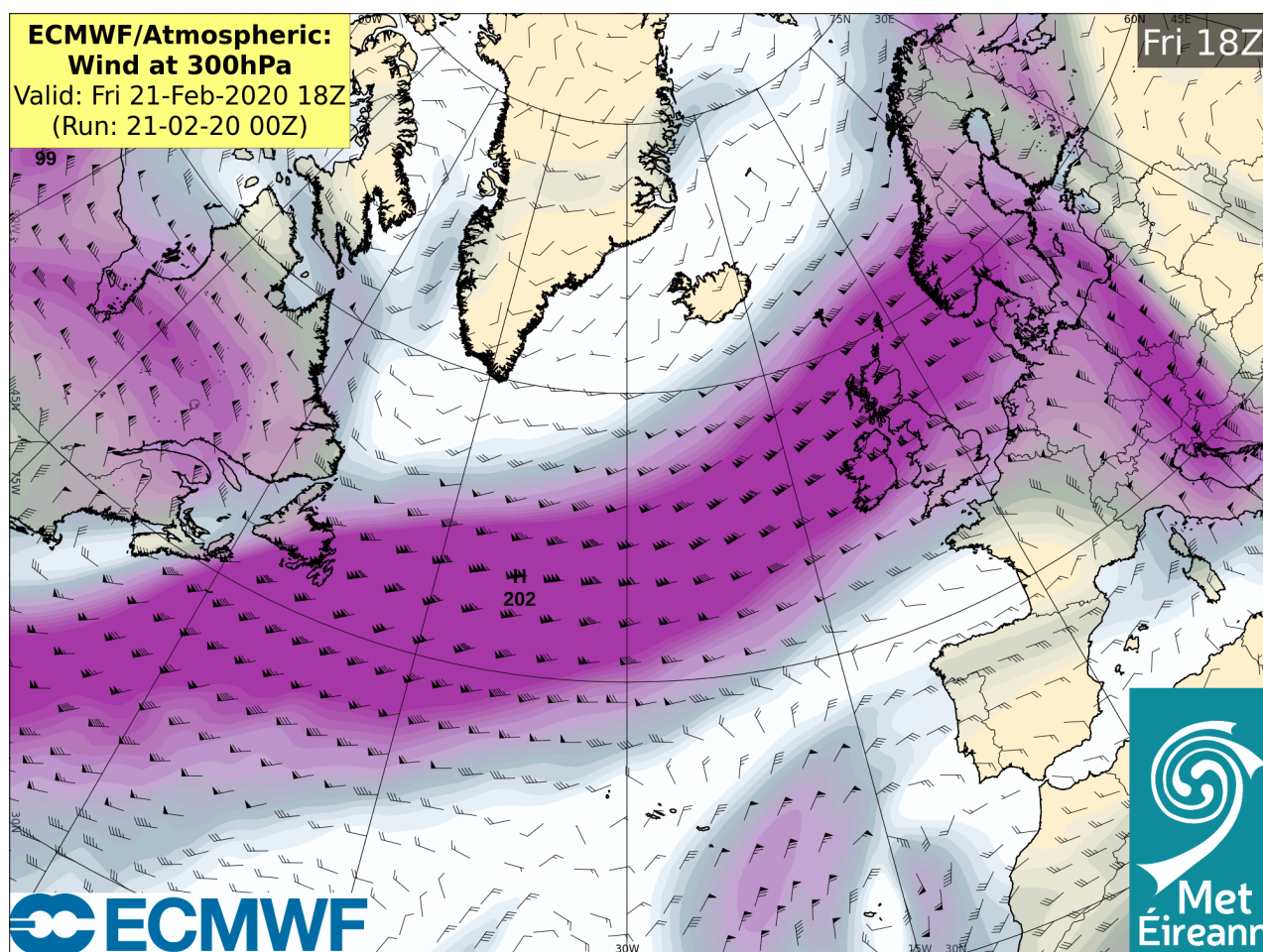


**Latest February Analysis 2020 updated at 10am, Wednesday 27<sup>th</sup> February 2020 by Paul Moore, Aidan Murphy and Sandra Spillane, Climate Services**

A strong Stratospheric Polar Vortex<sup>1</sup>, coupled with the troposphere, has led to the North Atlantic Oscillation<sup>2</sup> being in a strongly positive phase during February 2020. This has resulted in a zonal pattern across the Atlantic with a strong Polar Jetstream, further south than normal, bringing a series of vigorous Atlantic depressions, towards or just to the north of Ireland. These depressions, including two named storms, Ciara and Dennis, brought prolonged periods of heavy rainfall and stormy weather leading to extensive flooding in places, particularly along the Shannon catchment. Heavy rainfall falling on already saturated ground and with low evaporation rates in winter exacerbated the flooding.

The position and strength of the Polar Jetstream has resulted in 1.5 to 3 times the normal monthly rainfall so far for February throughout the country (a month usually associated with one of the least rainfall amounts).



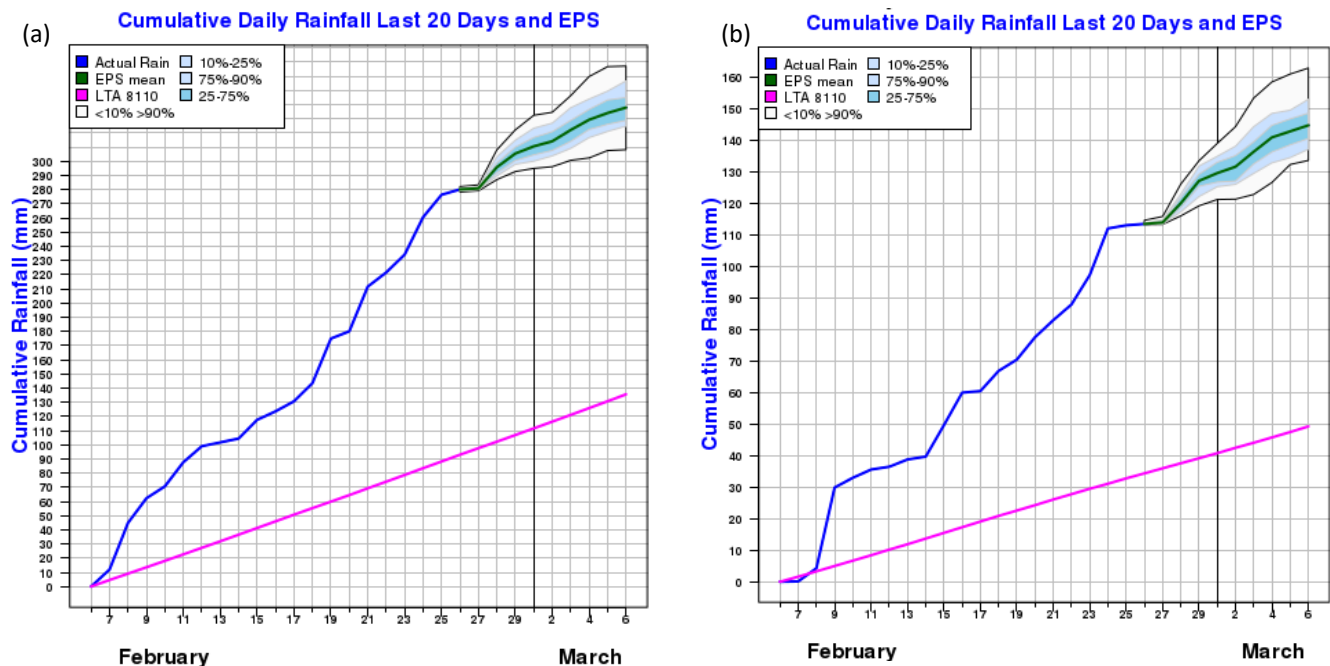
Synoptic analysis chart showing the position of the Jetstream on the 21st February 2020. Strongest winds in Purple.

The highest monthly rainfall total during the period 1-26 February was observed at Newport, Co Mayo with 306.6 mm (242 % of its February LTA). The Lowest monthly rainfall total during the period 1-26 February was observed at Dublin Airport, Co Dublin with 120.7 mm (247% of its February LTA). While the highest daily rainfall total was 51.5 mm on Saturday 8 February 2020 at Knock Airport, Co Mayo (50% of its monthly LTA).

So far this month, ten synoptic stations have already had their wettest February on record, including Phoenix Park, Co Dublin (records going back to 1850), Shannon Airport, Co Clare (record

length 74 years), Newport, Co Mayo (record length 60 years), Claremorris, Co Mayo (record length 19 years), Casement, Co Dublin (record length 56 years) and Knock Airport (record length 23 years).

The following graphs illustrate rainfall for the last 20 days together with the Forecast ensembles going into the coming week for (a) Newport, Co Mayo (the highest rainfall recorded so far in February 2020) and (b) Dublin Airport, Co Dublin (the lowest rainfall recorded so far in February 2020)



Station Name	Rainfall (mm) 1st- 25th February 2020	Mean 1981 to 2010 Rainfall (mm) for February.	Percentage (%) of February Rainfall to date	Approximate Return Periods for monthly rainfall *
ATHENRY	229.1	87.8	261	1 in 10 year event
BALLYHAISE	188.3	72.6	259	1 in 15 year event
BELMULLET	212.4	97.1	219	1 in 10 year event
CASEMENT	140.6	48.5	290	1 in 3 year event
CLAREMORRIS	261.4	101.1	259	1 in 75 year event
CORK AIRPORT	175.6	97.8	180	1 in 2 year event
DUBLIN AIRPORT	120.7	48.8	247	1 in 2 year event
DUNSANY	140.1	59.7	235	1 in 2 year event
FINNER	246.3	95.3	258	1 in 20 year event
GURTEEN	198.0	66.2	299	1 in 20 year event
JOHNSTOWN CASTLE	128.3	75.5	170	1 in 18 month event
KNOCK AIRPORT	254.5	102.9	247	1 in 20 year event
MALIN HEAD	184.4	87.4	211	1 in 2 year event
MARKREE	223.0	91.6	243	1 in 15 year event
MOORE PARK	135.5	80.1	169	1 in 18 month event
MT DILLON	196.7	77.7	253	1 in 10 year event
MULLINGAR	174.6	70.3	248	1 in 5 year event
NEWPORT	306.6	126.5	242	1 in 4 year event
CARLOW	156.0	57.3	272	1 in 10 year event
PHOENIX PARK	132.9	51.3	259	1 in 2.5 year event
ROCHES POINT	126.2	74.8	169	1 in 18 month event
SHANNON AIRPORT	221.5	76.2	291	1 in 45 year event
SHERKIN ISLAND	138.9	101.4	137	1 in 18 month event
VALENTIA	211.8	123.7	171	1 in 18 month event

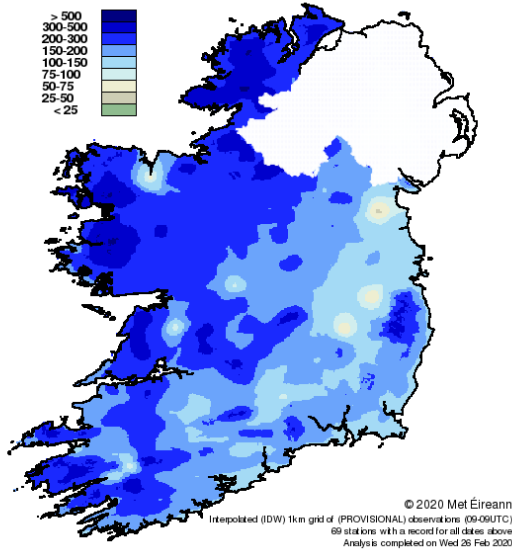
\* Return periods are estimates of the average period between rainfall events of a given magnitude, based on past data for all months.

Synoptic station Data including rainfall for February 2020 so far, mean February rainfall, February 2020 percentage of LTA and approximate return periods for this amount of rainfall for any given month.

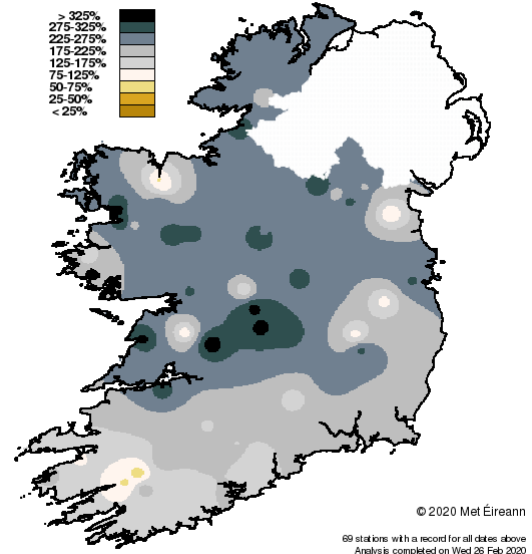
## Historical context

February 1990 and 2014 were similarly wet and windy months, with prolonged heavy rainfall leading to widespread flooding. In 2014, a number of rainfall stations recorded February rainfall totals in excess of 350 mm. Comparisons with 2020 below:

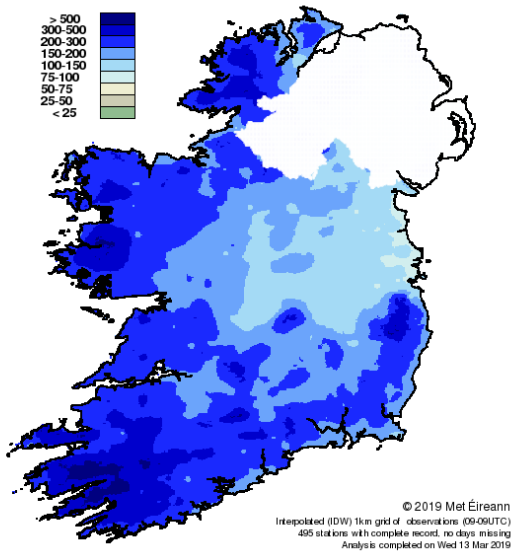
Total Monthly Rainfall (mm) - 1-25 February 2020 (PROVISIONAL)



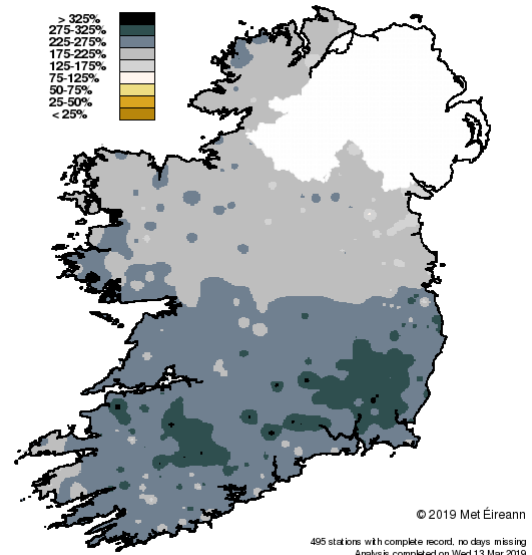
Rainfall % of 1981-2010 Monthly Average - 1-25 February 2020 (PROVISIONAL)



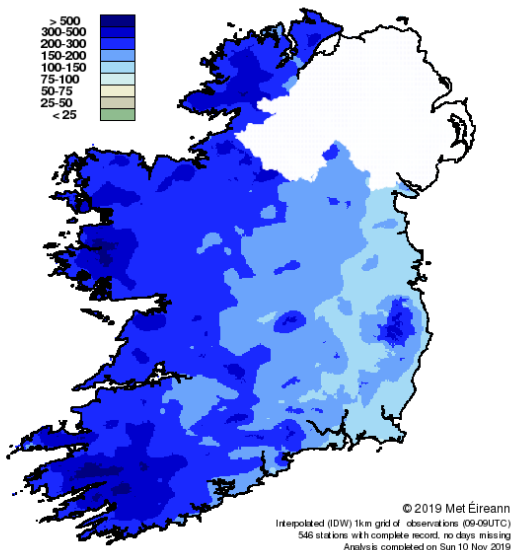
Total Monthly Rainfall (mm) - February 2014



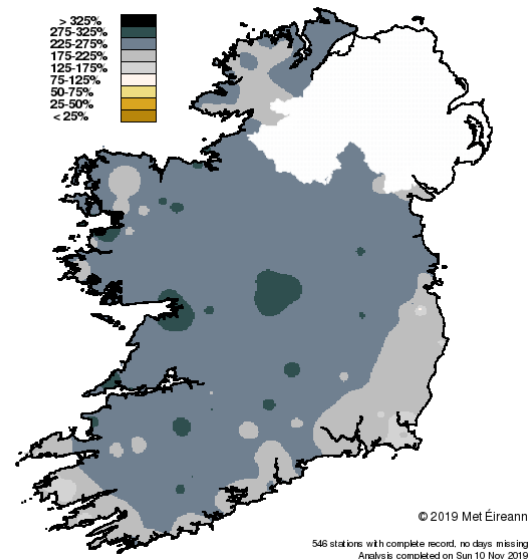
Rainfall % of 1981-2010 Monthly Average - February 2014



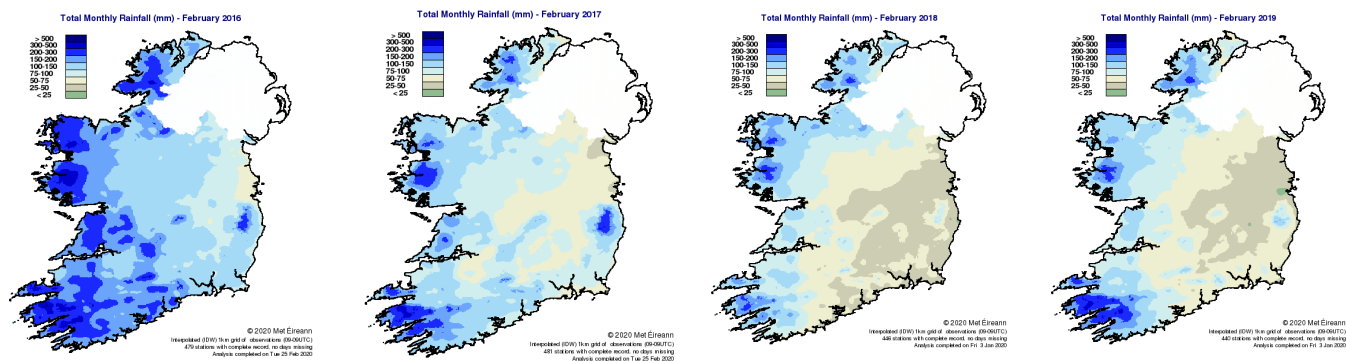
Total Monthly Rainfall (mm) - February 1990



Rainfall % of 1981-2010 Monthly Average - February 1990



Gridded rainfall totals (left) and Gridded % of LTA (right) for February 2020, 2014 and 1990. There may be some gaps in the 2020 maps as the climate station data from some upland stations are only reported at the end of each month.



The following gridded maps show the observed rainfall totals across the last four February's (2016, 2017, 2018 and 2019) for comparison.

## Climate Change

In Met Éireann, basic trend analysis has been performed on a number of high quality rainfall stations over a fifty year period. Some stations show an increase in the frequency of heavy precipitation (>10mm) / very heavy precipitation (>20mm) days over the past decades, however other stations show a decrease, there is large regional variation and occasionally conflicting trends from stations that are geographically relatively close. The fact that rainfall displays such a high degree of variability, both temporally and spatially makes it difficult to be definitive about trends.

In general, an increase in the frequency of extreme weather events has been attributed to climate change and is linked to human activity. However, without further detailed analysis, it's not possible to say whether this particular event is due to the natural variation in the climate system or whether climate change had an effect.

**Be aware of flooding and keep up to date with the latest warnings and weather forecasts for your area: [www.met.ie/warnings](http://www.met.ie/warnings).**

The Weather and Climate Statements for February 2020 and Meteorological Winter 2020 (December 2019, January 2020 and February 2020) will be published on the 2nd working day and 3rd working day of March 2020 respectively. For these publications, and more, see: [www.met.ie/climate/past-weather-statements](http://www.met.ie/climate/past-weather-statements).

Note: The provisional values for February 2020 may go up or down by the end of the month when quality control on the data is completed, and as Met Éireann receives more rainfall observations. This analysis is based on Met Éireann's 25 synoptic weather stations.

<sup>1</sup> The stratospheric polar vortex is a large-scale region of air that is contained by a strong west-to-east jet stream that circles the polar region in the stratosphere (not to be confused with the Polar Jetstream that steers the weather in the mid latitudes, which is located at the top of the troposphere). The stratosphere jet stream is much higher up and is usually referred to as the polar night jet.

<sup>2</sup> The North Atlantic Oscillation is a weather phenomenon in the North Atlantic Ocean of fluctuations in the difference of atmospheric pressure at sea level between the Icelandic Low and the Azores High. A positive phase is when both the sub-polar low and the subtropical high are stronger than average, intensifying the Polar Jetstream.