



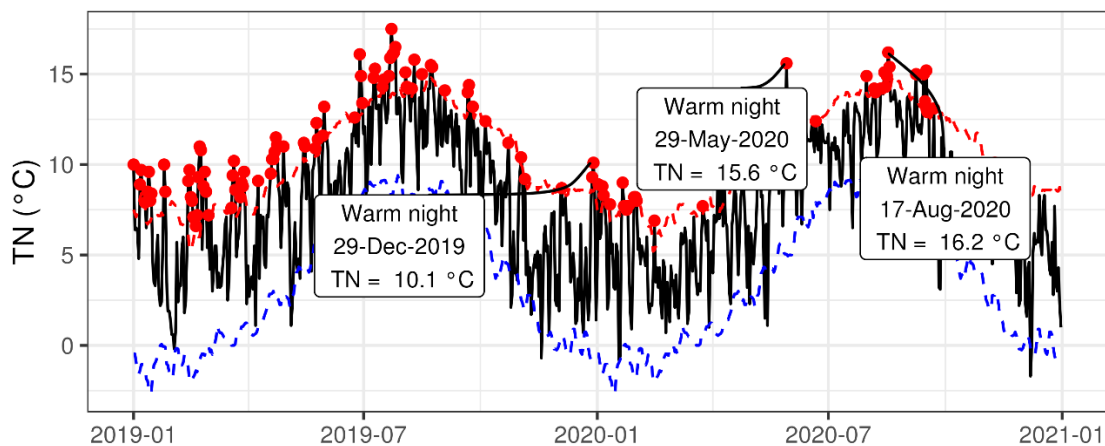
WARM NIGHTS (TN90p)

KEY MESSAGE

- “Warm nights”, as defined here, are occurring more frequently than in the past at the majority of weather stations.

DEFINITION

- Daily minimum temperature (**TN**), based on 09UTC - 09UTC observations, are used to calculate the index.
- The **TN90p** index is based on the occurrence of “warm night” events, relative to a 1961-1990 climatology.
- The climatological 90th percentiles of **TN** are calculated using a rolling 5-day window for the time period of 1961-1990.
- These percentiles are used as thresholds. The rate of exceedance of these thresholds determines the **TN90p** index.
- A bootstrapping method is used to calculate the index within the “base period” (1961-1990) to avoid biases, as outlined in (Zhang, Hegerl, Zwiers, & Kenyon, 2005).

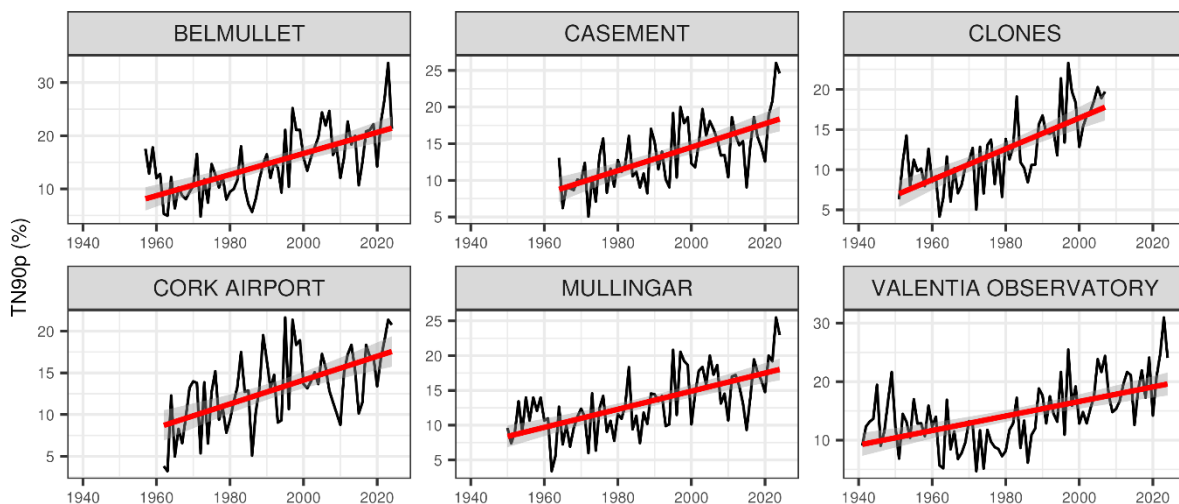


- For example the warm nights that occurred at Belmullet during 2019 and 2020 are shown above (marked by red dots, when the black line goes above the dashed red line). The annual values of the **TN90p** index were 22.2% and 14.2% respectively.



TRENDS

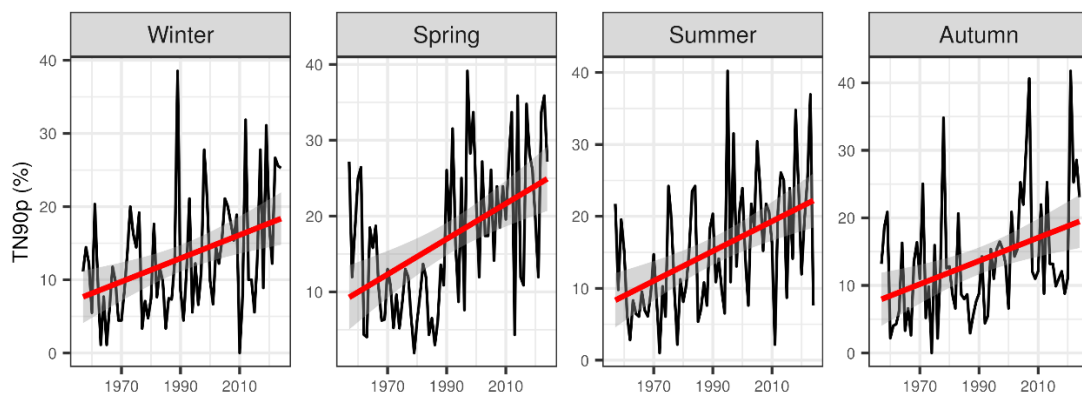
- There is an increasing trend in the occurrence of warm nights at the majority of Met Éireann's synoptic weather stations, when compared to the 1961-1990 climatology.
- These are in agreement with global trends for this index, (Dunn, et al., 2020).



SEASONALITY

- The increasing frequency of warm nights is present for all seasons, shown below for Belmullet.

Belmullet



DATA ACCESS

Data for this index can be downloaded through the webpage below (or the QR code in the header):

- <https://www.met.ie/climate/climate-change-indices-etccdi/>

For further information contact Met Éireann Climate Enquiries: enquiries@met.ie



REFERENCES

- Dunn, R. J., Alexander, L. V., Donat, M. G., Zhang, X., Bador, M., Herold, N., . . . others. (2020). Development of an updated global land in situ-based data set of temperature and precipitation extremes: HadEX3. *Journal of Geophysical Research: Atmospheres*, e2019JD032263. doi:<https://doi.org/10.1029/2019JD032263>
- Zhang, X., Hegerl, G., Zwiers, F. W., & Kenyon, J. (2005). Avoiding inhomogeneity in percentile-based indices of temperature extremes. *Journal of Climate*, 1641-1651. doi:<https://doi.org/10.1175/JCLI3366.1>