METEO FRANCE

Evolution of cooling degree days
Past climate – French West Indies

1. Graph reading aid

Annual cooling degrees-day (base 25°C)
Le Lamentin

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- **Cooling degrees-day**
- **11 years running average**
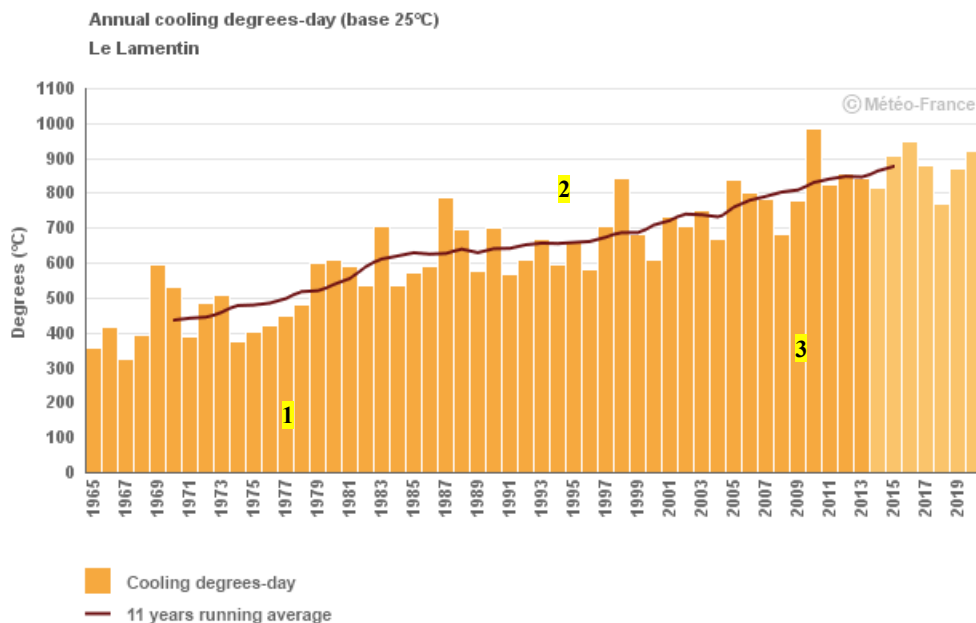
3 time series are represented on the graph :

Series 1 'yellow histogram' :
The cooling degree days are used to evaluate the energy consumption associated with air conditioning. For each year, the accumulated cooling degree days over the year, computed with the air conditioning method (*see §2.2 Definition*) using observed data (*daily reference time series, see § 3. Data and methods*), are represented here.

Series 2 'purple curve' :
11-year running mean of the yearly accumulated cooling degree days. For instance, the value for year 2000 is the average over the 1995-2005 period. The running mean being centered on the considered year by construction, there is no value for the first 5 years of the time series, nor for the last 5 years.

Series 3 "lighter' yellow histogram' :
Accumulated cooling degree days over the year, computed with the air conditioning method (*see §2 Definition*) using observed data (*daily reference time series over the period following homogenized series, see § 3. Data and methods*).

Edited on August 24, 2021

2. Definitions

Cooling degree days with the air conditioning method : (TMq - 25) if   TMq > 25°C
The 25°C threshold has been adapted for the French West Indies and Reunion Island. It is 18°C in continental France.

Daily mean temperature (TMq) : TMq = (TNq + TXq)/2

Daily minimum temperature (TNq) : minimum observed temperature between D-1 day at 8 pm local time and D-day at 8 pm local time

Daily maximum temperature (TXq) : maximum observed temperature between D-day at 8 am local time and D+1 day at 8 am local time

3. Data and methods

Homogenized series :
Observed time series cannot be used directly to analyze climate change. Indeed, they are affected by changes in measurement conditions over time, such as displacements of the measuring station, or changes in sensors. These changes cause shifts, which can be of the same order of magnitude as the climate signal. Homogenization is a statistical treatment that consists in detecting and correcting shifts in observed time series in order to produce reference series adapted to quantify climate change. Homogenized series are produced for a particular period, e.g. 1965-2013.

Daily reference time series :
Homogenization applies to monthly mean time series. Homogenized series therefore do not allow analyzing changes in daily extremes, such as the number of days with temperature exceeding a certain threshold. Daily reference time series are observed time series that have not been corrected, but have been selected because of their quality, making use of the results of homogenization among others. They may start later than homogenized series, if they do not satisfy the quality criteria at the beginning of the period. On the graph, they are represented with a lighter colour over the period following that of the homogenized series.

For mean temperature, only 1 daily reference time series in Martinique (Le Lamentin since 1965) has been selected, according to criteria of availability, quality and representativeness.