable, 45
Sensor (definition), 409
Sensor characteristics, 411
Sensor comparisons, 415
Sensor lag, 412, 415
Sensors
  Specifications, 57–59
Serial port. *See* PC Connection
Setting a barometer. *See* Pressure: Correction for altitude
Sharing observations, 378
  One-minute summary, 391
Shelter Effects
  On air temperature measurements, 92
  On precipitation measurements, 125
  On sunshine and solar radiation measurements, 260–261
Shelter ratio, 81
Signal processing, 409
Site, 76
  Access restrictions, 80
  Definition, 76
  Description, 324
  Geographical context, 324
  Map, 323. *See also* Metadata
  Security, 264
Site and exposure, 63

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-02681-0 — The Weather Observer's Handbook
Stephen Burt
Index
More Information

Site and exposure (cont.)
One-minute summary, 85
Requirements and tolerance, 130–135
Six, James
Maximum-minimum thermometer, 9
Skin temperature. *See* Grass minimum temperature
Smartphones, 378
Smithsonian Institution, 24
Snow core measurements, 161
Snow depth measurements, 160
Snow grains, 299
Snow lying
Definition, 300
Snow or sleet
Definitions, 299
Snow pellets, 299
Snowdon raingauge, 138
Snowfall
Measurements with recording raingauges, 162
Precipitation measurements, 160
Procedure for grass-tip thermometers, 225
Snowfall equivalents of precipitation, 160
Snowfall measurement, 159
Societas Meteorologica Palatina observation network, 20
Soil temperature. *See* Earth temperature
Solar and terrestrial radiation wavelengths, 234
Solar constant, 235
Solar elevation diagram, 261
Solar power, 52
Solar radiation
Atmospheric absorption, 235
Daily totals (derivation of), 265
Definitions, 233
Direct
Measurement, 236
Estimation from satellites, 241
Global
Measurement, 237
Sensors, 238
Terminal hours, 273
Units, 234
Solar radiation and sunshine sensors, 232
Calibration, 258
Exposure
Levelling, azimuth and latitude adjustments, 264
Logging requirements, 265
Measurement methods, 235
One-minute summary, 267
Site and exposure requirements, 260
Time standards, 266
Solar UV Index (UVI). *See* Ultraviolet
Solarimeter. *See* Pyranometer
Sonic anemometer, 200, 201
Spares, 69
Specific humidity, 184
Starting speed (anemometer), 201
Static performance, 411
Static port, 171. *See* Pressure
Stefan's law, 234
Stevenson screen, 9, 10, 93, 94, 412
Plastic (Metspec), 96
Stevenson, Thomas, 10, 94
Stockholm, Sweden, 17
Storage media lifetimes, 345
Strathfield Turgis
Raingauge comparisons, 134
Thermometer screen comparisons, 11
Subiaco Abbey, Arkansas, 26
Summer Time, 271. *See also* Daylight savings time
Sunshine
Definition, 242
Estimates from pyranometer, 255
Percentage of maximum possible, 234, 245
Terminal hours, 273
Sunshine and solar radiation, *See* Solar radiation and sunshine sensors
Sunshine recorder, 245
Blake-Larsen, 254
Campbell-Stokes, 246
Comparison between types of, 255
Exposure, 260
Foster-Foskett, 250
Haenni, 254
Instromet, 251
Jordan, 245
Kipp & Zonen, 253
Principles, 236
Threshold, 245
Sunshine records
Compatibility over time, 257
Sunshine records using a pyranometer, 417
Suppliers of meteorological instruments. *See* Appendix 4
Support (from supplier or manufacturer), 56
Switzerland
Raingauge network, 130
System setup and configuration, 289

Tarmac minimum temperature, 226
Technical support, 56
Technoline, 33, 56–58, 62
Temperature, 89
Air
Site and exposure requirements, 91
Standard observing periods, 274
Air temperature measurements – One-minute summary, 120
Aspirated, 93
Definition, 89
Earth temperatures, 228
Effects of shelter, 92
Factors influencing air temperature, 90
Grass and Earth, 222
Height above ground, 91
Hours of observation, 91
Logging requirements, 119
Measuring air temperature, 89
Radiation shield, 66, 67
Representative measurements, 93

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-02681-0 — The Weather Observer's Handbook
Stephen Burt
Index
More Information

Sampling and logging intervals, 114
Sensor response time, 412
Sensor shielding, 63
Sensors, 115
Units, 89
Terminal hours, 272, 313
Civil day, 273
Climatological day, 274
Differences in extreme temperatures, 277
Effects on mean temperature, 278
Grass minimum, 278
Incompatibility in temperature observations, 276
Precipitation, 279
Survey of, 280
Synoptic observations, 275
Variation by element, 273
Wind observations, 219
Thermistor, 117, 119
Thermograph, 11, 119
Thermometer
Calibration checks, 117
History, 8
Mechanical sensors, 119
Resistance Temperature Devices (RTDs), 117
Sheathed, 116
Thermometer screen, 93
Blackened interior, 105
Campbell Scientific Met21 screen, 70, 105
Choosing, 113
Comparisons, 94, 112
Cotton Region Shelter, 94–96
Davis Instruments passive screen, 105
Differences between types, 109
In hot, dry climates, 110
Installation and maintenance, 103
Response time, 412
Self-assembly, 103, 104
Stevenson screen, 94–97
Thatched, 109
Thermopile. *See* Pyranometer
Thick fog, 301
Throwing back
Maximum temperature, 274, 342
Precipitation, 163, 279
Thunder heard
Definition, 299
Tilting-siphon rain recorder, 149
Time constant, 114, 412
Time periods for daily observations. *See* Terminal hours
Time standards and terminal hours, 271
Time-based datalogger, 284
Tinytag logger, 69, 285, 310
Earth temperature sensor, 230
Use in calibration, 310
Tipping-bucket raingauge, 141, 411
Calibration, 304
Invention, 9
Upgrading, 42
Tornado and Storm Research Organisation (TORRO), 385, 428
Towneley, Richard, 9
Trace (of precipitation), 136
Transducer (definition), 409
Tretyakov wind shield, 155
True solar time, 266. *See* Local Apparent Time
Tufte, Edward, 371, 377
Turf wall raingauge shield, 156

U.S. Climate Reference Network, 99
U.S. Historical Climate Network (HCN), 389
U.S. Regional Climate Reference Network, 102
U.S. Weather Bureau, 24, 388
UK Weatherworld, 384
uk.sci.weather, 384
Ultraviolet (UV) radiation, 234
Measurement and units, 242
Unit conversions, 420
United Kingdom
Climate data, 375
Raingauge network, 130
United States
Climate data, 375
Observing network population, 103
Raingauge network, 130
Units, 7, 89, 325, 339, 410
Precipitation, 125
Pressure, 169
Solar radiation, 234
Sunshine, 234
Wind speed and direction, 194
Uppsala, Sweden, 16
USA
Raingauge network, 130
USB. *See* PC connection
USB ‘dropouts’, 288
USB port connection to datalogger, 288
USCRN, 99, 415
USRCRN, 99, 102
UTC, 271
UV-A, UV-B and UV-C, 242. *See* Ultraviolet

Vaisala Oyj, 433
Vapour pressure, 183
Saturation vapour pressure, 183
Vector Instruments, 434
Cup anemometer A100, 197
Vector mean wind, 217, 341, 416, 418
Vereniging voor Weerkunde en Klimatologie, VWK, 427
Virtual Weather software, 289, 291
Visibility, 296
Visibility objects, 296, 297
Vlaamse Vereniging voor Weerkunde (VVW), 425
Voluntary observer programmes
Co-operating observers network, Ireland, 391
U.S. cooperating observers network, 388
UK co-operating observers network, 390
Voluntary observer rainfall network, UK, 391
Voluntary observers, 385

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-107-02681-0 — The Weather Observer's Handbook
Stephen Burt
Index
More Information

Washington, George, 388
Weather Channel blog, 384
Weather diary, 302
Weather Display software, 289, 291
Weather newsgroups, 383
Weather Observations Website WOW, 81, 291, 382
Weather Underground, 289, 291–292, 381, 383
Weather websites, 378
WeatherLink, 289, 292
  WeatherLinkIP, 292
Webcams, 298
Websites
  AWS website, 378
  Data aggregation, 380
Week numbers, 365
Weerspiegel. *See* Vereniging voor Weerkunde
Weighing raingauge, 150
Wet bulb temperature, 116, 183, 185
Wet day
  Definition, 300
Wien's law, 234
Wind
  Beaufort wind scale, 203
  Data tabulations, 218
  Definition, 193
  Gusts
    Sampling interval, 199
  Measurement methods, 195
  Terminal hours, 219
  Units, 194
  Vector quantity, 194
Wind direction, 195
  Degree equivalents, 195
  Measurements, 204
  Modal, 217
  Vector mean, 217
Wind power, 52
Wind roses, 373
Wind run, 217
Wind sensors
  Accuracy versus precision, 208
  Calibration, 208
  Choosing, 205
  Corrections for height, 213
  Exposure, 208, 211
  Height corrections, 214
  Installation and maintenance, 212
  Logging requirements, 217
  Masts and fittings, 216
  Safety aspects, 209
  Severe weather performance, 205
  Wind vane alignment, 215
Wind shields. *See* Raingauge: Wind shield
Wind speed, 194
  Gust, 194
  Gusts
    Sampling interval, 195
  Mean, 194
  Terminal hours, 273
  Variation with height, 213
  World record, 207
Wind speed and direction, 192
  Measurements and sensors, 196–205
  One-minute summary, 219
Wind vane, 204
  Alignment, 215
Wind velocity, 194
Wireless
  Statutory regulations, 43
  Transmission and reception ranges, 43
Wireless connections *See* AWS – Connections
Wireless range, 43, 64, 66, 68
World Meteorological Organization (WMO), 6
WOW. *See* Weather Observations Website
Wren, Christopher, 8, 9

Zoning permission, 211

© in this web service Cambridge University Press www.cambridge.org