

Warm Dry Weather of June and July 2018

Wednesday 1 August 2018

This is a preliminary report, based on the data from our Synoptic stations, and will be updated when all the data from our Climate stations is received.

The weather included thunderstorms, heat waves, droughts and storm force winds. The following report is a summary of the weather for June and July 2018.

Summary June 2018

There were intense thunderstorms especially on the 1st and 8th June, but in general the dry, settled weather from the end of May continued for the first two weeks of June with high pressure dominating producing and a slack easterly flow. The north Atlantic jet stream stayed well to the north. There was a break in the fine weather for the third week of that month. Storm Hector passed close to the Northwest, giving two days of rain and gales on the 13th and 14th followed by frontal systems crossing the country from the west up to the 20th. Even during this unsettled spell, rainfall totals were very low everywhere but especially in the South and East. From the 21st, the remainder of the month and the first part of July was settled and exceptionally dry due to an area of high pressure building over Ireland. For June and July, heat wave, partial drought and absolute drought conditions were reported in many locations (See tables below).

On June 21st, an intense area of high pressure of was centred to the west of Ireland bringing a northwesterly air flow across Ireland. In the days that followed, an easterly airflow dominated our weather. It brought the warmest conditions, with the highest maximum temperature of 32.0°C recorded at Shannon Airport, Co Clare (13.7°C above its LTA) on the 28th.

Over three days, 27th, 28th and 29th, five stations in counties Clare, Tipperary, Roscommon, Galway and Mayo recorded maximum screen air temperatures over 30°C.

On the 27th, Shannon Airport recorded 30.8°C (12.5°C above its LTA) and Mount Dillon, Co Roscommon recorded 30.5°C (12.4°C above its LTA). On the 28th, Shannon Airport (mentioned above), 30.3°C was recorded at Mount Dillon, Co Roscommon (12.2°C above its LTA), 30.2°C was recorded at both Claremorris, Co Mayo (12.7°C above its LTA) and at Athenry, Co Galway (12.2°C above its LTA) and 30.1°C recorded at Moore Park, Co Cork (11.8°C above its LTA).

On 29th June, Shannon Airport, Co Clare and Gurteen, Co Tipperary recorded temperatures above 30°C with a temperatures of 31.1°C (12.8°C above its LTA) and 30.1°C (11.8°C above its LTA) respectively. The highest (minimum) night-time temperature was 18.8°C recorded on the 29th at Mace Head, Co Galway (8.1°C above its LTA).

FIGURE 1. METEOSAT VISIBLE SATELLITE 29TH

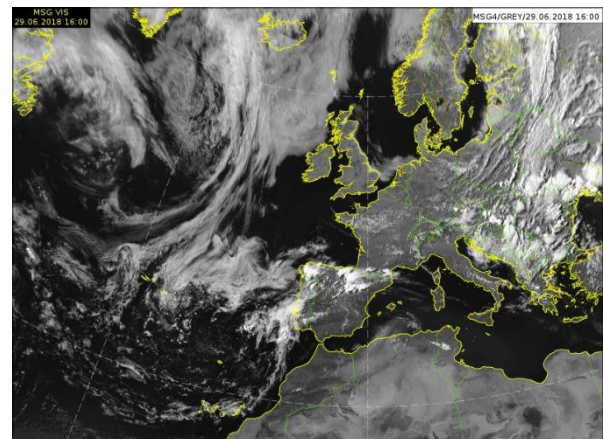
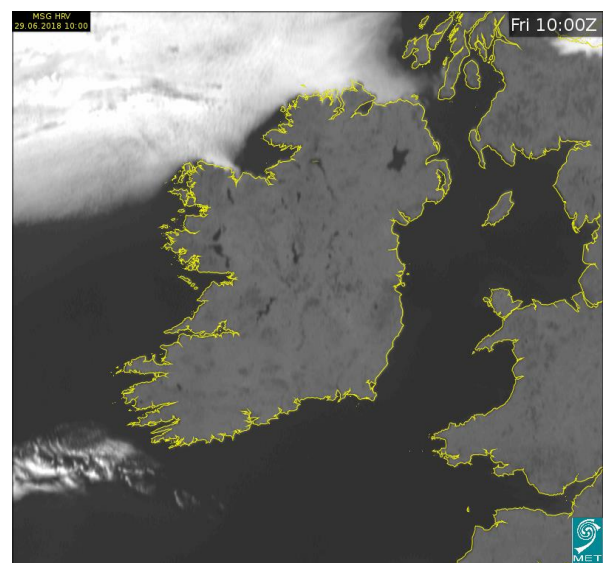


FIGURE 2. METEOSAT VISIBLE SATELLITE 29TH



Summary July 2018

High temperatures and drought conditions, most prolonged in the East and South, were also experienced during July. The first half of the month was characterised by a large area of blocking high pressure stretching from the Azores to Scandinavia pushing the north Atlantic Jet Stream well to the north away from Ireland. This gave dry and very warm conditions with a lot of sunshine and light variable winds, with heat wave conditions continuing for a few days at the beginning of the month. For the second half of the month, up to the 26th, pressure stayed relatively high, but Atlantic weather fronts broke through on some occasions, giving somewhat cooler conditions with some rain at times to Western and Northern areas and more generally on the 15th, 20th and 23rd. An area of low pressure

to the northwest became dominant from the 26th to the end of the month, with associated frontal troughs bringing wind, rain or heavy thundery showers.

The latter part of July saw temperatures drop back to near normal levels for the time of year. There was also some rainfall recently which ended the Absolute drought status and Partial drought status in all areas.

For July, rainfall was about 80% of normal in the west and about 47% of normal in the east. Gurteen, Co Tipperary had only 35% of normal rainfall in July. This follows on from a dry and warm May and June. Phoenix Park recorded its lowest combined two-monthly rainfall total of 34.5 mm for June and July since records began in 1850.

LTA : Long-Term-Average period 1981-2010

DEFINITIONS

A **heat wave** occurs where there are 5 consecutive days or more with maximum temperature over 25°C (that is, a daily maximum screen air temperature > 25°C).

A **dry spell** is a period of 15 or more consecutive days to none of which is credited 1.0mm or more of precipitation (that is daily rainfall < 1.0mm).

A **partial drought** is a period of at least 29 consecutive days the mean daily rainfall of which does not exceed 0.2mm (that is, a mean for period ≤ 0.2 mm).

An **absolute drought** is a period of 15 or more consecutive days to none of which is credited 0.2mm or more of precipitation (that is, a daily rainfall total < 0.2mm).

HEAT WAVES AND MAXIMUM TEMPERATURES

Heat waves occur in summer when high pressure develops over the country. High pressure systems, also known as anticyclones, are slow-moving and can persist for a prolonged period of time, resulting in dry and settled weather. In anticyclones, cool air descends from aloft and diverges outwards at lower levels. When a high pressure system materialises over Ireland, the jet stream is usually located to the north of us and keeps low pressure systems away.

Different air masses affect us at different times of the year and this has a major impact upon the weather we experience in this country. The Tropical Continental air mass is the least frequent air mass affecting Ireland and is most common in summer, this air mass originates over North Africa. Although the lower layers of this air mass are usually quite stable, the unstable upper layers may give rise to severe thunderstorms. Its low humidity tends to bring us clear skies and long periods of sunshine. The highest temperatures experienced in Ireland usually occur under the influence of this air mass giving maximum temperatures in excess of 30°C.

Ireland only experiences occasional heat waves compared to other European countries. In August 1976, Birr, Co Offaly recorded heat wave conditions lasting 14 days (the maximum temperature recorded at that station during this event was 28.2°C (8.9°C above its LTA)). More recently, heat

wave conditions occurred in the summers of 2017, 2013, 2006, 2003, 1995, 1989 and 1983. Official heat waves were recorded at fifteen stations this year (see table below).

RECORDED HEAT WAVE PERIODS SINCE 2000

STATION WITH LONGEST PERIOD	START DATE	END DATE	LENGTH (Days)
CAVAN	04-Aug-03	08-Aug-03	5
GLENGARRIFF	09-Jul-05	13-Jul-05	5
CAVAN	15-Jul-06	21-Jul-06	7
NAVAN	24-Jul-06	28-Jul-06	5
CASHEL	06-Jul-13	14-Jul-13	9
KILKENNY	17-Jun-17	21-Jun-17	5
OAK PARK	24-Jun-18	4-Jul-18	11
MULLINGAR	24-Jun-18	29-Jun-18	6
GURTEEN	24-Jun-18	30-Jun-18	7
ATHENRY	24-Jun-18	30-Jun-18	7
MOUNT DILLON	24-Jun-18	30-Jun-18	7
SHANNON AIRPORT	24-Jun-18	30-Jun-18	7
CASEMENT	24-Jun-18	28-Jun-18	5
MOORE PARK	26-Jun-18	4-Jul-18	9
BALLYHAISE	25-Jun-18	29-Jun-18	5
NEWPORT	25-Jun-18	29-Jun-18	5
DUNSANY	24-Jun-18	29-Jun-18	6
CLAREMORRIS	25-Jun-18	30-Jun-18	6
KNOCK AIRPORT	26-Jun-18	30-Jun-18	5
MARKREE	26-Jun-18	30-Jun-18	5
FINNER	26-Jun-18	30-Jun-18	5

HIGHEST JUNE MAXIMUM TEMPERATURES PER DECADE

DECADE	TEMPERATURE	STATION	DATE
1940's	27.7°C	Shannon Airport	23rd June 1949
1950's	28.9°C	Mullingar	6th June 1950
1960's	26.6°C	Belmullet	10th June 1963
	26.6°C	Mountmellick	1st June 1963
	26.6°C	Tuam	12th June 1968
1970's	32.5°C	Boora, Co. Offaly	29th June 1976
1980's	28.7°C	Galway	19th June 1989
1990's	31.1°C	Athy	29th June 1995
2000's	28.6°C	Galway	2nd June 2009
2010's	32.0°C	Shannon Airport	28th June 2018

RECENT MAXIMUM TEMPERATURE INFORMATION

- The last time an Irish June temperature was above 31.5°C occurred in 29 June 1976 at Shannon Airport, Co Clare, when it was 31.6°C (13.3°C above its LTA) and on the same day at Boora, Co Offaly it was 32.5°C (14.0°C above its LTA).

32.0°C recorded on 28 June 2018 at Shannon Airport, Co Clare (13.7°C above its LTA)

- the highest temperature recorded so far this year;
- the highest June temperature recorded in Ireland since 1976;
- the highest temperature for any month since July 2006 when 32.3°C was recorded at Elphin, Co Roscommon (13.1°C above its LTA) on the 19th; and
- the highest temperature ever recorded at a synoptic station in Ireland.

For more information on weather observing stations Ireland, see:

<https://www.met.ie/climate/weather-observing-stations>

SUNSHINE

The highest daily sunshine for June this year was 16.5 hours at Malin Head, Co Donegal on the 28th June. Malin Head also had a daily sunshine value of 16.4 hours on the 3rd July (the highest July daily sunshine value). A value of 16.0 hours was recorded at Knock Airport on the 24th June, its highest daily value since the station opened in 1997. All stations had above average sunshine for June and, apart from the North and West, most stations had above average sunshine for July.

Monthly sunshine totals for June were highest at Johnstown Castle, Co Wexford with 244.3 hours. Monthly sunshine totals for July were also highest at Johnstown Castle, Co Wexford with 240.5 hours.

RAINFALL AND DROUGHT

RAINFALL

For the combined June and July period all stations reported rainfall below the long term average (LTA). This was particularly the case in midland eastern and southern areas with between one third and one half of the Long Term Average rainfall reported. At the Phoenix Park it was the driest June-July period in the available digital record which dates from 1850.

Rainfall totals and % of LTA for June and July 2018

Station name	June (mm)	June (% LTA)	July (mm)	July (% LTA)	June & July (mm)	June & July (% LTA)
Phoenix Park, Dublin	4.1	6%	30.5	56%	34.6	28
Mace Head	31.6	38%	47.9	57%	79.5	48
Oak Park	5.2	9%	42.5	72%	47.7	40
Shannon Airport	13.6	19%	57	86%	70.6	52
Dublin Airport	4.8	7%	40	71%	44.8	36
Moore Park	32.4	46%	42.9	69%	75.3	57
Ballyhaise	40.9	60%	69.2	94%	110.1	78
Sherkin Island	17.2	23%	48.8	63%	66.0	43
Mullingar	27.1	37%	33.5	47%	60.6	42
Roches Point	12.4	19%	47.2	75%	59.6	47
Newport	65.9	73%	58.5	58%	124.4	65
Markree	39.6	48%	71.2	77%	110.8	63
Dunsany	11.4	16%	41.9	68%	53.3	40
Gurteen	22.8	32%	24.1	36%	46.9	34
Malin Head	51.1	73%	60.3	75%	111.4	74
Johnstown Castle	12.7	17%	53.3	73%	66.0	45
Athenry	25.2	32%	69.7	81%	94.9	57
Mount Dillon	82.2	111%	42.2	58%	124.4	84
Finner	47.7	66%	84	92%	131.7	81
Claremorris	43.1	58%	62.7	84%	105.8	71
Valentia Observatory, Kerry	39.2	41%	50.1	51%	89.3	46
Belmullet	40.1	56%	64.1	81%	104.2	69
Casement	18.5	30%	30.1	56%	48.6	42
Cork Airport	10.4	13%	40.1	51%	50.5	32
Knock Airport	54.1	59%	82.6	86%	136.7	73

DROUGHT

The tables show droughts recorded this year to date. The last time there were drought conditions in Ireland was April to May 2017 in the Midlands and the West.

RECORDED ABSOLUTE DROUGHTS 2018			
STATION	START DATE	END DATE	LENGTH (Days)
Belmullet	22-May-18	12-Jun-18	22
Phoenix Park	21-Jun-18	14-Jul-18	15
Mace Head	21-Jun-18	06-Jul-18	15
Oak Park	21-Jun-18	14-Jul-18	24
Shannon Airport	21-Jun-18	13-Jul-18	23
Dublin Airport	21-Jun-18	14-Jul-18	24
Sherkin Island	21-Jun-18	14-Jul-18	24
Ballyhaise	21-Jun-18	10-Jul-18	20
Mullingar	21-Jun-18	14-Jul-18	24
Roches Point	21-Jun-18	05-Jul-18	15
Dunsany	21-Jun-18	14-Jul-18	24
Gurteen	21-Jun-18	14-Jul-18	24
Johnstown Castle	21-Jun-18	14-Jul-18	24
Athenry	21-Jun-18	07-Jul-18	17
Mount Dillon	21-Jun-18	10-Jul-18	20
Finner	21-Jun-18	09-Jul-18	19
Claremorris	21-Jun-18	10-Jul-18	20
Valentia	21-Jun-18	13-Jul-18	23
Casement	21-Jun-18	14-Jul-18	24
Cork Airport	21-Jun-18	05-Jul-18	15
Knock Airport	21-Jun-18	10-Jul-18	20

RECORDED PARTIAL DROUGHTS JUNE-JULY 2018			
Oak Park	28-May-18	19-Jul-18	52
Cork Airport	21-Jun-18	25-Jul-18	35
Moore Park	14-Jun-18	14-Jul-18	31
Roches Point	21-Jun-18	25-Jul-18	35
Casement	03-Jun-18	19-Jul-18	47
Dublin Airport	28-May-18	19-Jul-18	53
Phoenix Park	28-May-18	19-Jul-18	53
Dunsany	21-Jun-18	19-Jul-18	29
Gurteen	21-Jun-18	25-Jul-18	35
Johnstown Castle	18-Jun-18	20-Jul-18	33

RECORDED DRY SPELLS JUNE-JULY 2018

Belmullet	21-Jun-18	13-Jul-18	23
Moore Park	18-Jun-18	14-Jul-18	27
Newport	21-Jun-18	10-Jul-18	20
Markree	21-Jun-18	14-Jul-18	24
Malin Head	21-Jun-18	10-Jul-18	20

Notably dry June 2018

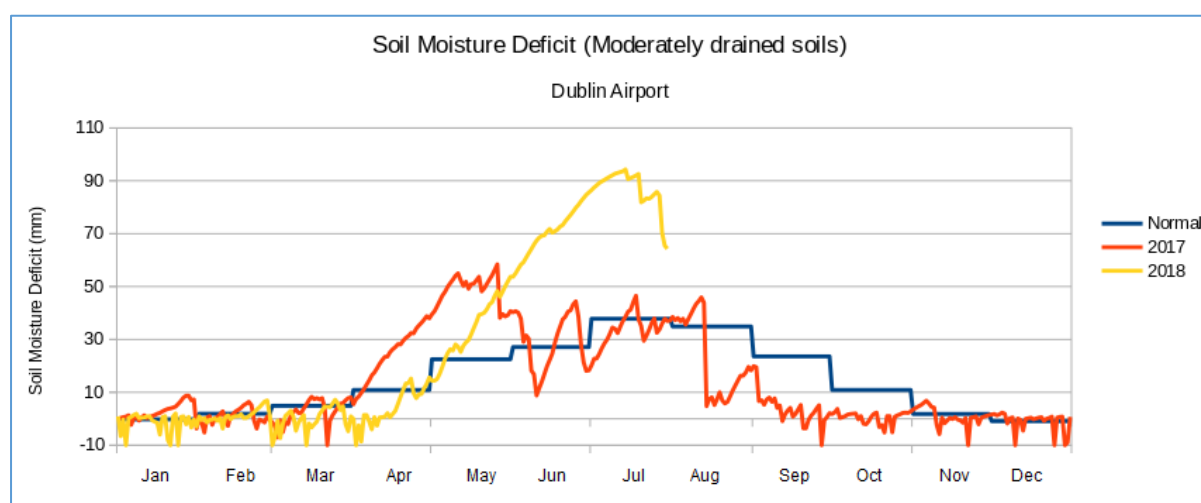
Johnstown (62m), Co Wexford 12.7 mm (17% of its LTA), driest in 77 years (previous dry or drier: on record)
 Phoenix Park, Co Dublin (48m), Co Dublin 4.1 mm (6% of its LTA), driest in 76 years (previous dry or drier: 4.1 mm in 1942)
 Dublin Airport (71m), Co Dublin 4.8 mm (7% of its LTA), driest in 76 years (previous dry or drier: 4 mm in 1942)
 Shannon Airport (15m), Co Clare 13.6 mm (19% of its LTA), driest in 72 years (previous dry or drier: on record)
 Cork Airport (155m), Co Cork 10.4 mm (13% of its LTA), driest in 56 years (previous dry or drier: on record)
 Dunsany (83m), Co Meath 11.4 mm (16% of its LTA), driest in 54 years (previous dry or drier: on record)
 Athenry (40m), Co Galway 25.2 mm (32% of its LTA), driest in 43 years (previous dry or drier: 22.8 mm in 1975)
 Valentia Observatory (24m), Co Kerry 39.2 mm (41% of its LTA), driest in 43 years (previous dry or drier: 18 mm in 1975)

Notably dry July 2018

Gurteen (75m), Co Tipperary 24.1 mm (36% of its LTA), driest in 63 years (previous dry or drier: 10.6 mm in 1955)

Soil moisture deficits

Soil moisture deficits give an indication of the amount of moisture available for growth Current soil moisture deficits range from around 25mm in the north and west to over 70mm in the Midlands and East.



Is Ireland's dry, warm weather of June and July, 2018 due to climate change?

There is no simple yes or no answer to the question. According to the World Meteorological Organisation, episodes of extreme heat and precipitation are increasing as a result of climate change. Although it is not possible to attribute the individual extreme events of June and July to climate change, they are compatible with the general long-term trend due to rising concentrations of greenhouse gases.

It is a fact that a current weather event is occurring in a climate that is approximately 1°C warmer than pre-industrial times but that alone does not mean that the event would not have occurred if the climate were colder by 1 degree (pre- industrial). An extreme event occurring in the current (warmer) climate is within the natural variability of the current climate, but it may also have been possible for it to have occurred in the colder climate, but perhaps more or less likely.

The Fifth Assessment report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) concluded that 'human influence on the climate system is clear' and that 'changes in many extreme weather and climate events have been observed since about 1950. Societies around the world are faced with increasing climate change risks. Many recent studies have found that the probability of the extreme event has been influenced by human activity, either directly or indirectly. Of a set of 131 studies published between 2011 and 2016 in the Bulletin of the American Meteorological Society, 65% found that the

event's probability was significantly affected by anthropogenic activities. In the case of some extreme high temperatures, the probability increased by a factor of ten or more.

How can weather events be attributed to anthropogenic climate change?

In order to give an evidence based estimate of whether a particular event can be attributed to climate change, a relatively new area of study in the field of climate change detection and attribution has recently developed. This is achieved by running a model with only natural influences in it, such as the solar cycle and volcanoes. Then the real world model is run - this includes human influences, such as emitting greenhouses gases, expanding cities, deforestation and many other things, along with natural influences. The two model outputs are the compared. By running an ensemble of models it is then possible to give a percentage probability of how more/less likely a particular event is. These model simulations are expensive to run computationally, so it is not possible to get information on attribution in real time. Results of attribution studies have statements like "the event is 30% more likely to have occurred in a warmer climate". Met Éireann is involved in a European project [EUPHEME](#), which is studying study attribution of a number of extreme events. There is also an [attribution project underway in UCC](#) which is looking at an assessment of the influence of anthropogenic climate change on Irish weather extremes.



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