



**An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta**
Department of Housing,
Local Government and Heritage



Ireland's Climate Averages

1991-2020
Summary Report

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Ireland's Climate Averages 1991-2020

Introduction

Climate averages are the mean or average values of a climate variable over a standard reference period. The World Meteorological Organization (WMO) established that the length of the reference period should be 30 years, with a recommendation to update the climate averages every 10 years to provide representative reference values for recent climatic conditions.

Climate averages are used for two principal purposes. They provide information about typical weather conditions at a particular location and they serve as a benchmark against which recent or current observations can be compared, including providing a basis for many anomaly-based climate datasets. They are also widely used as a reference baseline to provide context for future climate projections.

In accordance with WMO guidelines, Met Éireann has compiled a set of climate averages for the period 1991-2020 for a range of parameters including air temperature, precipitation, sunshine and wind. Annual, seasonal, and monthly average values for the period 1991-2020 were compiled using quality controlled data obtained from Met Éireann's observation network. Multiple Analysis of Series for Homogenisation (MASH) software was applied to a selection of long-term temperature and rainfall stations in the network. Values are averaged for each month over the 30-year period to obtain the long-term average. In the case of air temperature and rainfall, gaps in observational data are estimated using data from neighbouring stations. Long-term averages for stations are then used to generate maps and gridded data at a 1 km resolution.

Here we present a summary of the latest set of climate averages for Ireland as well as an assessment of trends between the two 30-year averaging periods, 1961-1990 and 1991-2020.

Going forward, weather and climate statistics will reference the new long-term average period 1991-2020, unless otherwise stated. These will replace the 1981-2010 long-term averages that are currently in use. The historical baseline period of 1961-1990 will be retained for use in climate change assessments. A separate Climatological Report will be made available to provide details of quality control and homogenisation methods along with a description of the infilling and gridding techniques used to generate the 1991-2020 climate averages.

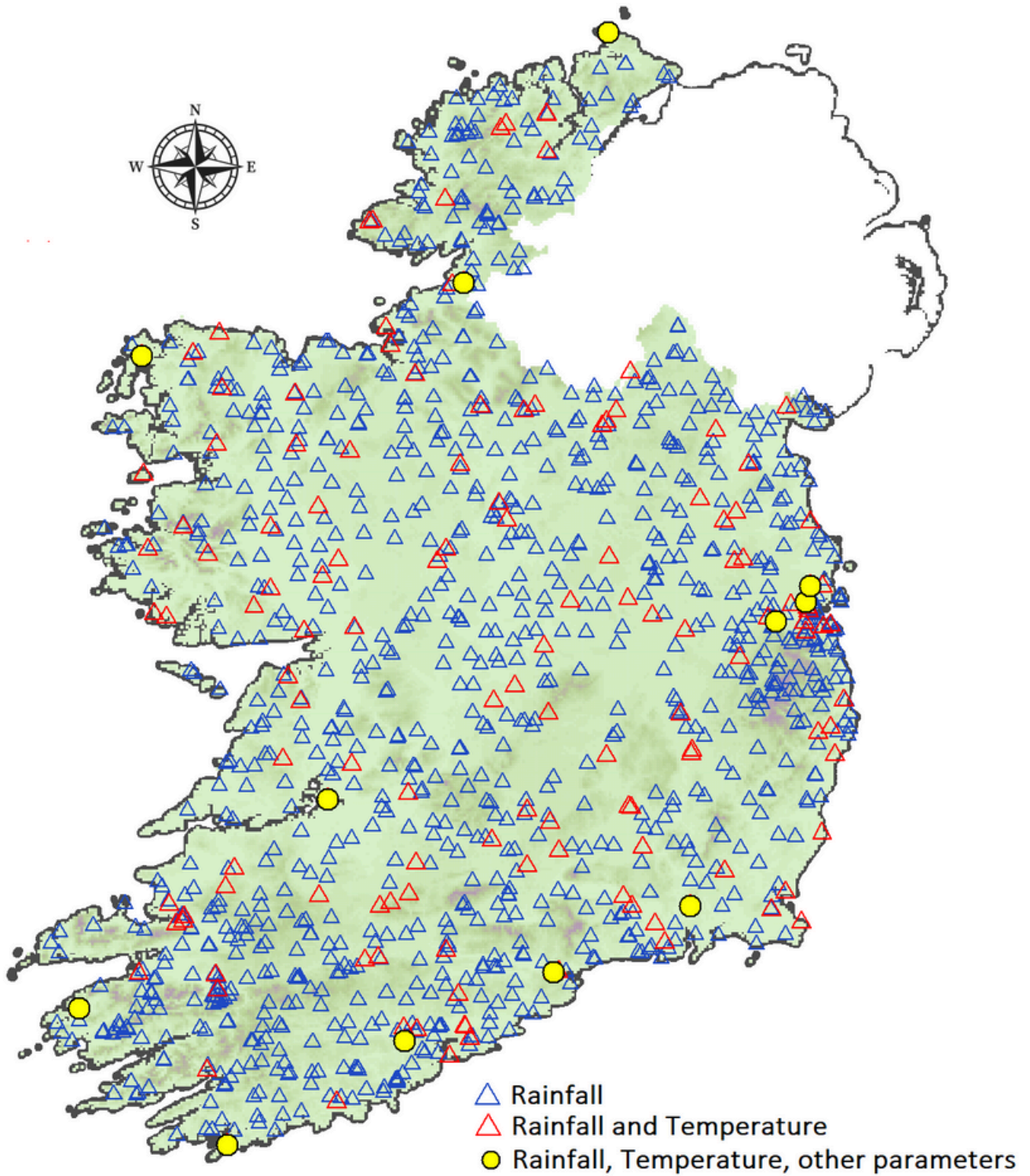
Data Accessibility

Data and maps for Ireland's 1991-2020 climate averages will be made freely available on www.met.ie along with site-specific climate averages for a range of parameters for principal climate stations. For other data requests please e-mail Climate Enquires at enquiries@met.ie.

Acknowledgements

We would like to thank Dan Hollis and Mark McCarthy of the Met Office, United Kingdom for the provision of data for Northern Ireland and their valuable advice and assistance. Particular thanks and recognition to the Met Éireann climate and rainfall voluntary observers without whom this work would not have been possible.

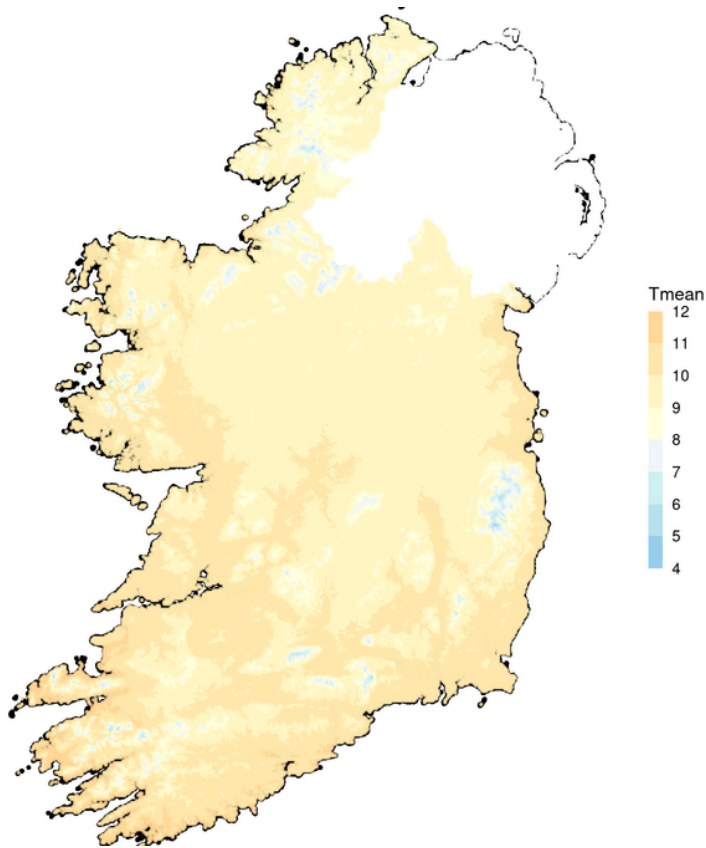
Location of stations in Met Éireann's observation network used in the calculation of the 30-year averages



Annual Mean Temperature (1991-2020)

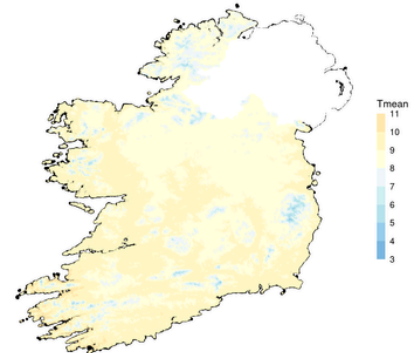
The annual mean air temperature for Ireland over the period 1991-2020 is 9.8°C. The annual mean air temperature ranges from approximately 8.5°C to 10.8°C. Due to the moderating influence of the sea, areas closest to the coast are generally warmest while areas at higher elevations are the coolest.

Annual Mean Temperature (°C)

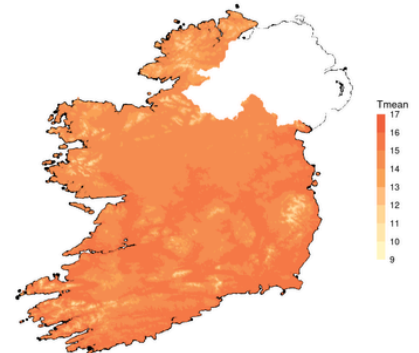


Seasonal Mean Temperature (°C)

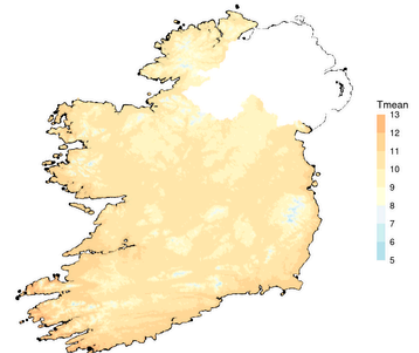
Spring Mean Temperature (°C)



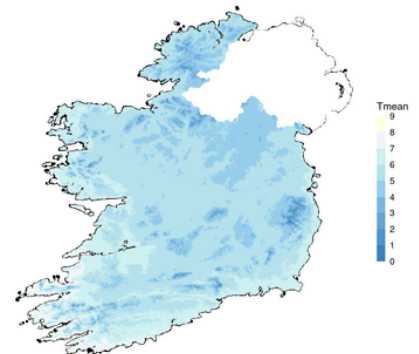
Summer Mean Temperature (°C)



Autumn Mean Temperature (°C)



Winter Mean Temperature (°C)



Seasonal Mean Temperature (1991-2020)

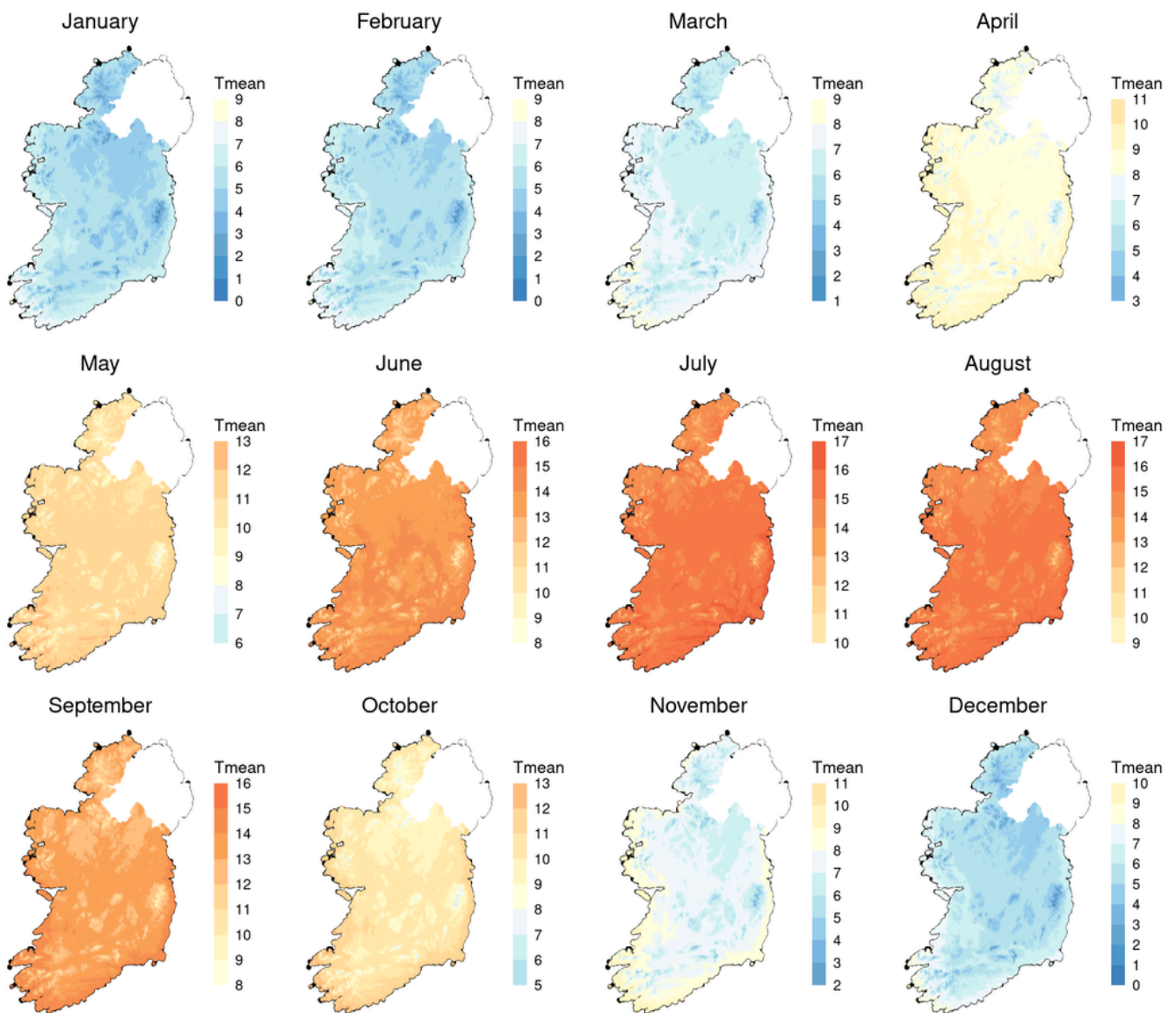
Summer is the warmest season in the 1991-2020 period with a mean air temperature for Ireland of 14.6°C. Autumn is the second warmest season with a mean air temperature of 10.3°C, followed by Spring at 8.8°C. Winter is the coldest season with a mean air temperature of 5.4°C. In summer, the highest temperatures are commonly observed in inland areas. The reverse is true in winter with coastal regions observing the highest temperatures.

Ireland's Climate Averages 1991-2020

Monthly Mean Temperature (1991-2020)

Over the period 1991-2020, the highest monthly mean air temperatures for Ireland are observed in July and August, with monthly mean air temperature of 15.2°C and 15°C, respectively. June has the third highest monthly mean air temperature at 13.6°C. The winter months are the coldest over the 30 year period, with the lowest monthly mean air temperatures observed in January at 5.3°C. February is the second coldest month with a monthly mean air temperature of 5.5°C, followed by December at 5.6°C.

Monthly Mean Temperature (°C)



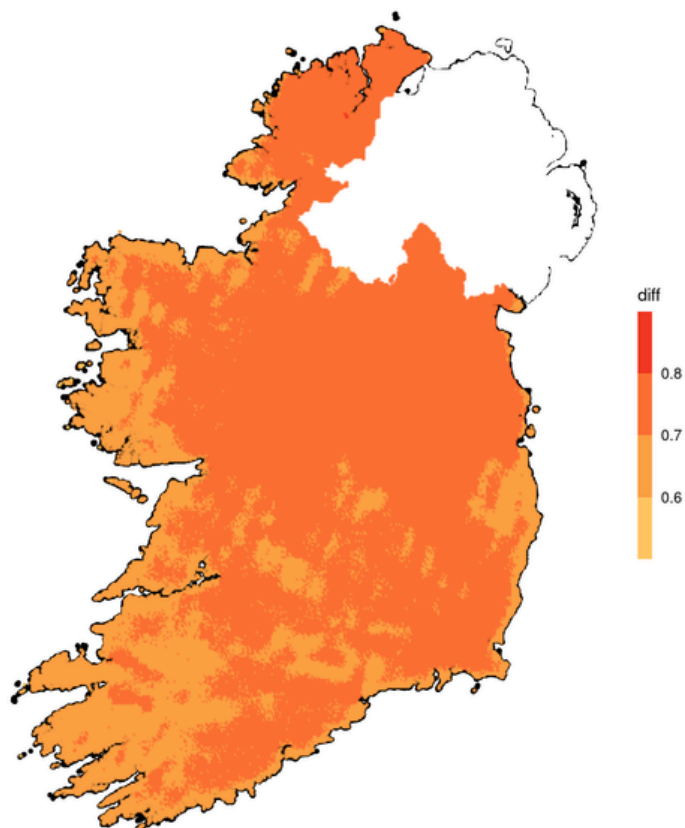
Ireland's Climate Averages

Comparison between 1991-2020 and 1961-1990 climate averages

Annual Mean Temperature Comparison (°C)

Comparing the 1991-2020 annual mean air temperature for Ireland with that of the 1961-1990 period, there has been an increase of approximately 0.7°C.

Annual Mean Temperature Comparison (°C)



Seasonal Mean Temperature Comparison (°C)

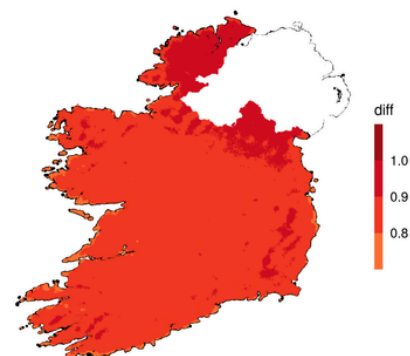
Mean air temperature has increased in all seasons. Spring shows the highest increase of approximately 0.8°C. Winter has the smallest increase at 0.6°C. Summer and autumn observed an increase of approximately 0.7°C.

Monthly Mean Temperature Comparison (°C)

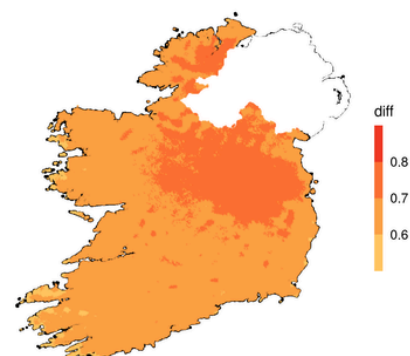
All months observed an increase in mean air temperature in the 1991-2020 period when compared with the 1961-1990 period. The greatest increase at 0.9°C is observed in February, April, May and November. The smallest increase in monthly mean air temperature is in October at 0.2°C, followed by December at 0.3°C. All other months observed an increase of between 0.6°C and 0.8°C.

Seasonal Mean Temperature Comparison (°C)

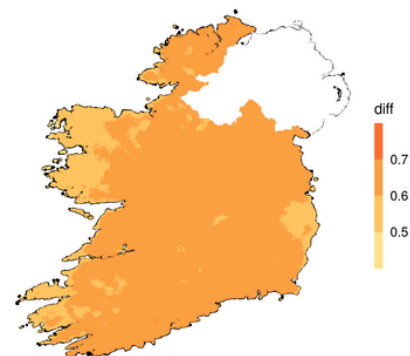
Spring Comparison (°C)



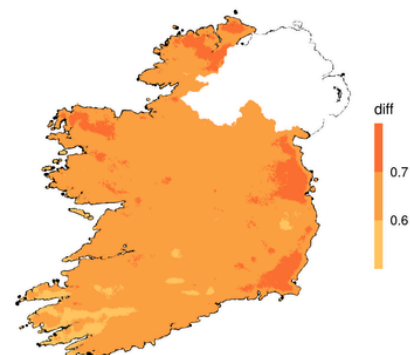
Summer Comparison (°C)



Autumn Comparison (°C)



Winter Comparison (°C)

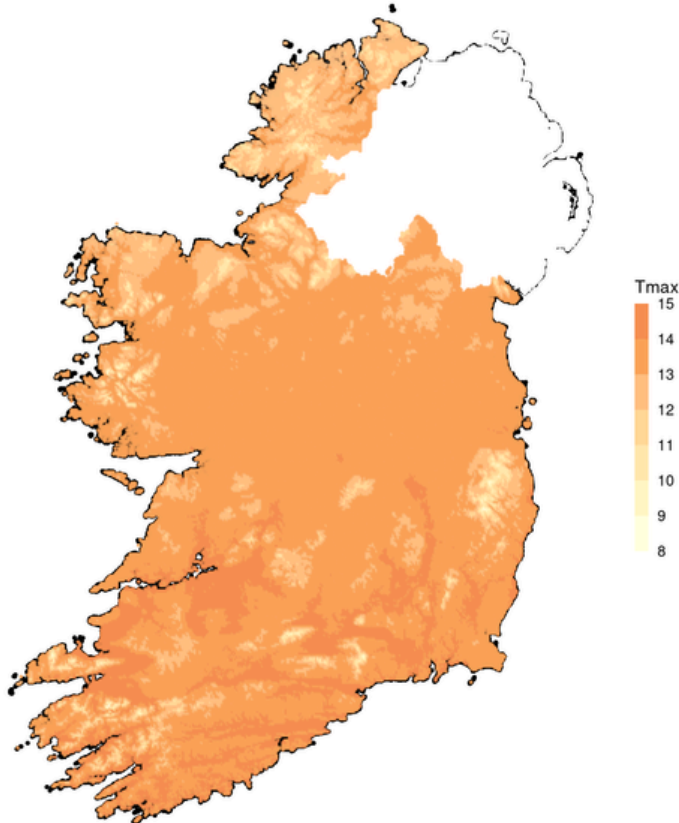


Ireland's Climate Averages 1991-2020

Annual Maximum Temperature (1991-2020)

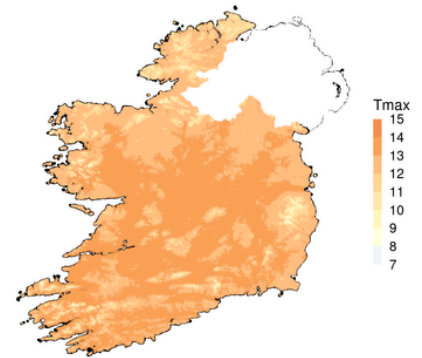
The annual mean maximum air temperature for Ireland over the period 1991-2020 is 13.4°C. The annual maximum air temperature ranges from approximately 12.0°C to 14.2°C.

Annual Maximum Temperature (°C)

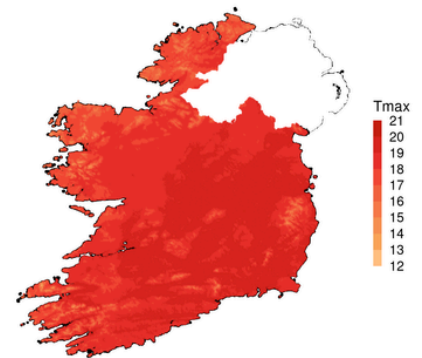


Seasonal Maximum Temperature (°C)

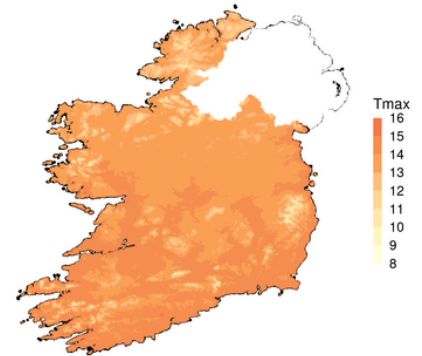
Spring Maximum Temperature (°C)



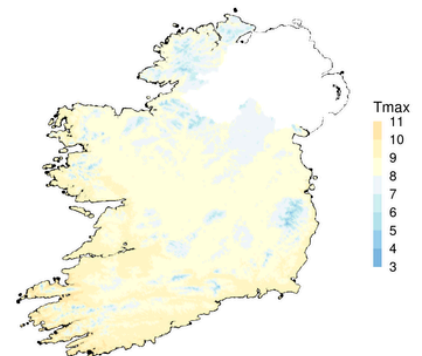
Summer Maximum Temperature (°C)



Autumn Maximum Temperature (°C)



Winter Maximum Temperature (°C)



Seasonal Maximum Temperature (1991-2020)

Summer is the season with the highest mean maximum air temperature for Ireland with a value of 18.6°C. Autumn is the second highest with a mean maximum air temperature of 13.7°C, followed by spring at 12.8°C and winter at 8.5°C.

Monthly Maximum Temperature (1991-2020)

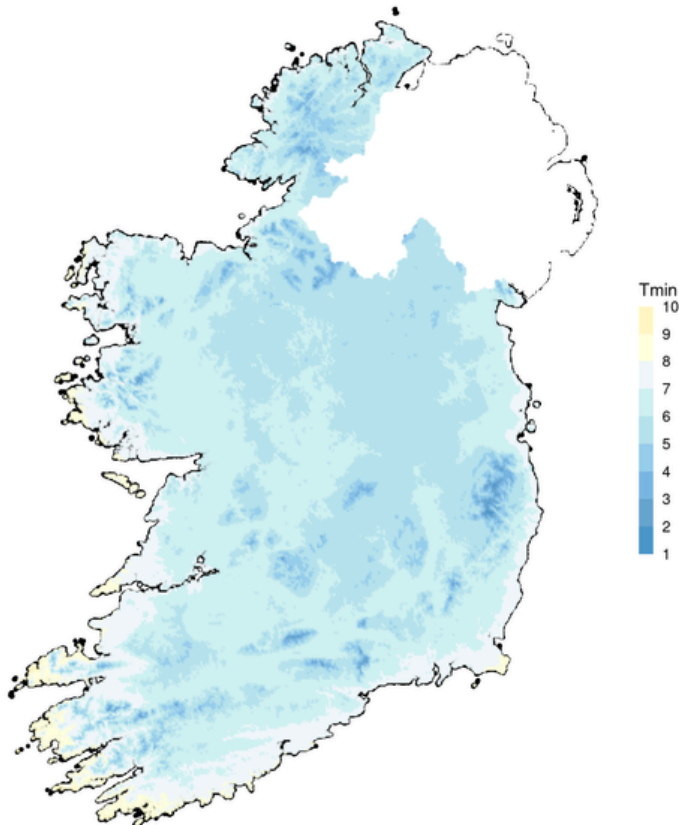
July has the highest mean maximum air temperature with a value of 19.1°C, closely followed by August at 18.9°C, and June at 17.8°C. January has the lowest mean maximum air temperature at 8.2°C, followed by December at 8.5°C and February at 8.7°C.

Ireland's Climate Averages 1991-2020

Annual Minimum Temperature (1991-2020)

The annual mean minimum air temperature for Ireland for the period 1991-2020 is 6.2°C. The annual minimum air temperature ranges from approximately 4.9°C to 7.6°C.

Annual Minimum Temperature (°C)



Seasonal Minimum Temperature (1991-2020)

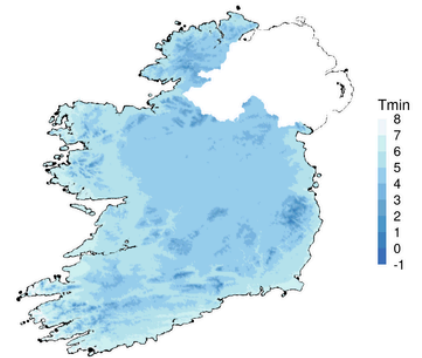
Winter has the lowest mean minimum air temperature for Ireland with a value 2.4°C. Spring has the second lowest mean minimum air temperature at 4.8°C, followed by autumn at 6.8°C. Summer has the highest mean minimum air temperature at 10.7°C.

Monthly Minimum Temperature (1991-2020)

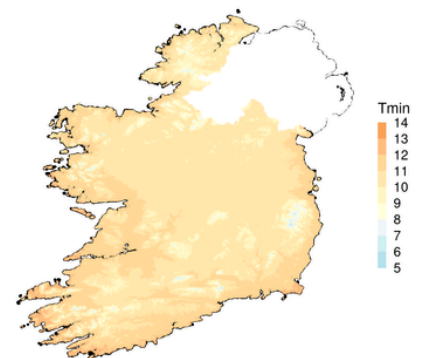
January and February have the lowest monthly mean minimum air temperature at 2.3°C, followed by December at 2.7°C. The summer months have the highest monthly mean minimum air temperatures. Minimum temperatures are at their highest in July and August, with mean minimum air temperatures of 11.4°C and 11.2°C, respectively.

Seasonal Minimum Temperature (°C)

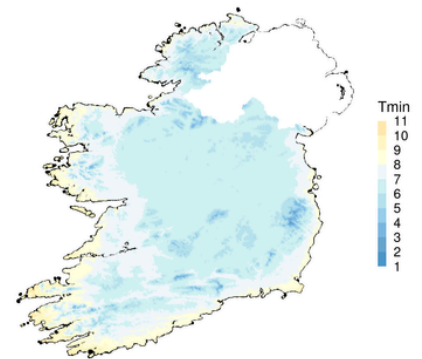
Spring Minimum Temperature (°C)



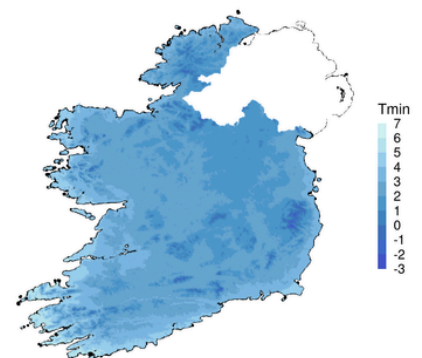
Summer Minimum Temperature (°C)



Autumn Minimum Temperature (°C)



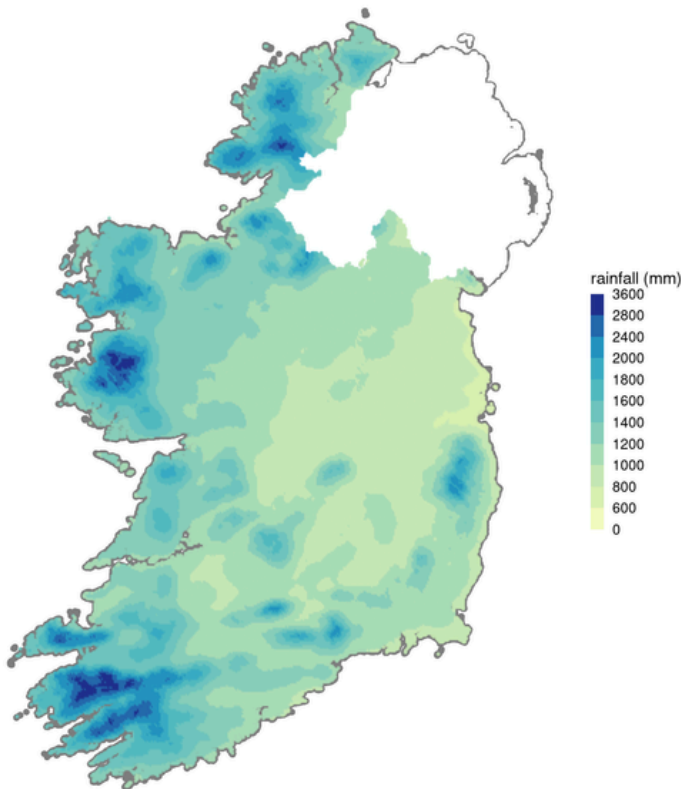
Winter Minimum Temperature (°C)



Annual Rainfall (1991-2020)

Nationally, annual average rainfall over the period 1991-2020 is approximately 1,288 mm. The 30-year average annual distribution shows a typical west to east decline. Highest rainfall amounts are observed in the west of the country, particularly on higher ground. Annual average rainfall ranges from 878 mm in regions along the east coast to 2,045 mm in the southwest mountainous regions.

Annual Rainfall (mm)

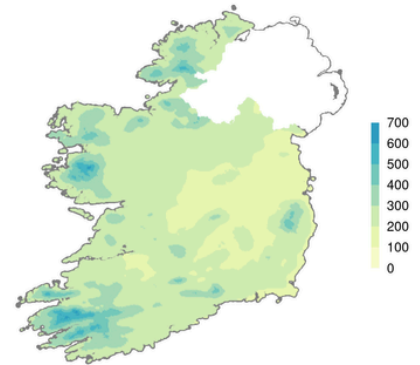


Seasonal Rainfall (1991-2020)

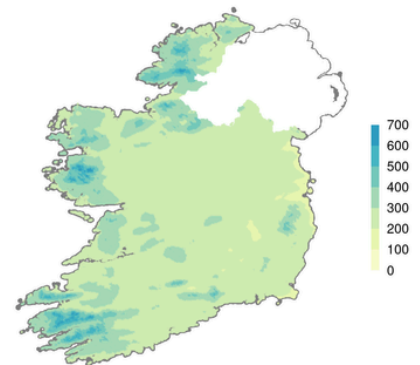
Winter and autumn are the wettest seasons in the 1991-2020 period, with average rainfall of 380 mm and 369 mm, respectively. The driest season is spring with an average of 256 mm of rainfall, followed by summer with an average of 282 mm of rainfall observed over the 30-year period.

Seasonal Rainfall (mm)

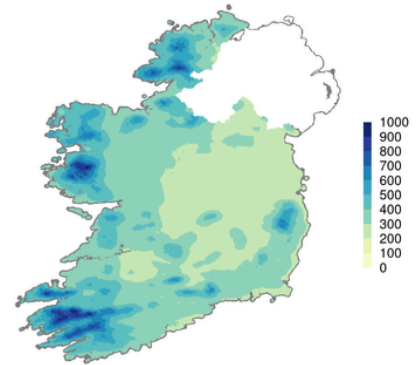
Spring Rainfall (mm)



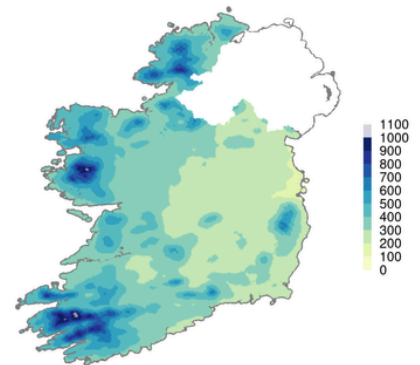
Summer Rainfall (mm)



Autumn Rainfall (mm)



Winter Rainfall (mm)

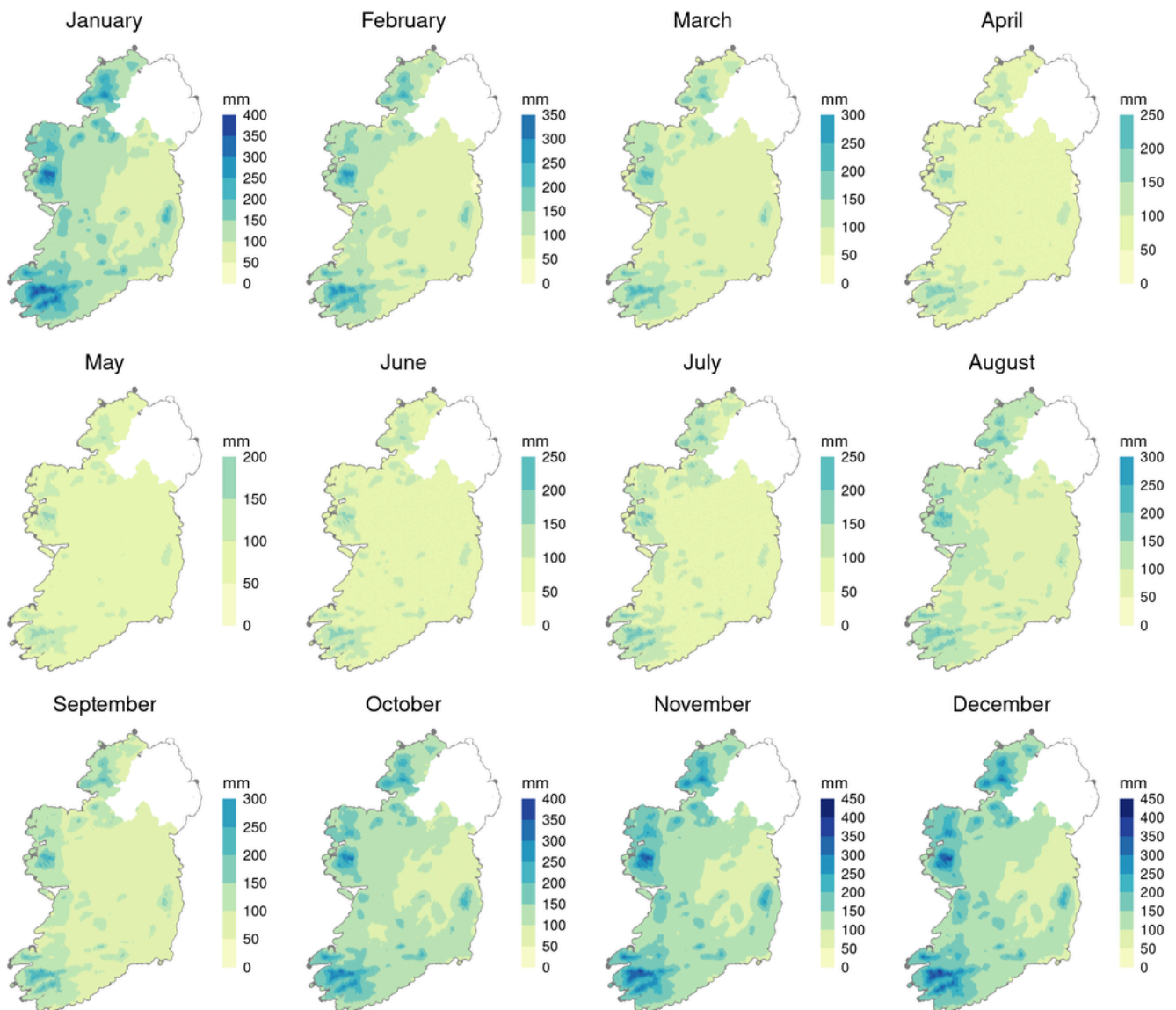


Ireland's Climate Averages 1991-2020

Monthly Rainfall (1991-2020)

December is the wettest month with average rainfall of approximately 142 mm over the 1991-2020 period. Following December, the wettest months in the 30-year period are October, November and January with average rainfall amounts of approximately 130 - 140 mm. The driest months are April and May with average rainfall of 82 mm and 79 mm, respectively. In summer, August is the wettest month with average rainfall of 103 mm. June is the driest of the summer months with average rainfall of 85 mm.

Monthly Rainfall (mm)



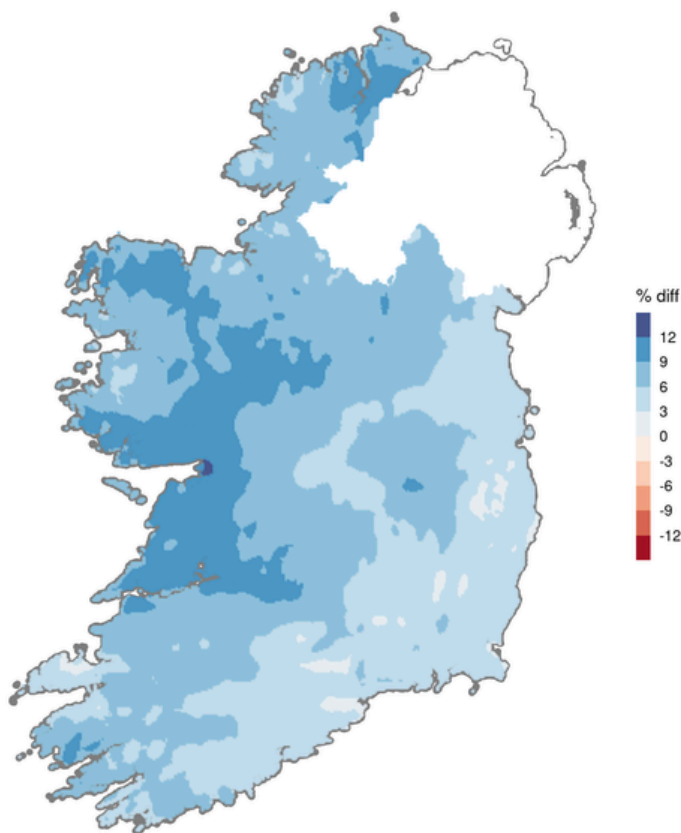
Ireland's Climate Averages

Comparison between 1991-2020 and 1961-1990 climate averages

Annual Rainfall Comparison

Annual average rainfall has increased by approximately 7% between the periods 1961-1990 and 1991-2020. Almost all regions have observed an increase in annual average rainfall between the two 30-year periods. The greatest increases are seen in the west and north of the country. The driest regions are in the east and south of the country, along with parts of the midlands region.

Annual Rainfall Comparison (%)

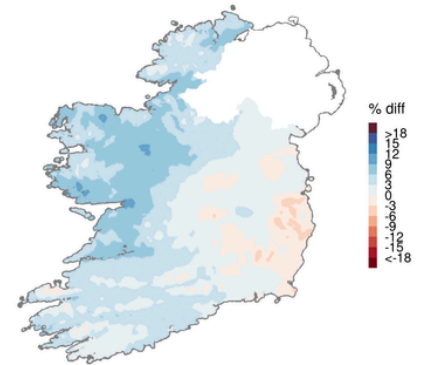


Seasonal Rainfall Comparison

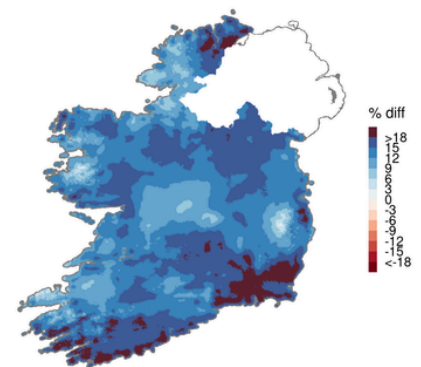
All seasons show a percentage increase in average rainfall amounts between the periods 1961-1990 and 1991-2020 although there are large regional variations. The greatest increase is observed in summer rainfall at 14%. Winter rainfall has increased by 7% between the two 30-year periods. Spring and autumn show increases of 4% and 5%, respectively.

Seasonal Rainfall Comparison (%)

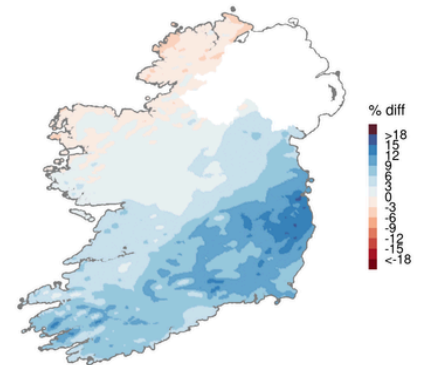
Spring Comparison (%)



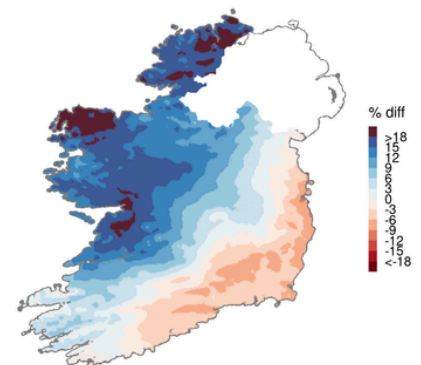
Summer Comparison (%)



Autumn Comparison (%)



Winter Comparison (%)



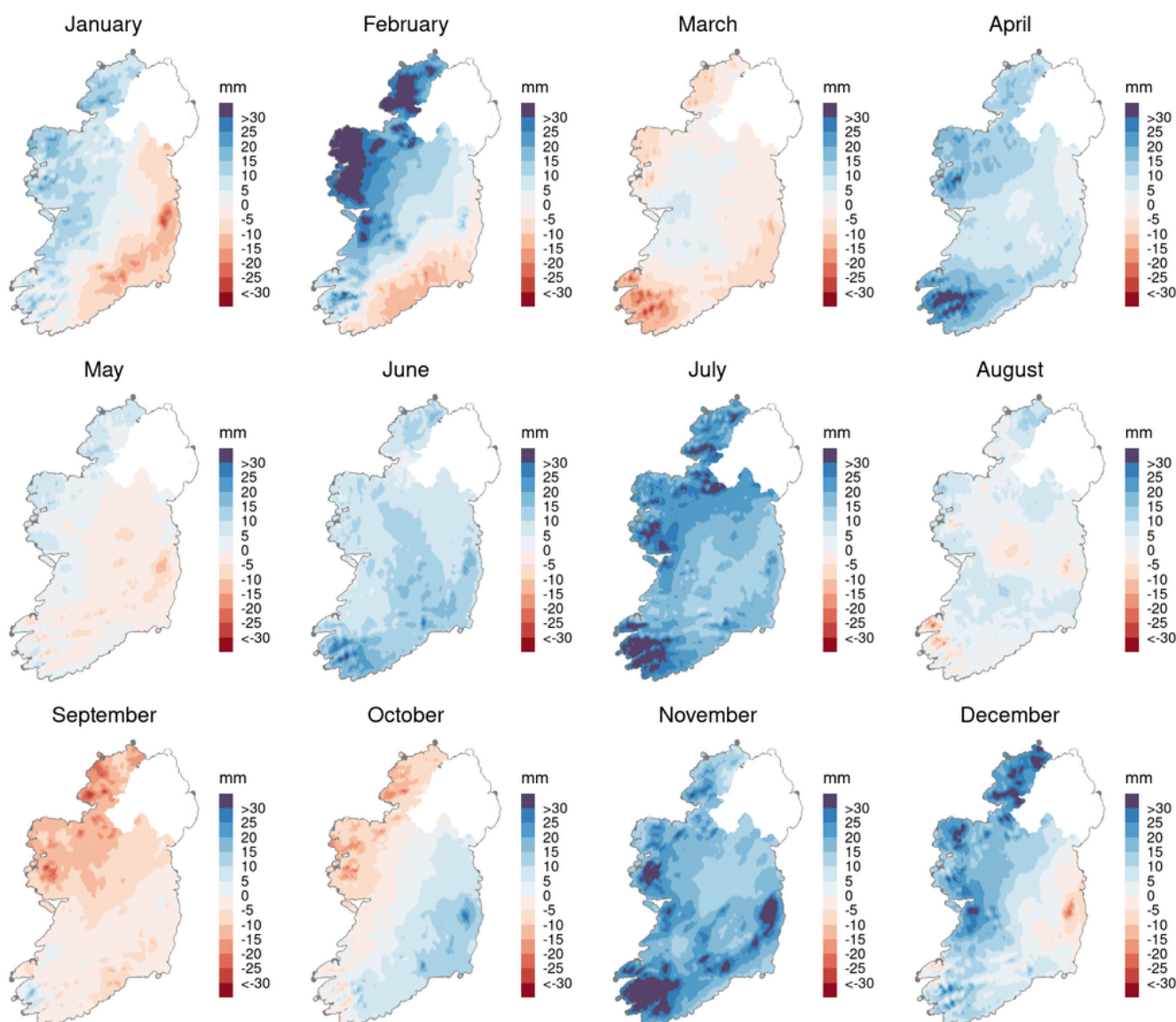
Ireland's Climate Averages

Comparison between 1991-2020 and 1961-1990 climate averages

Monthly Rainfall Comparison

Comparing the two 30-year periods (1961-1990 and 1991-2020) the greatest difference at 28% is observed in July, with most regions throughout the country observing an increase in average rainfall amounts. Similarly, large areas of the country observed increases in rainfall amounts in April, June and November, with increases of between 15-17%. March and September are the only months that have observed a decrease in average rainfall amounts, in the order of 3% and 6%, respectively. All other months show marked regional variations when comparing average rainfall amounts over the two 30-year periods. February, in particular, shows a clear north-east to south-west decline in rainfall amounts.

Monthly Rainfall Comparison (%)

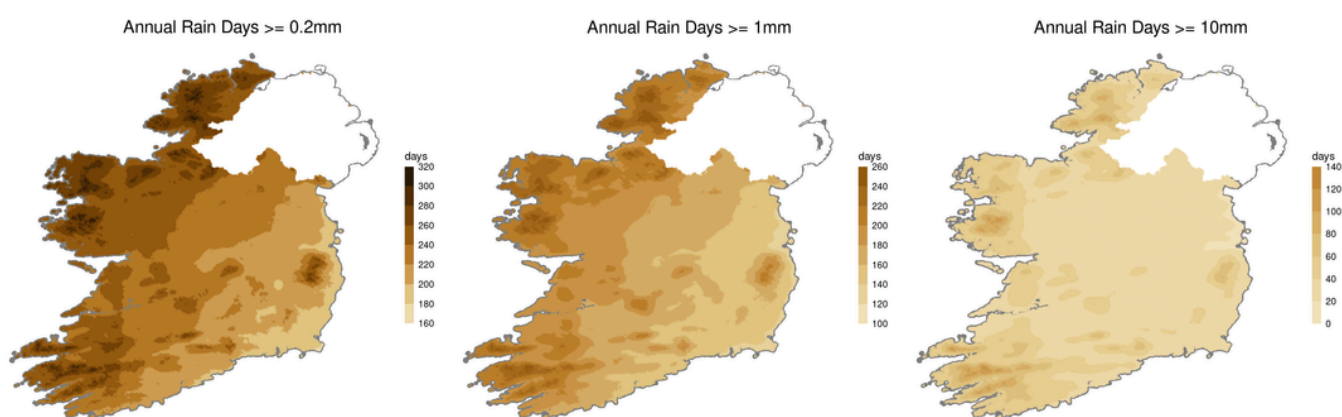


Rainfall (1991-2020) - Days of Rain

Climate averages were obtained for the annual, seasonal and monthly number of rain days (number of days with rainfall ≥ 0.2 mm), wet days (number of days with rainfall ≥ 1 mm) and very wet days (number of days with rainfall ≥ 10 mm).

Over the period 1991-2020, on an annual basis, the average number of rain days ranges from 201 days to 272 days; the average number of wet days ranges from 147 days to 226 days; and the average number of very wet days ranges from 22 days to 68 days. The 30-year average annual distribution shows a typical west to east decline in the number of rain days and wet days, with east and south-east regions experiencing the lowest number of rain days and wet days. The highest number of rain days and wet days are observed in elevated western and northwest regions. The average annual number of very wet days observed over the period 1991-2020 again shows that these events are more frequent in the west of the country than in eastern and midland regions.

Comparing the two 30-year periods, there has been an increase in the average annual number of rain days, wet days and very wet days observed between the 1961-1990 and 1991-2020 periods. On a seasonal basis, winter, summer and autumn show an increase in the number of rain days, wet days and very wet days. There is a decrease in the number of rain days and wet days observed in spring, with a slight increase observed in very wet days. For all indicators, there are monthly and regional variations in both the direction and magnitude of change. The greatest increases are observed in the month of July for both rain days and wet days.

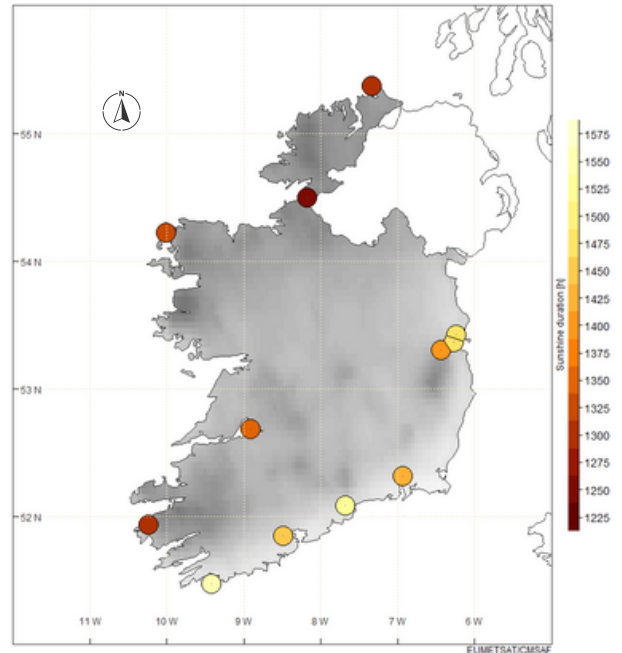


Sunshine (1991-2020)

Across the twelve stations shown in the map, the mean annual sunshine duration for the period 1991-2020 is 1403.3 hours. In general, stations located near eastern and southern coasts are relatively sunny, while those located near western and northern coasts are relatively dull. Sherkin Island, Co. Cork, has the greatest mean annual total with 1541.9 hours of sunshine. The lowest mean annual total is 1252.3 hours at Ballyshannon, Co. Donegal.

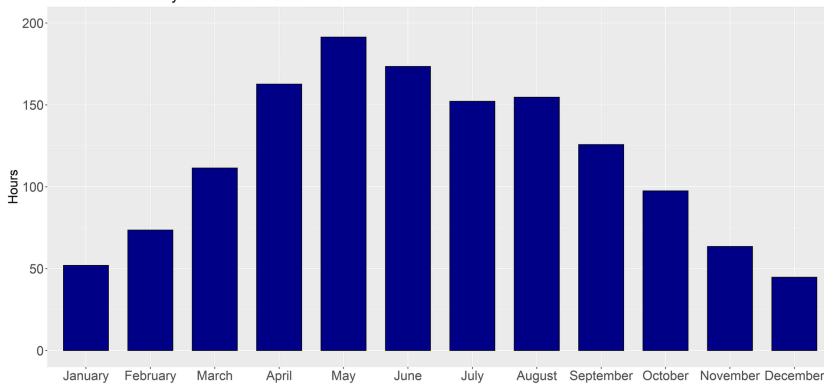
Compared to the available averages calculated for the period 1961-1990, annual sunshine duration for 1991-2020 has increased by an average of 4.5% or 58.6 hours.

Annual Sunshine Hours 1991-2020



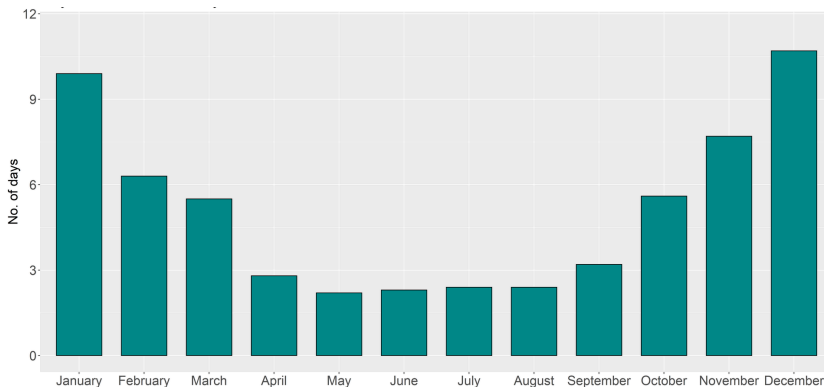
Sunshine hours determined from satellite observations over the 1991-2020 are used as a background to the map allowing the general patterns of sunshine hours over the period to be illustrated. Source: EUMETSAT <https://www.cmsaf.eu>

Sunshine hours by month 1991-2020



May is the sunniest month of the year for the period 1991-2020 with an average of 191.4 hours. This is followed by June (173.5 hours), April (162.7 hours), August (154.7 hours) and July (152.2 hours). December is the dulliest month of the year with an average of 44.8 hours.

Days with no sunshine by month 1991-2020



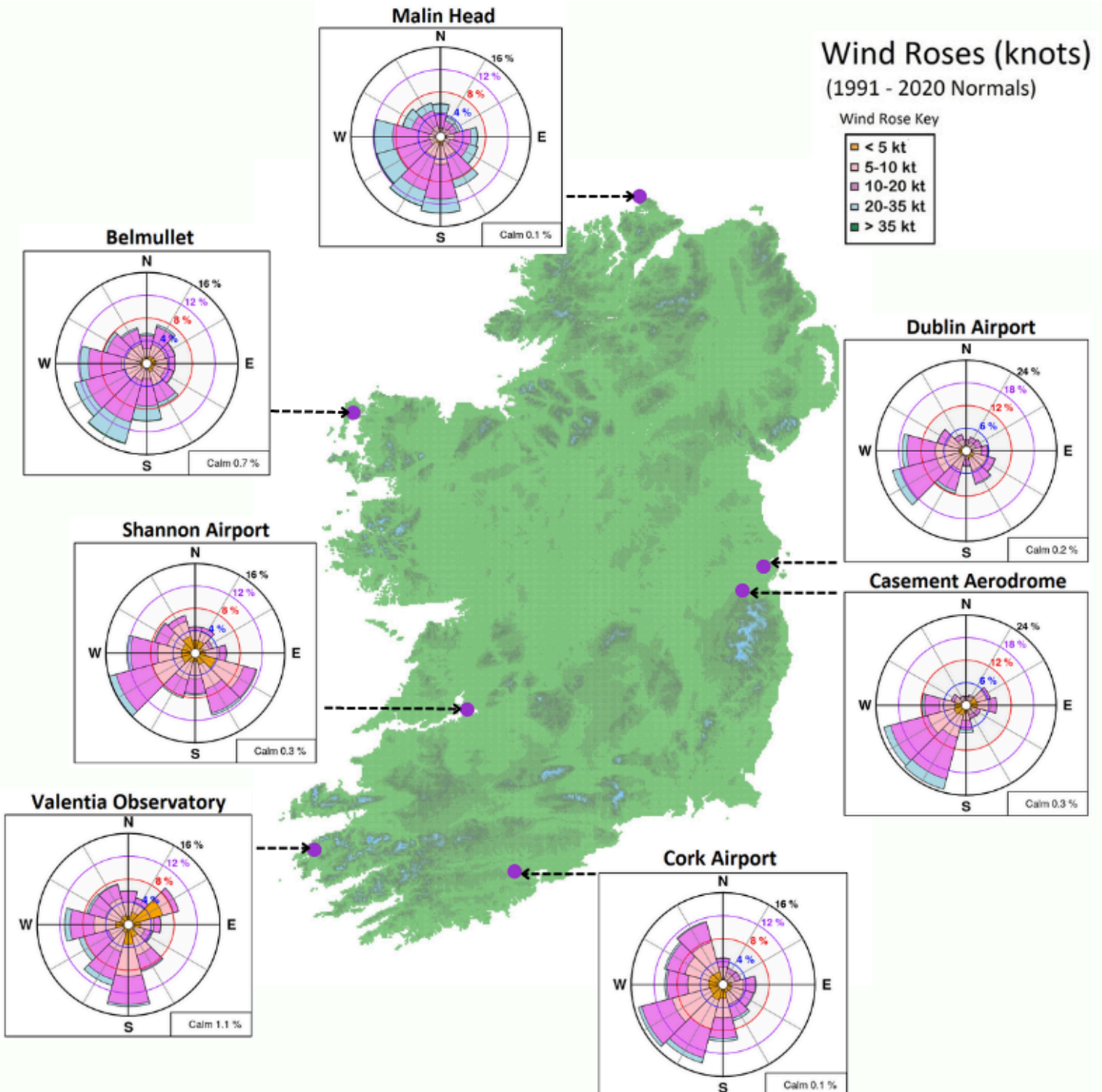
Across available stations, May has the fewest number of days with no sunshine over the period 1991-2020 with an average of just 2.2. This is closely followed by June with 2.3 days, and July and August with 2.4 days, respectively. December at 10.7 has the greatest number of days with no sunshine.

Note: Sunshine hours by month based on data from 12 stations shown on map.
 Days with no sunshine by month based on data from 8 stations only.
 Insufficient data available for Dublin Airport, Glasnevin, Ballyshannon and Dungarvan.

Ireland's Climate Averages 1991-2020

Wind (1991-2020)

The annual mean hourly wind speed ranges from 9 knots at Shannon Airport to 15 knots at Malin Head. Winds are generally strongest in the northwest of the country. The strongest winds are observed during the winter months and range from 10 knots at Shannon Airport to 18 knots at Malin Head. The lightest winds are observed during the summer months and range from 8 knots at Valentia Observatory to 13 knots at Malin Head. *Note: Values based on data from stations shown on map.*





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