

# Actuarial Weather Extremes Series

## Southern Europe Heatwave: July 2022

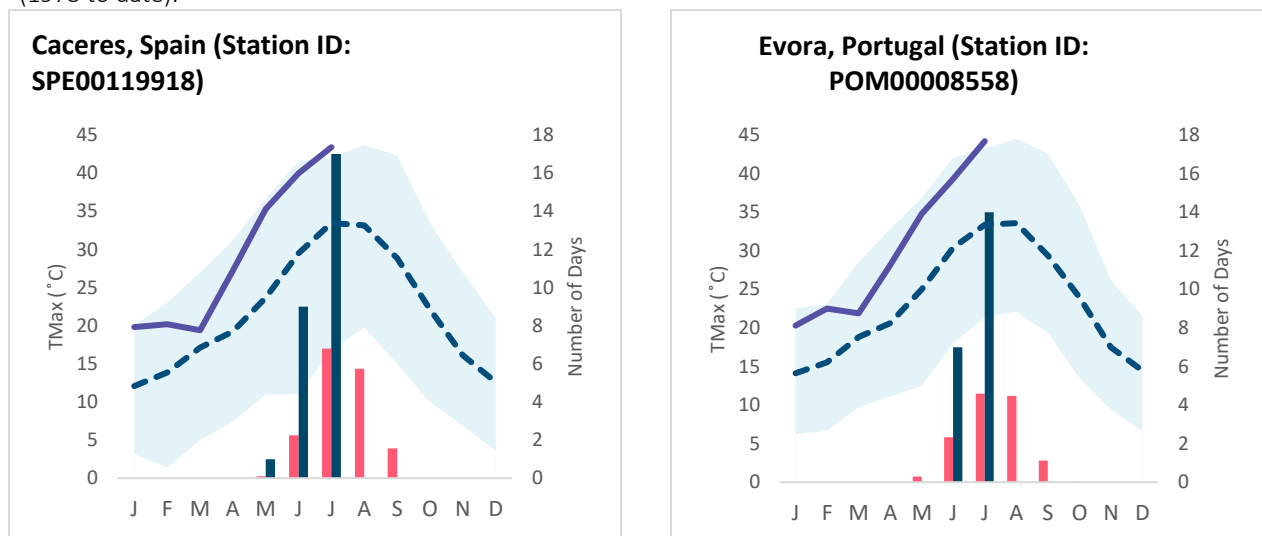
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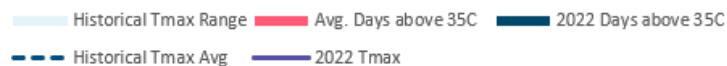
### Event Description

Over the past few weeks of July 2022, a record-breaking heat wave has baked several countries across Europe. From the Global Historical Climatology Network Daily Summaries (GHCND), we can infer that several weather stations in southwestern Europe recorded their highest temperatures since the stations started collecting data (dating back to the 1970s). [1]. In parts of Portugal, mercury breached 47 degrees Celsius (117 degrees Fahrenheit). In neighboring Spain, some areas recorded temperatures as high as 37C (99F) at 7am [2]. According to Spain’s and Portugal’s health institutes, more than 2,000 people have died in Spain and Portugal from heat-related causes in early July as the unprecedented heat wave moved across Europe [3].

The graphs below depict the magnitude of the 2022 heatwave observed at two GHCN stations - one each in Spain and Portugal. Both stations illustrate that the maximum temperature (Tmax) observed in July 2022 was higher than the maximum temperature ever observed at the respective stations and much higher than the historical average (1973 to date).



Source: Global Historical Climatology Network Daily Summaries

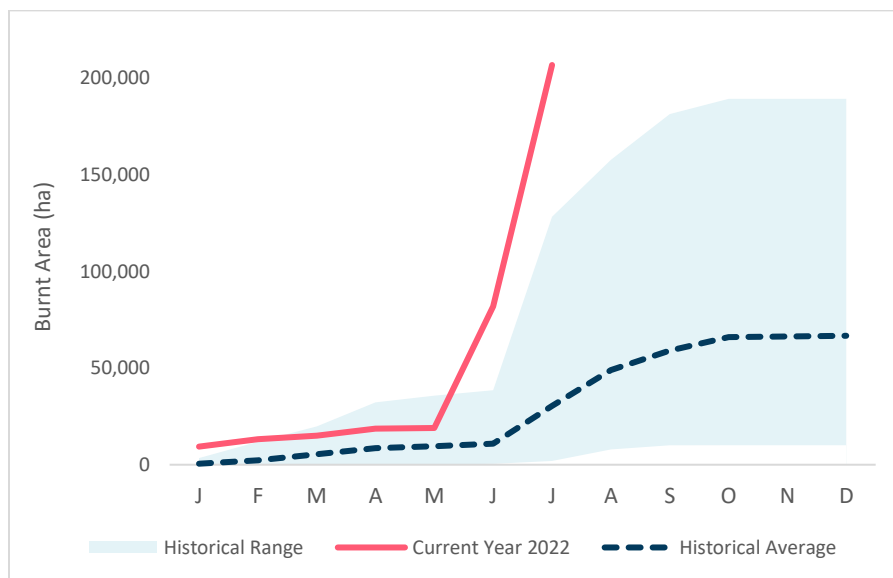


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Apart from the temperature severity, the frequency of the extreme temperatures is a worrying concern. The bars on the graphs portray the number of days where the maximum temperature recorded was above 35C; in June and July 2022, the number of days is more than double the historic average. It is worth noting the July data is up to July 22<sup>nd</sup>, so in Caceres, Spain, a temperature of at least 35C (95F) was observed on 17 out of the 22 days.

Coincidental to the heatwave was the incidence of forest fires that swept through southwestern Europe. The graph below uses data from the European Forest Fire Information System (EFFIS) to illustrate the 2022 cumulative burnt area (hectares) versus the historical (2006 – 2021) amount of burnt area in Spain. In Spain alone, more than 120,000 hectares of forest cover has been burnt down over the last four weeks [4].



Source: European Forest Fire Information System

Apart from the heat-related deaths and thousands who have had to flee the wildfires, extreme heat also damages the economy. Studies performed by European economists have estimated that heat waves have lowered annual GDP growth across Europe by around 0.5% in the past decade. The higher temperatures have reduced labor productivity and the forest fires have dampened agricultural output. Droughts resulting from the extreme temperatures can lead to reductions in yields for staple grains like corn, soybeans, cotton and wheat. Crop shortages coupled with the energy crisis are potential drivers of the upward inflation trend [5], [6].

**Sources**

- [1] Source: GHCNd
  - Data: Maximum Temperature (Tmax)
  - <https://www.ncei.noaa.gov/access/search/data-search/daily-summaries>
  - Date Accessed: 7/26/2022
- [2] Al Jazeera, July 16, 2022. [Heatwave scorches Europe as hundreds evacuated from wildfires | Al Jazeera](#)
- [3] Axios, July 22, 2022. [Heat wave kills more than 2,000 people in Spain and Portugal](#)
- [4] EFFIS, July 23, 2022. [European Forest Fire Information System \(EFFIS\)](#)
- [5] NY Times, July 19, 2022. [The Cost of Extreme Heat | NY Times](#)
- [6] CBS News, July 20, 2022. [The devastating economic toll of severe heat waves | CBS News](#)

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