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UK-wide Typical Meteorological Year Global Horizontal Irradiance Data for Photovoltaic Systems

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LICENCE

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REPOSITORY RECORD

Palmer, Diane, and Tom Betts. 2018. "Uk-wide Typical Meteorological Year Global Horizontal Irradiance Data for Photovoltaic Systems". figshare. <https://doi.org/10.17028/rd.lboro.6945311.v1>.

TMY 2008 - 2017

10 km grid

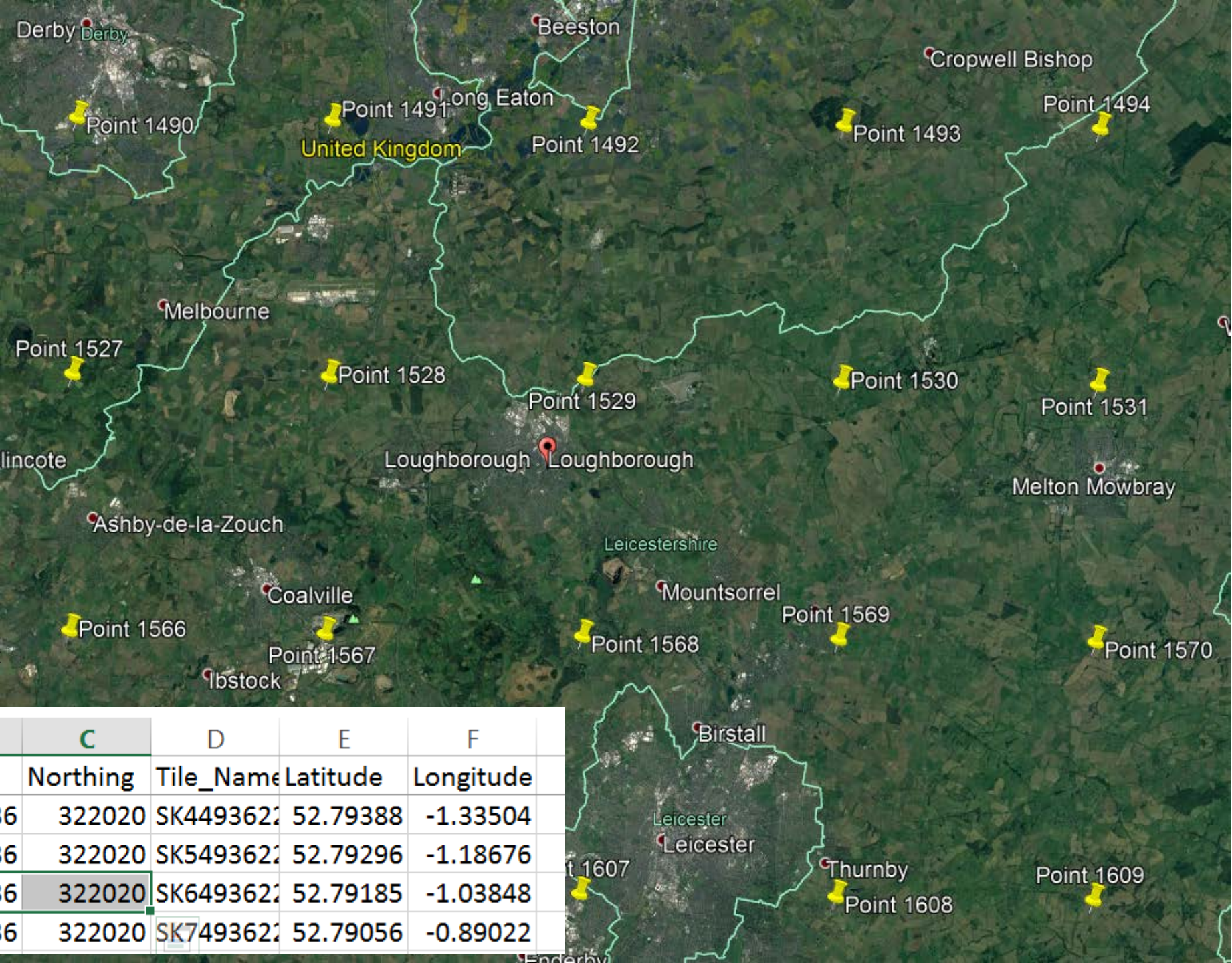
INSTRUCTIONS:

Open the kml file in Google Earth or software of your choice and locate the grid point nearest to the location you are interested in. Look up the coordinates of the point in the grid info file. Unzip folder and use Windows Explorer to open the csv containing TMY data for your selected point.

See below for illustrated step-by-step example.

File	Description
UK_10kmgrid_kml	KML of grid points to use in Google Earth
UK_10kmgrid_info.xlsx	Table of xy and latlong of grid points
10kmgrid_2008_17_GHI_TMY.7z	Folder containing 2,453 csv files each with TMY irradiance (8760 hours)

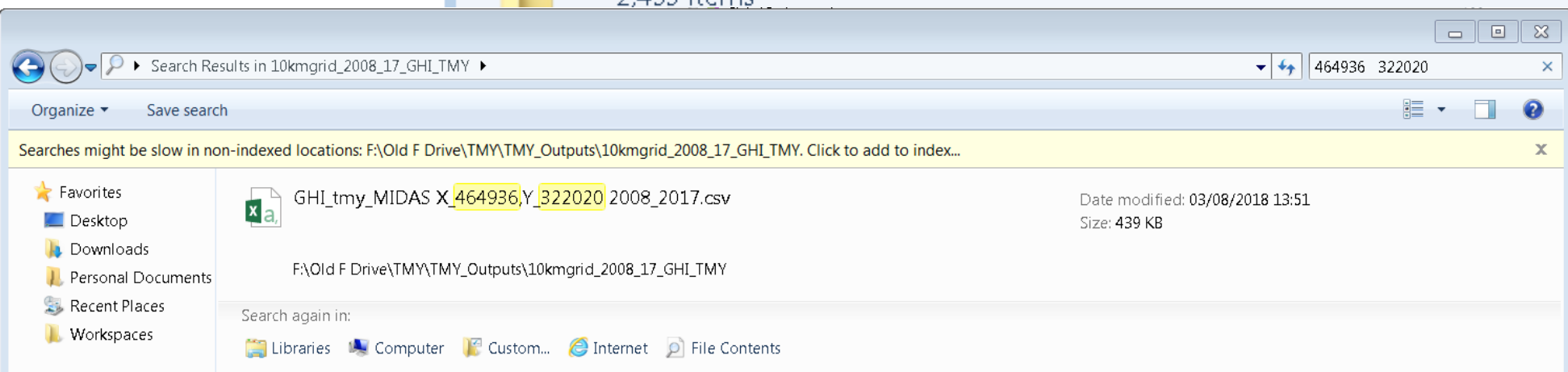
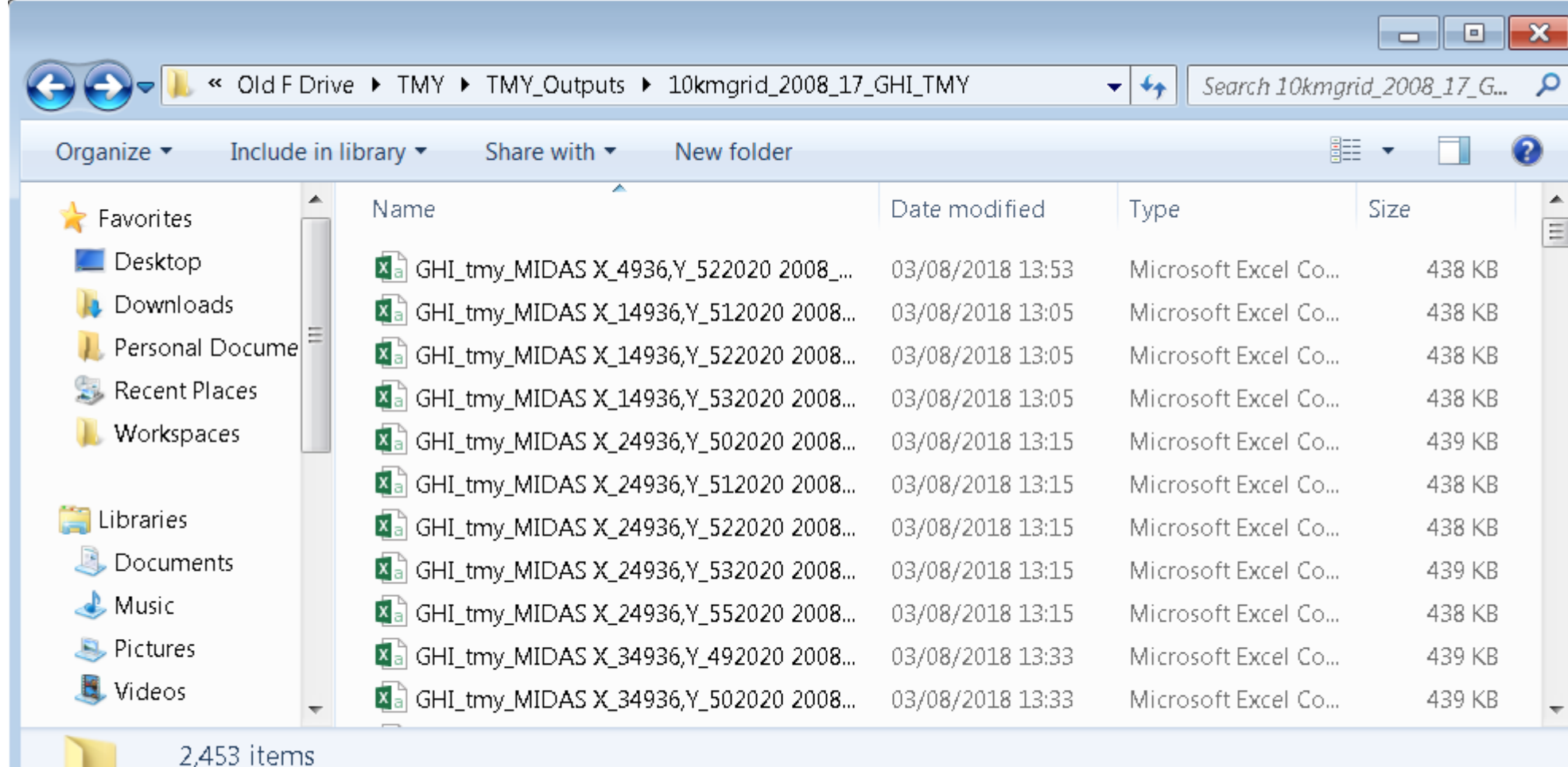
Loughborough
Example – Find
the closest
point using UK-
10km_grid.kml



UK_10kmgrid_info.xlsx
- Find coordinates

A	B	C	D	E	F	
Point	Easting	Northing	Tile_Name	Latitude	Longitude	
1527	444936	322020	SK4493622	52.79388	-1.33504	
1528	454936	322020	SK5493622	52.79296	-1.18676	
1529	464936	322020	SK6493622	52.79185	-1.03848	
1530	474936	322020	SK7493622	52.79056	-0.89022	

Unzip 10kmgrid-2008_17_GHI_TMY.7z and search for coordinates in Windows Explorer

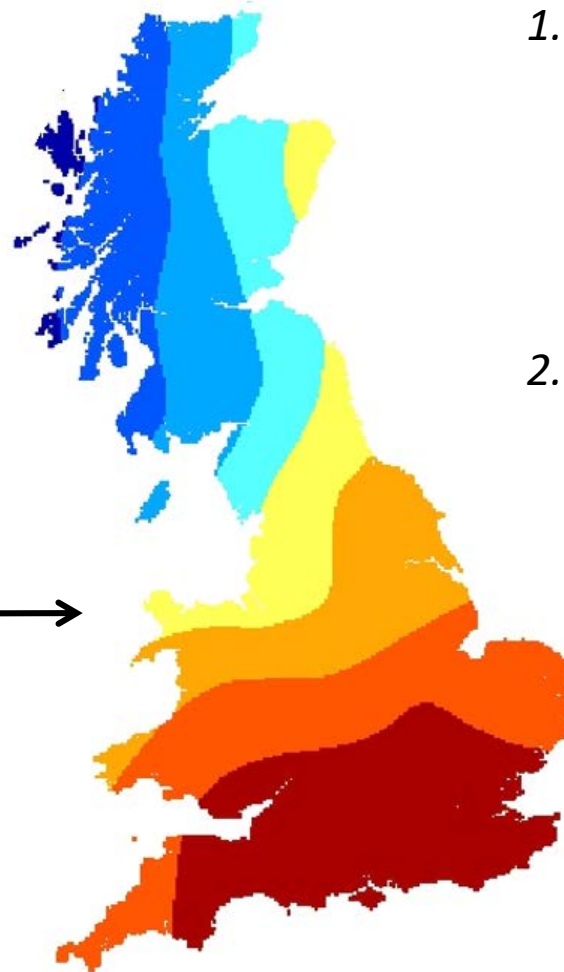
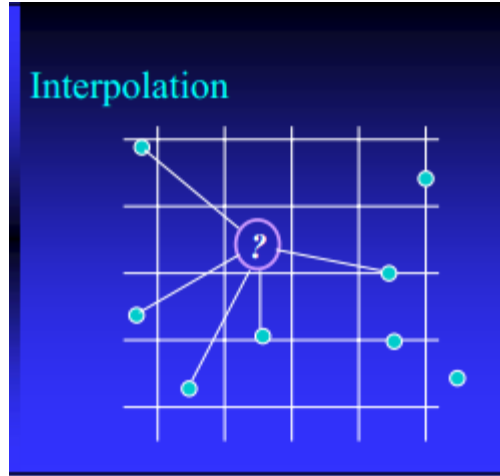
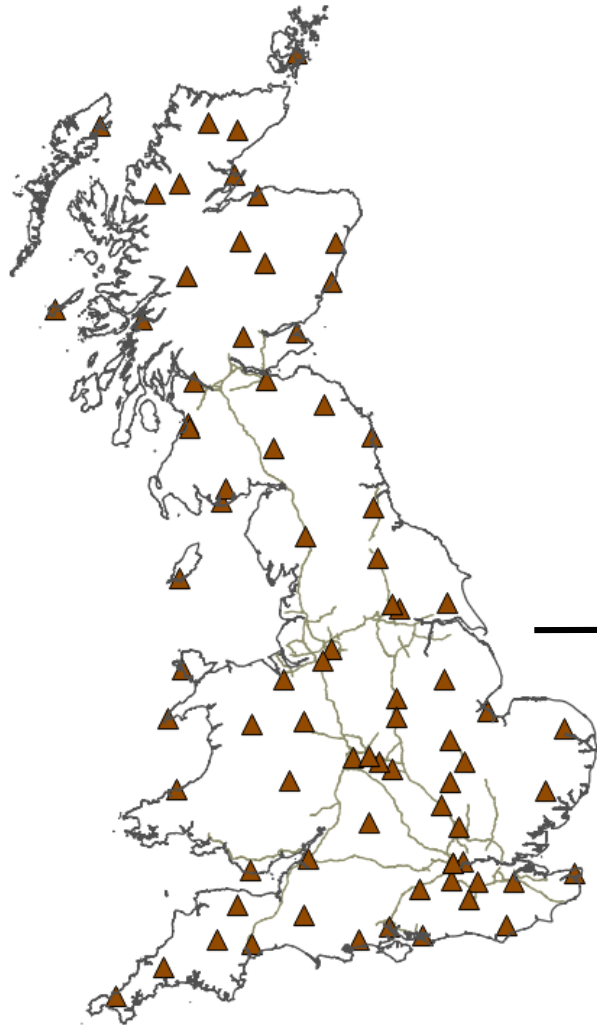


Hour	Day	Month	Year	Global horizontal irradiance (W/m2)			
00:00:00	21	June	2011	0			
01:00:00	21	June	2011	0			
02:00:00	21	June	2011	0			
03:00:00	21	June	2011	0			
04:00:00	21	June	2011	66.56293			
05:00:00	21	June	2011	167.9114			
06:00:00	21	June	2011	316.0472			
07:00:00	21	June	2011	369.6249			
08:00:00	21	June	2011	389.1842			
09:00:00	21	June	2011	385.8885			
10:00:00	21	June	2011	387.46			
11:00:00	21	June	2011	327.8862			
12:00:00	21	June	2011	271.4906			
13:00:00	21	June	2011	27.12751			
14:00:00	21	June	2011	150.0019			
15:00:00	21	June	2011	48.74833			
16:00:00	21	June	2011	0.868246			
17:00:00	21	June	2011	2.466149			
18:00:00	21	June	2011	65.46534			
19:00:00	21	June	2011	187.8174			
20:00:00	21	June	2011	347.5261			
21:00:00	21	June	2011	384.0088			
22:00:00	21	June	2011	332.8402			
23:00:00	21	June	2011	86.99476			
00:00:00	22	June	2011	0			
01:00:00	22	June	2011	0			

Loughborough Example (Point closest)

Month	Year
January	2014
February	2012
March	2012
April	2016
May	2010
June	2011
July	2016
August	2016
September	2013
October	2012
November	2010
December	2012

Data Origins (1)



Data interpolated via ordinary kriging from 80+ UK Met. Office weather stations to 10 x 10 km grid.

Please cite the following:

1. Met Office (2006): MIDAS: Global Radiation Observations. NCAS British Atmospheric Data Centre, 8 August 2018 <http://catalogue.ceda.ac.uk/uuid/b4c028814a666a651f52f2b37a97c7c7>
2. Diane Palmer, Ian Cole, Tom Betts, Ralph Gottschalg, 2017, "Interpolating and estimating horizontal diffuse solar irradiation to provide UK-wide coverage: selection of the best performing models", *Energies*, Special Issue "Solar Photovoltaics Trilemma: Efficiency, Stability and Cost Reduction 2017", 10, 181; doi:10.3390/en10020181 <http://www.mdpi.com/1996-1073/10/2/181>

Data Origins (2)

The data available for download comprises hourly TMY Global Horizontal Irradiance values generated from the 2008-2016 decade for a 10 x 10 km resolution grid covering the UK and Northern Ireland. Global Horizontal Irradiance in Wh/m².

The data is initially interpolated to each grid point from UK Meteorological Office measured weather station values. Ordinary kriging with an exponential semivariogram is used. The TMY for each point is then calculated as follows:

- For each month in the year (i.e., Jan., Feb., March, etc.), the ten-year monthly mean of irradiance data is obtained for the period 2004-2015.
- The historic month that most closely matches the ten-year mean for that month is identified i.e. the most “typical” month.
- The hourly data values from the twelve typical months are combined to create the typical year file. This might comprise e.g. January from 2010, February from 2005, March from 2007 etc.
- This simple method has been shown to perform well compared to other free-to-download TMY datasets.