

Weather Trends Over the Past 60 Years

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Summary

- Ireland was warmer, wetter and sunnier during the 30-year period 1991-2020 than the previous 30-year period 1961-1990.
- Annual mean temperature increased by 0.7°C.
- Annual rainfall increased by 7%
- Annual sunshine duration increased by 4.5%.

Introduction

Climate long-term averages (LTA) or normals are the mean or average values of a climate variable over a standard reference period. The World Meteorological Organisation (WMO) established that the length of the reference period should be 30 years and recommended that the climate averages are updated every 10 years to provide representative reference values for recent climatic conditions.

In accordance with WMO guidelines, Met Éireann recently produced a set of climate averages for the period 1991-2020 for a range of parameters including air temperature, precipitation and sunshine. Annual, seasonal, and monthly average values for the period 1991-2020 were compiled using high-quality data obtained from Met Éireann's observation network. Using the same methodology, 30-year averages for the preceding period from 1961-1990 were also calculated allowing the difference between the two averaging periods to be determined. An outline of the process used to generate the long-term averages for temperature and rainfall is shown in Figure 1 below.

This paper presents an overview of the latest set of climate averages for Ireland as well as an assessment of trends between the two 30-year averaging periods for air temperature, rainfall and sunshine.

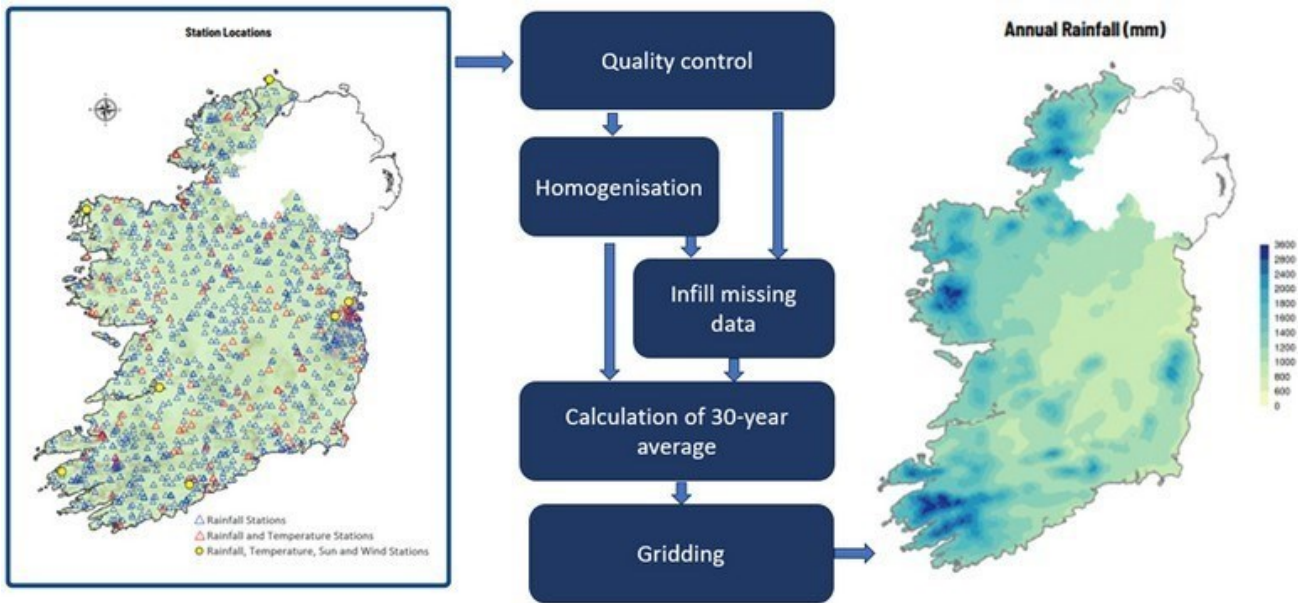


Figure 1. The process used to produce the long-term averages and grids for Ireland

Results

Air Temperature

Long-term average (LTA) annual, seasonal, and monthly maps were generated for mean, maximum and minimum air temperature for the 30-year periods 1991-2020, and 1961-1990 along with difference maps which compare the long-term averages for the two periods. Figure 2 shows an example of the maps produced for annual mean air temperature 1991-2020 and the map of the difference between the two periods.

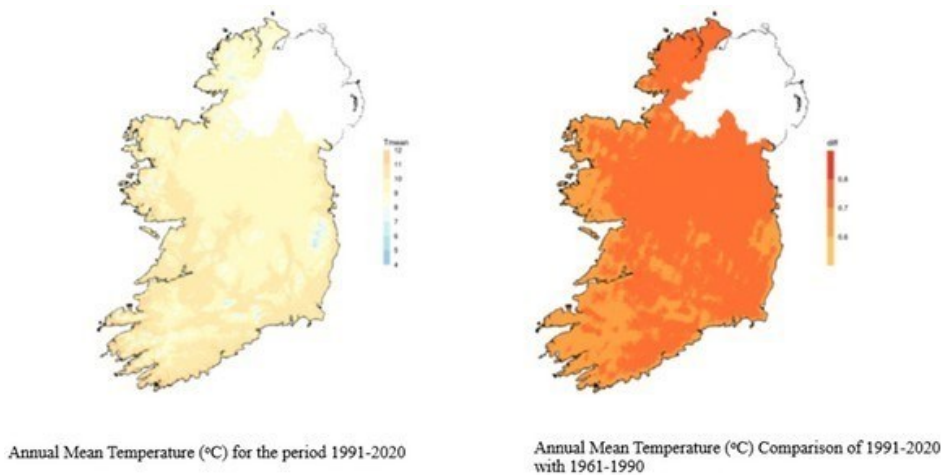


Figure 2. Annual mean air temperature for the period 1991-2020 and differences between the 1991-2020 and 1961-1990 period.

The annual mean, maximum and minimum air temperature for Ireland over the 30-year period 1991-2020 is 9.8°C, 13.4°C and 6.2°C respectively. For all three parameters there is an increase of 0.7°C compared with the 1961-1990 period. An increase is also seen in the 3 parameters in all seasons and months across all regions of Ireland.

Seasonal temperature changes ranged from 0.6 to 0.8°C (mean), 0.6 to 0.9°C (maximum), and 0.5 to 0.8°C (minimum). While all months have recorded an increase in temperature between the recent LTA and the period 1961-1990, the change varies from month to month. For example, October has seen just a 0.2 to 0.3°C increase across all air temperature measures, but the following month, November, has a 0.8 to 1.0°C increase recorded.

Rainfall

Nationally, annual average rainfall over the period 1991-2020 is approximately 1,288 mm. 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. The driest regions are in the east and south of the country, along with parts of the midlands region (Figure 3).

Annual average rainfall has increased by approximately 7% between the periods 1961-1990 and 1991-2020 (Figure 3). Almost all regions have observed an increase in annual average rainfall with the greatest increases seen in the west and north of the country.

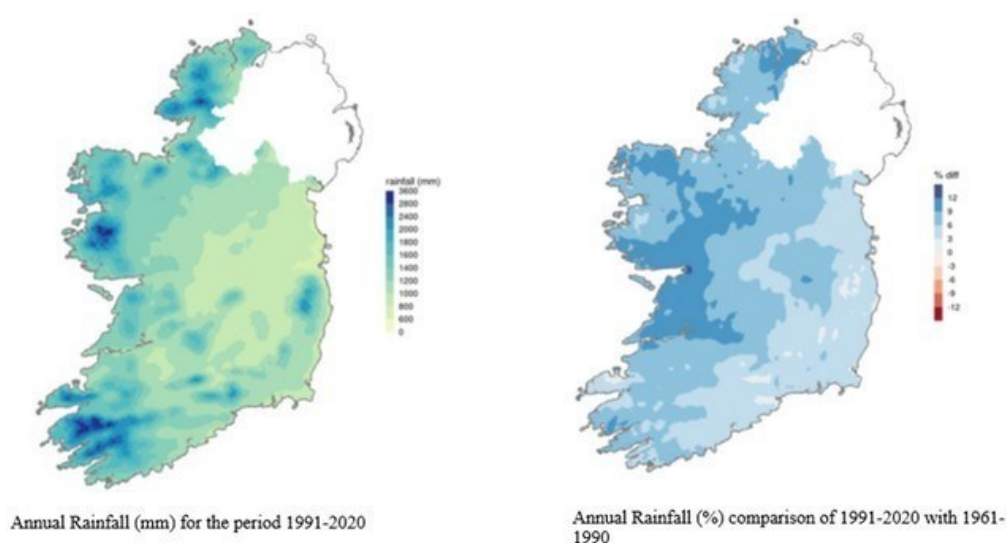


Figure 3. Annual rainfall for the period 1991-2020 and differences between the 1991-2020 and 1961-1990 period.

All seasons show a percentage increase in average rainfall amounts for Ireland between the periods 1961-1990 and 1991-2020 although there are large regional variations with some regions showing a decrease and others an increase in rainfall. On a monthly basis, the greatest difference at 28% is observed in July, with all regions throughout the country observing an increase in average rainfall amounts. March and September are the only months that have observed a decrease in average rainfall amounts for Ireland, in the order of 3% and 6%, respectively. The difference between the two periods for all other months ranges from 0 to 17% but significant regional differences are evident across the country.

Sunshine

Across the twelve stations shown in the map (Figure 4), 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.

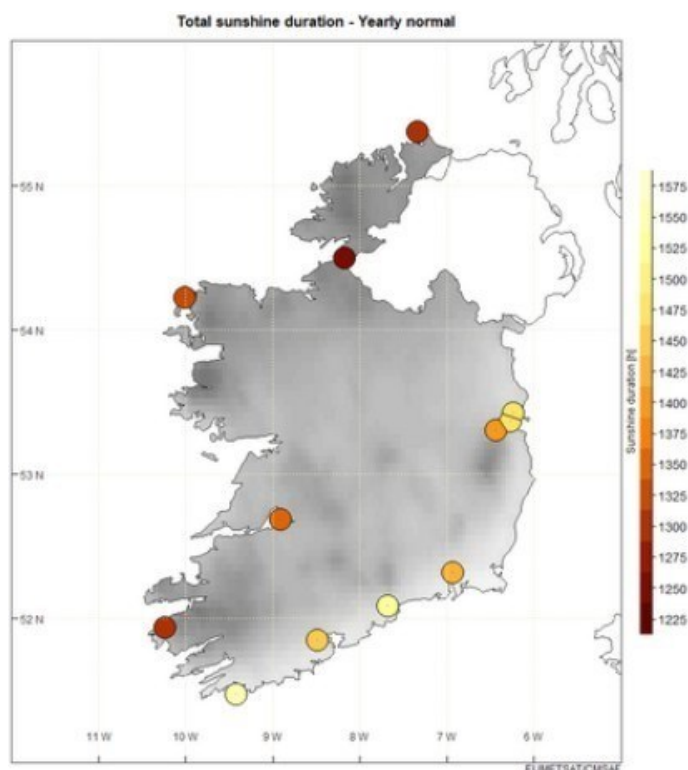


Figure 4. Annual Sunshine Hours 1991-2020.

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.

Conclusion

The publication of Ireland's most recent climate averages allows us to assess how Ireland's current climate compares to the previous 30-year period. Ireland's climate is changing, we have warmed by 0.7°C, become 7% wetter and sunnier by 4.5% over the period 1961-1990 to 1991-2020. We know that the atmosphere is warming and what we are seeing aligns with global trends. The findings in these new 30-year averages are consistent with the results from Met Éireann's TRANSLATE climate projections, which confirms the likelihood of a warmer and wetter climate annually for Ireland, in relation to future potential global warming under different green-house emission scenarios.

Acknowledgements

Information in this paper comes from Met Éireann's research into climate averages (www.met.ie/climate/30-year-averages) and the TRANSLATE climate change projections (www.met.ie/science/translate).

References

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