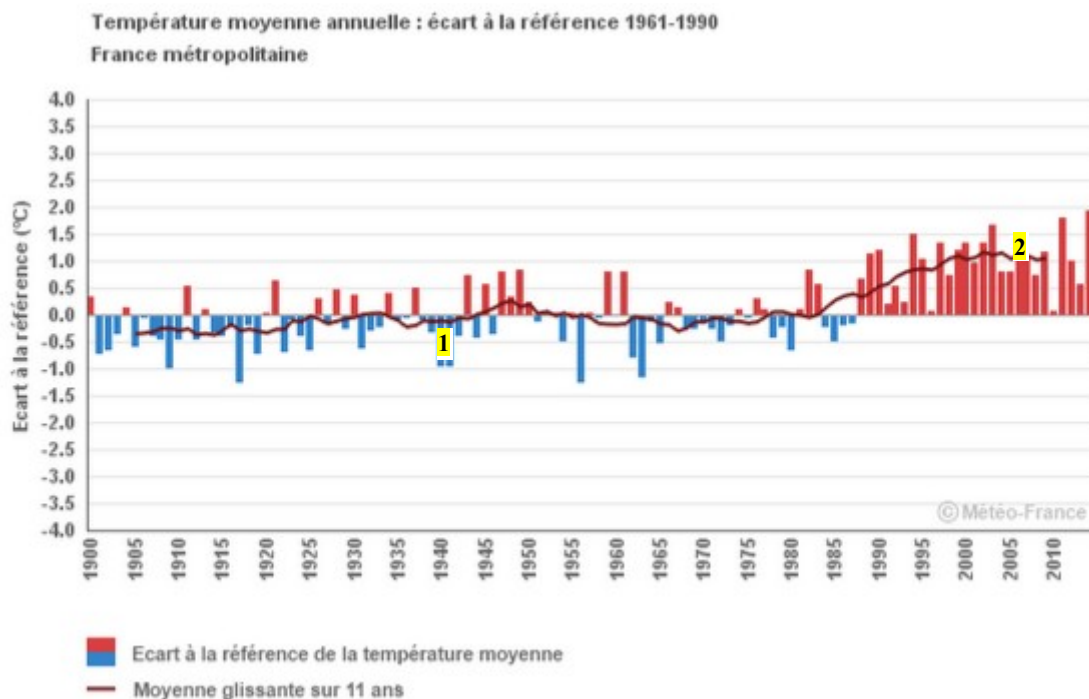


Evolution of annual / seasonal temperatures Past climate – metropolitan France

1. Graph reading aid



2 data sequences are shown in this graph:

Sequence 1 'histogram in blue and red':

Deviation from the reference (average over the period 1961-1990) of the annual/seasonal average of minimum/average/maximum daily temperatures observed (national thermal indicator cf § 3 Data and methods).

Values inferior to the average value established over the period 1961-1990 (the reference) are represented in blue, the higher values in red.

Sequence 2 'curve in ochre':

11 year moving average of the parameter represented in the form of a histogram. Due to the moving average which is focussed on the year concerned, there is no value for the first 5 years of the sequence, nor for the 5 last.

2. Definitions

Meteorological seasons :

- Winter of year A : December of the year A-1 to February of the year A
- Spring : March to May
- Summer : June to August
- Autumn : September to November

Minimum / maximum / average temperatures:

- Daily minimum temperature (TNq) = Minimum temperature observed between J-1 at 18:00 UTC and J at 18:00 UTC
- Daily maximum temperature (TXq) = maximum temperature observed between J at 06:00 UTC and J+1 at 06:00 UTC
- Daily average temperature (TMq) = $(TNq + TXq)/2$

Deviation from the reference of the annual / seasonal average of daily minimum / maximum temperatures:

- Annual/seasonal average TNs (resp. TXs) of daily minimum temperatures (resp. maximums) = average of daily minimum temperatures during the year/season TNq (resp. maximums TXq)
- Reference average across the period 1961- 1990 (Ref TNs ou Ref TXs) = average of 30 values of TNs or TXs
- Deviation from the reference = difference between the annual/seasonal average (TNs or TXs) and the reference average (Ref TNs or Ref TXs)

Deviation from the reference of the annual/seasonal average of daily average temperatures:

- Annual/seasonal average TMs of daily average temperatures = average during the year/season of daily average temperatures TMq
- Reference average across the period 1961- 1990 (Ref TMs) = average of 30 values of TMs
- Deviation from the reference = difference between the annual/seasonal average (TMs) and the reference average (Ref TMs)

3. Data and methods

National thermal indicator:

The national thermal indicator is defined as the average of daily measures of the mean air temperature in 30 weather stations distributed equally throughout the metropolitan territory and selected from work on homogenisation.

Homogenised sequences:

The sequences of measures are not immediately usable for the analysis of climate evolutions. They are affected by changes in measurement conditions over the course of time, such as alterations in the position of the measuring station, or sensor changes. These changes cause breaks, which can be in the same order of magnitude as the climatic signal. Homogenisation is a statistical treatment the aim of which is to detect and correct breaks in the raw sequences, in order to produce adapted reference sequences for quantifying climate change.

4. References

Évolution de la température en France depuis les années 1950 : constitution d'un nouveau jeu de séries homogénéisées

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ONERC (Observatoire National sur les Effets du Réchauffement Climatique - National Observatory for the Effects of Climate Warming) :

<http://www.developpement-durable.gouv.fr/-Observatoire-National-sur-les-.html>