What is Going On?

This is the sixth report on the changing weather conditions in the area known as Mow Cop on the border between Cheshire and Staffordshire, England. It has been researched and compiled by Knud Møller at **KVM Research,** website: www.kvmresearch.co.uk, email: knudvmoller@gmail.com

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Introduction

The above photograph is an impression from my garden one summer's day during the year 2017.

It looks in a south-westerly direction and seems to show a weather front as reflected in a cloud formation.

Global warming and climate change are much talked about, and the concepts are still viewed with scepticism by many. During the year 2020 it was pushed down the list of priorities by the Covid-19 pandemic, but is increasingly recognised as a problem to which responsible local, national and international leaders must find solutions.

"Global warming is the long-term rise in the average temperature of the Earth's climate system. It is a major aspect of climate change, and has been demonstrated by direct temperature measurements and by measurements of various effects of the warming. Global warming and climate change are often used interchangeably. But more accurately, global warming is the mainly human-caused increase in global surface temperatures and its projected continuation, while *climate change* includes both global warming and its effects, such as changes in precipitation." (Copied from *Wikipedia:* 'Global warming'.)

"The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report concluded, "It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century"." (Ibid)

"These findings have been recognized by the national science academies of the major industrialized nations and are not disputed by any scientific body of national or international standing." (Ibid)

The following is an attempt to catch these changes in an amateurish way over a relative short period in my particular locality, Mow Cop, on the northern outskirts of the City of Stoke-on-Trent and inside Cheshire County, England.

Global warming and climate change are not abstract constructs, but part of everyday realities that affect us all. I will not claim that this in any way is a scientific study, and I am not a meteorologist and only know about weather patterns what I hear and see on radio and TV.

However, for the last just over 6 years or so one of my first activities every morning has been to take a reading of the thermometer placed in my backyard. As I am inflicted with Parkinson's disease the intension is to correlate these readings with 'UPDRS' (Unified Parkinson's Disease Rating Scale) observations to see if the strength of symptoms vary with weather conditions. This note is therefore a by-product of this other investigation.

The thermometer, I use, is a simple plastic plate with a glass tube in the middle. The scale is the simple Celcius scale with 0°at the freezing point and 100° at the boiling point, and as indicated above I take the reading soon after getting out of bed. I started the exercise in August 2015.

Annual Cycle

Figure 1

Annual temperatures 2015-2018

Figure 2

Annual temperature cycle 2019-2022

The above diagrams show the annual cycle for each of the last eight years, and it will not come as a surprise that it shows the summer months – June, July, August - to be warmer than the winter months – December, January, February. But what is also noticeable is that for the year 2018 (grey) the early months were somewhat colder than in other years, due at the time to the socalled 'Beast from the East'.

These observations are shown in a tabular form below. It is noted that the annual average temperature fluctuates, but 2022 has been the warmest year so far recorded, and the 3rd quarter (July-September) of 2022 was the warmest 3 months so far recorded.

Table 1: Temperature changes by regular 3 months quarters.

	2015	2016	2017	2018	2019	2020	2021	2022
	<----------			Degrees Celcius		---------->		
Quarter 1		3.22	4.41	2.49	4.5	4.65	3.86	5.29
Quarter 2		8.91	8.7	11.31	9.49	10.59	9.92	10.92
Quarter 3	10.33	13.95	13.27	14	14.08	13.69	14.98	15.15
Quarter 4	7.46	6.17	7.88	6.79	5.77	6.65	7.34	8.63
Annual	8.58	8.02	8.64	8.66	8.37	8.91	9.26	9.66

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Table 2 show the same changes arranged differently by 3 monthly seasons rather than quarters defined by calendar months.

Table 2: Temperature changes by seasons.

	2015	2016	2017	2018	2019	2020	2021	2022
	<----------			Degrees Celcius		---------->		
Spring		5.48	7.43	7.12	6.94	7.54	6.77	8.15
Summer		13.6	13.68	15.59	14.36	14.35	15.31	15.61
Autumn	8.12	8.71	9.07	8.37	7.89	9.23	10.32	10.4
Winter	4.51	4.44	2.92	4.66	4.64	3.97	5.12	3.72
Annual	8.58	8.02	8.64	8.66	8.37	8.91	9.26	9.66

Note: Spring ~ March-May; Summer ~ June-August; Autumn ~ September –November; Winter~ December-February.
*) 2015/16, 2016/17, 2017/18 etc.

It is noted that the Autumn (September-November) of 2022 was the warmest so far recorded.

Extremes

Another way of looking at the changes is by comparing the extremes year by year.

Table 3 shows the warmest and the coldest days for each of the four years 2016-2019 and the relevant temperature measurement. The pattern is not very clear, but it is worth noting that the two warmest days occurred in 2021 and 2022 at the end of the period under observation.

Table 3: Warmest and coldest days.

	Warmest		Coldest		Average
	Date	Temperature	Date	Temperature	
2016	18-Jul	22	07-Mar	-2.5	8.02
2017	17-Jun	20	27-Jan	-1.5	8.64
2018	02-Jul	24	28-Feb	-7	8.66
2019	29-Jun	22	02-Feb	-4	8.37
2020	26-Jun; 13-Aug	21	25-Dec	-2	9.02
2021	05-Jun	30	02-Feb	-4	9.26
2022	19-Jul	26	05-Dec	-5	9.66

In table 4 below we have counted the number of days temperatures within three intervals were recorded.

It is noted that the number of days when temperatures of below 5° C were recorded have 'shrunk' from 187 in total during 2016 and 2017 combined to 165 during 2021 and 2022 combined. Conversely the number of days when temperatures of more than 15° C were recorded have increased from 41 during 2016 to 2017 to a total of 100 during 2021 t0 2022.

Table 4: Number of days by recorded temperature.

|	< 5° C	5° C-15° C	> 15° C	Other	Total
	<----------------	No of days	--------------->		
2016	106	214	22	24	366
2017	81	251	19	14	365
2018	97	201	51	16	365
2019	81	239	35	10	365
2020	78	253	34	1	366
2021	87	214	56	8	365
2022	78	232	44	11	365

Longitudinal evidence

We can now aggregate the readings for all seven years into one graph to provide a longitudinal view of the temperature variations. The diagram is shown in the appendix with an inserted trend line in red.

The line shows the trend increasing from just below 8°C in 2015 to close to 10°C in January 2023 which add up to an average annual rise of +0.2°C.

As I have referred to above, the readings are taken first thing in the morning, in winter months even before sunrise. They are therefore likely to be lower than national temperatures discussed in scientific literature and referred to in radio and TV broadcasts.

Rain
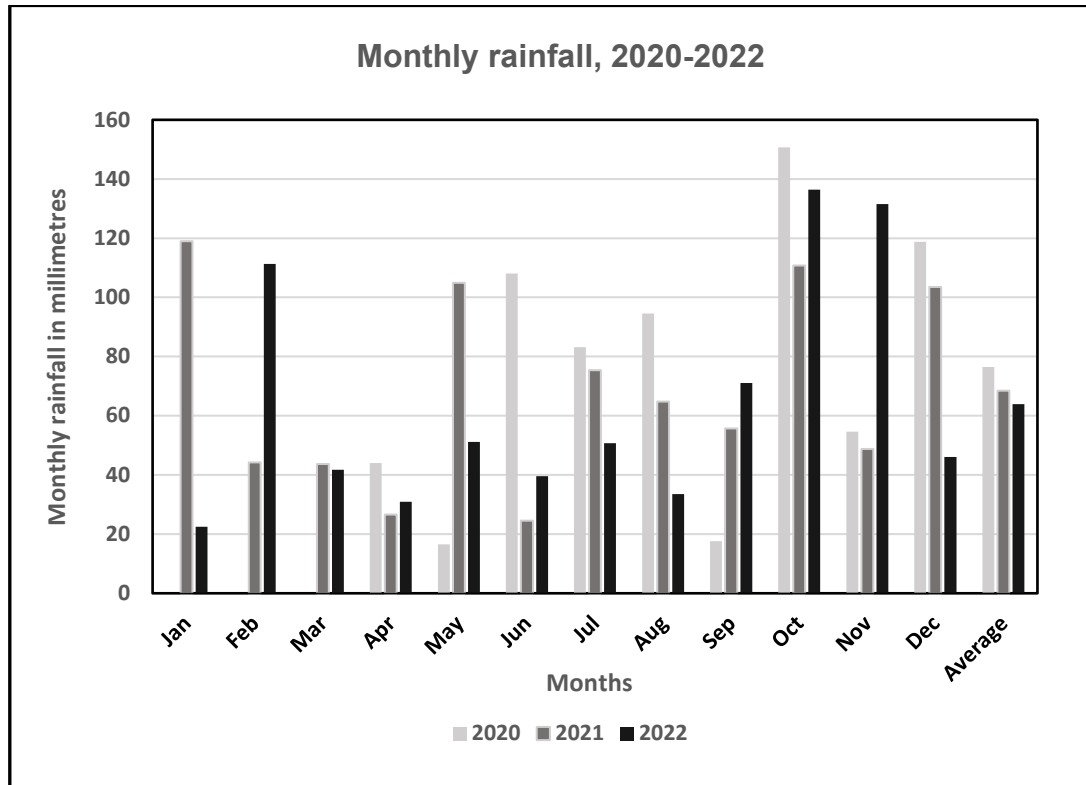
Mote: Does not include snowfall.

For the third year I have recorded daily rainfall at the same time in the morning as I have recorded temperature and barometer readings. For this I use a simple plastic gauge bought from a local garden centre. The results so far are shown in the diagram above.

It can be deducted from the observations that the average monthly rainfall for the year 2020 was 76 mm and for 2022 it was just 64 mm.

Conclusion

As already indicated the above study is not scientific, even less a proof of anything. However, despite its shortcomings it is at least evidence. As such it is clear that 2022 was the warmest of the eight years included in the study, more than 1° C warmer than 2016 which was the coldest. Likewise in 2022 there were 44 days with temperatures exceeding 15° C, but only 22 such days in 2016. However, in 2021 there were 56 such days.

It is not conclusive, but perhaps it will make you the reader stop and think. If Global Warming and/or Climate Change mapped in this way may be caused by man, and we cannot afford to ignore that possibility, perhaps it is time we cut out our bad habits? If the observed phenomenon is part of a long term cyclical pattern, just maybe cutting out our bad habits will help to alleviate the consequences of global warming. If it is caused by man then we need to stop, think and find alternatives to the way, we live at present.

Temperature Variation, August 2015 - January 2023