Title	Meteorological data Silwood Park, UK
General metadata	
Abstract	Several meteorological measurements have been registered at Silwood Park campus since 1947.
Keywords	Weather station, temperature, rain, soil, air, humidity
Is this part of a larger study?	NO
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Organization	Silwood Park, Buckhurst Road, Ascot, Berkshire SL5 7PY. United Kingdom
Address	Department of Life Sciences, Imperial College London
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Funding	Department of Life Sciences, Imperial College London
Data set status and accessibility	
Status	Ongoing
Latest update	Daily
Latest archive date	Daily
Metadata updated	October 2023
Accessibility	
Storage location and medium	Weather station PC, lb-weatherst, and network drive on the College: \\ic.ac.uk\group\fols\bio\Silwood Weather Station.
website	http://www.imperial.ac.uk/silwood-park/research/field-experiments/silwood-weather/
Usage rights	Open access
Geographic metadata	
Geographic description	A weather station located in Silwood Park Campus from Imperial College London, Buckhurst Road, Ascot, Berkshire SL5 7PY, United Kingdom. The station from 1947 to 2009 was located in front of the Manor house. Since 2009 the station is in Hill bottom
Bounding coordinates	Station 1947-2009

Latitude	51.4088
Longitude	-0.64152
UK National grid	
Square	SU
Easting	94581
Northing	68628
Bounding coordinates	Station from 2009
Latitude	51.41142
Longitude	-0.64283
UK National grid	
Square	SU
Easting	SU 94485
Northing	68918
Temporal metadata	
Temporal description	Meteorological measurements have been recorded at Silwood Park since 1947. Records have been digitized since 1987. Data from other years exist as images of data sheets and ad paper format at the Hamilton building office G11 and the college archives https://www.imperial.ac.uk/admin-services/acru/.
Begin	1947
End	Ongoing
Methods metadata	
Equipment	For weather station active since Dec 2009 • Campbell Scientific weather station tripod CM10 -3m with a CR1000 datalogger. • Met One 024A wing direction sensor oriented towards true north • Met One 014A wind speed sensor. Three-cup anemometer that monitors horizontal wind speed for the range of 0 to 45 m s–1 with a threshold of 0.45 m s–1 • LI-COR LI200X silicon pyranometer (Solar Radiation Sensor), Calibrated against an Eppley Precision Spectral Pyranometer to measure sun plus sky radiation. Calibrated for the daylight spectrum (400 to 1100 nm) • HMP45C or HMP35C VAISALA temperature and RH probe. Thermisor sensor with temperature range -35 to 55 ^{o}C and maximum error 0.4^{o}C. Vaisala capacitive polymer H chip RH sensor for humidity range 0 -100% • 107/108 soil temperature probe. Thermisol sensor encapsulated in an epoxy-filled aluminium housing. The 107 measures from -35° to +50°C, the 108 from -5° to +95°C. • Environmental Measurements Limited Aerodynamic precipitation sensor SBS1000H (357 mm diameter (1000 cm^2 collector, 0.1 mm tip with internal heaters.
Data collection	<u>Data collected until December 2009 included in digital files</u> Meteorological instruments in the HaHa were inside a Stevenson

	screen shelter. Daily readings were done at around 9:00 am. Data collected: • **Dry bulb temperature** at the time (~9 am) in degree Celsius (°C): temperature of air measured by a thermometer freely exposed to the air but shielded from radiation and moisture. • **Wet bulb temperature** at the time (~9 am) in °C: the temperature air would have if it were cooled to saturation (100% relative humidity) by the evaporation of water into it, with the latent heat being supplied by the air. By combining the dry bulb and wet bulb temperature in a Psychrometric chart or Mollier diagram the state of the humid air can be determined. Dry and Wet temperature are used to estimate air humidity **(%)** • **Maximum and Minimum temperature** in 24h hours measured at ~9 am, °C. • **Ground temperature** at the time (~9 am) in °C. • **Soil temperature at 2 inches** deep at the time (~9 am in °C. • **Soil temperature at 4 inches** deep at the time (~9 am) in °C. • **State of soil water content** observed in a bare plot next to the weather station at the time (~9 am). • **Total rain** in 24h measured at ~9 am in mm (size of rain gauge unknown). <u>Data collected since 11th December 2009</u> The Campbell Scientific weather station located at Hill bottom is connected via radio to a computer at Hamilton building, where it records meteorological measures hourly using the software "LoggerNet". LoggerNet is configured to automatically collect data from the weather station every hour at 1 minute past the hour. The data collected is added to the comma separated text files (csv) files **D:\Met Data\CR1000_Table1.dat** and **CR1000_Table2.dat.** and they contain the hourly and daily data respectively. These tables are then imported as Microsoft Excel sheets named **D:\Weather Data Excel\SilwoodWeatherDailyMonthly.xlsx** and **D:\Weather Data Excel\SilwoodWeatherHourly.xlsx** into \\ic.ac.uk\group\fols\bio\Silwood Weather Station. Data: • **Air temperature** in °C. • **Relative humidity** measured at 1 minute past the hour (%). Ratio of the partial pressure of water vapour to the equilibrium vapour pressure of water at a given temperature • S**olar irradiance** measuring solar radiation flux density in Watts per square metre and millijoule per square metre. • **Temperature** of ground surface in °C. • **Soil temperature at 2 inches** deep in °C. • **Soil temperature at 4 inches** deep in °C. • **Wind direction** (degrees of azimuth angle, from true north) and **speed** (Km/h). • **Rain** in mm measured with a 357mm diameter collector

Other data	• Images in PDF format of paper forms with daily records summarized monthly for years: 1966 -1973, 1974 (not complete), 1976 (not complete), 1977-1987, 1988 (not complete) • Paper forms with daily records summarized monthly for years: 1952 -1973, 1974 (not complete), 1976 (not complete), 1977-1987, 1988 (not complete). Location Silwood Park, Hamilton building G.11 • Boxes with paper records in College archives (https://www.imperial.ac.uk/admin-services/acru/) including: Main Site 1947 – 1953 Copse Temperature 1948 -1959 Copse Relative Humidity 1948 – 1959 Guinness Hill 1959 – 1962 Wind data 1964 Sunshine Chards 1952 – 1959 Metdata 1959 - 2008
Quality control	Creation of metadata has been done by Catalina Estrada in February 2017
Data table metadata	
Number of tables	3
	SilwoodWeatherDaily1987to2009.csv
	SilwoodWeatherHourly.csv
	SilwoodWeatherDaily.csv
Format	.csv, .txt

File name	**SilwoodWeatherDaily1987to2009.csv**		
	Records from 1987 to 2009 summarized and transcribed from paper forms. Author unknown		
Size	423KB		
Case sensitive	No		
Number or records	8401 rows		
Number of attributes	10 columns		
Orientation	Variables (attributes) included as columns		
Data table structure and attribute description			
Attribute name	Definition	Type	Attribute description
DATE	Date measures taken	Date	Date DD/MM/YY format Min: 01/01/87, Max: 31/12/09
DRY	Dry bulb temperature measured at ~9 am	Floating point	Precision: 0.0 Unit: ºC Min: -9.0, Max: 29.9
WET	Wet bulb temperature measured at ~9 am	Floating point	Precision: 0.0 Unit: ºC Min: -9.2, Max: 26.9

MAX	Maximum air temperature the last 24h measured at ~9 am	Floating point	Precision: 0.0 Unit: ºC Min: -6.8, Max: 36.8
MIN	Minimum air temperature the last 24h measured at ~9 am	Floating point	Precision: 0.0 Unit: ºC Min: -11.5, Max: 26.5
GROUND	Ground surface temperature measured at ~9 am	Floating point	Precision: 0.0 Unit: ºC Min: -17.5, Max: 38.0
TWO_INCH	Soil temperature at 2 inches deep measured at ~9 am	Floating point	Precision: 0.0 Unit: ºC Min: -8.0, Max: 31.0
FOUR_INCH	Soil temperature at 4 inches deep measured at ~9 am	Floating point	Precision: 0.0 Unit: ºC Min: -4.0, Max: 25.8
STATE	Observed state of soil water content at ~9 am	String	Nominal DAMP, FROST, FROZEN, SNOW, WET, DRY and combinations of those or with annotations no data: NO RECORD
RAIN	Total rain in 24h measured at ~9 am	Floating point	Precision: 0.0 Unit: mm Min: 0.0, Max: 59.5

File name	**SilwoodWeatherHourly.csv**		
	Hourly weather records from December 2009 downloaded from the Campbell Scientific weather station		
Size	NA		
Case sensitive	No		
Number or records	NA		
Number of attributes	13		
Orientation	Variables (attributes) included as columns		
Data table structure and attribute description			
Attribute name	Definition	Type	Attribute description
TIMESTAMP	Time the measure was recorded	Date	Date DD/MM/YY hh:mm format Min: 09/12/09 11:00 Max: ongoing
RECORD	Record number	Integer	Consecutive numbers Min: 1, Max: ongoing
PTemp_C_Avg (Deg C) [Avg]	Average hourly panel temperature	Floating point	Precision: 0.000 Unit: ºC
Air_Temp_Avg (Deg C) [Avg]	Average hourly air temperature	Floating point	Precision: 0.000 Unit: ºC
RH (%) [Smp]	Relative humidity measured at 1 min pass the hour	Floating point	Precision: 0.0 Unit: %
SlrW_Avg (W/m^2) [Avg]	Average hourly solar	Floating	Precision: 0.000

	irradiance	point	Unit: solar radiation flux density Watts per square metre
SlrMJ_Tot (MJ/m^2) [Tot]	Total hourly solar irradiance	Floating point	Precision: 0.000 Unit: solar radiation flux density milliJoule per square metre
Grass_Temp_Avg (Deg C) [Avg]	Average hourly ground surface temperature	Floating point	Precision: 0.000 Unit: ºC
Soil_Temp_2in_Avg (Deg C) [Avg]	Average hourly soil temperature at 2 inches deep	Floating point	Precision: 0.000 Unit: ºC
Soil_Temp_4in_Avg (Deg C) [Avg]	Average hourly soil temperature at 4 inches deep	Floating point	Precision: 0.000 Unit: ºC
WindDir (Degrees) [Smp]	Wind direction at 1 min pass the hour	Floating point	Precision: 0.000 Unit: degrees of azimuth angle
WS_kph_Avg (kilometers/hour) [Avg]	Average hourly wing speed	Floating point	Precision: 0.000 Unit: Km/h
Rain_mm_Tot (mm) [Tot]	Total hourly rain	Floating point	Precision: 0.0 Unit: mm

File name	**SilwoodWeatherDaily.csv**		
	Daily weather records measured at 9am from December 2009 downloaded from the Campbell Scientific weather station		
Size	NA		
Case sensitive	No		
Number or records	NA		
Number of attributes	12		
Orientation	Variables (attributes) included as columns		
Data table structure and attribute description			
Attribute name	Definition	Type	Attribute description
MONTH	Time the measure was recorded	Date	Date YYYY-MM Min: 2009-12 Max: ongoing
TIMESTAMP	Time the measure was recorded	Date	Date DD/MM/YY hh:mm format Min: 10/12/09 9:00 Max: ongoing
RECORD	Record number	Integer	Consecutive numbers Min: 0, Max: ongoing
Air_Temp (Deg C) [Smp]	Sample of air temperature at 1min past 9:00 am	Floating point	Precision: 0.000 Unit: ºC
Grass_Temp (Deg C) [Smp]	Sample of ground temperature at 1min	Floating point	Precision: 0.000 Unit: ºC

	past 9:00 am		
Soil_Temp_2in (Deg C) [Smp]	Sample of soil temperature 2 inches deep at 1min past 9:00 am	Floating point	Precision: 0.000 Unit: ºC
Soil_Temp_4in (Deg C) [Smp]	Sample of soil temperature 4 inches deep at 1min past 9:00 am	Floating point	Precision: 0.000 Unit: ºC
Air_Temp_Max (Deg C) [Max]	Maximum air temperature in last 24h measured at 1min past 9:00 am	Floating point	Precision: 0.000 Unit: ºC
Air_Temp_Min (Deg C) [Min]	Minimum air temperature in last 24h measured at 1min past 9:00 am	Floating point	Precision: 0.000 Unit: ºC
Grass_Temp_Max (Deg C) [Max]	Maximum ground temperature in last 24h measured at 1min past 9:00 am	Floating point	Precision: 0.000 Unit: ºC
Grass_Temp_Min (Deg C) [Min]	Minimum ground temperature in last 24h measured at 1min past 9:00 am	Floating point	Precision: 0.000 Unit: ºC
Rain_mm_Tot (mm) [Tot]	Total rain in last 24h measured at 1min past 9:00 am	Floating point	Precision: 0.0 Unit: mm

Data anomalies	Until 2009 data were recorded in paper and then copied into computer files. Dates were revised and corrected when wrong. 28/05/87 should be 28/04/87 04/03/88 should be 04/04/88 06/05/94 should be 06/04/95 26/05/95 should be 26/06/95 28/08/93 should be 28/08/96 31/01/98 should be 31/01/99 07/05/07 should be 07/07/05 19/10/06 should be 19/01/06 24/10/05 should be 24/10/06 02/01/09 should be 02/02/09 04/05/09 should be 04/06/09 28/01/09 should be 28/10/09 Only a few obvious outliers in these records were also revised and corrected in February 2017. MAX 04/07/07 should be 25 TWO_INCH AND FOUR_INCH 29/06/91 should be 14.8 and 14.3 Failure in the rain gauge was noticed in July 2023 and the gauge was repaired and connected back on 26 September 2023. It is unknown when the failure

	started. The last record of rain before only '0' values were recorded was on 25 April 2023 but it is probable failing happen before that date. This could have happened anytime between 26 January 2023, day of last equipment check, to early April. Daily values of rainfall between 1 April to 25 September 2023 were obtained from a rain gauge located in the garden of Old Waterfield house, Winkfield Rd, Ascot SL5 7LJ, thanks to Mrs. Catherine Stevenson. Her gauge is a 5-inch brass gauge checked at 9 am every morning. Hourly values of rain for 26 April to 25 September period were left NULL.

Supplemental descriptors	
How to cite dataset	Contact c.estrada@imperial.ac.uk
How to acknowledge dataset	Contact c.estrada@imperial.ac.uk
Additional information	