METEO FRANCE

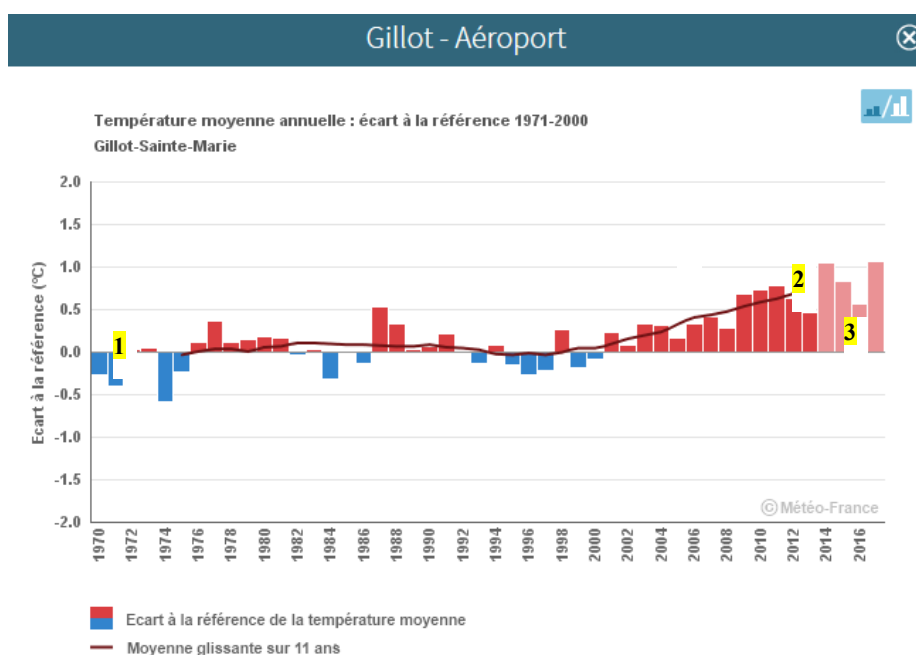## Evolution of annual/seasonal temperatures
Past climate - Reunion Island

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1. Graph reading aid

3 data series are represented on the graph:

Series 1 'blue and red histogram':
Deviation from the reference average (over the 1971-2000 period) of the annual/seasonal average of observed daily minimum/average/maximum temperatures *(homogenized series, see § 3. Data and methods)*.
Values below the reference average are represented in blue, those above in red.

Series 2 'brown curve':
11-year moving average of the parameter represented by the histogram. Due to the moving average which is centered on the concerned year, there is no value for the first 5 years of the series, nor for the last 5 years.

Series 3 *'lighter* blue and red histogram':
Deviation from the reference average (over the 1971-2000 period) of the annual/seasonal average of observed daily minimum/average/maximum temperatures *(non-homogenized series, see § 3. Data and methods)*.

2. Definitions

Weather Seasons:
  o January – March: austral summer (wet season)

- o April – June: transition season into austral winter
- o July – September: austral winter
- o October – December: transition season into austral summer

Minimum/maximum/average temperatures:
- o Daily minimum temperature (TNq) = minimum temperature observed between D-1 day at 7pm local time and D-day at 7pm local time
- o Daily maximum temperature (TXq) = maximum temperature observed between D-day at 7am local time and D+1 day at 7am local time
- o Daily average temperature (TMq) = (TNq + TXq)/2

Deviation from the reference average of the annual/seasonal average of minimum/maximum daily temperatures:
- o Annual/seasonal average TNs (resp. TXs) of daily minimum (resp. maximum) temperatures = annual/seasonal average of daily minimum temperatures TNq (resp. maximum TXq)
- o Reference average over the 1971- 2000 period (Ref TNs or Ref TXs) = average of the 30 TNs or TXs values
- o Deviation from the reference average = difference between the annual/seasonal average (TNs or TXs) and the reference average (Ref TNs or Ref TXs)

Deviation from the reference average of the annual/seasonal average of daily average temperatures:
- o Annual/seasonal average TMs of daily average temperatures = annual/seasonal average of daily average temperatures TMq
- o Reference average over the 1971- 2000 period (Ref TMs) = average of the 30 TMs values
- o Deviation from the reference average = difference between the annual/seasonal average (TMs) and the reference average (Ref TMs)

3. Data and methods

Homogenized series:
Data series are not directly usable for analyzing climate change. They are affected by changes in measurement conditions over time, such as movements of the measuring station, or changes in sensors. These changes cause breaks, which can be of the same order of magnitude as the climate signal. Homogenization is a statistical treatment that consists of detecting and correcting breaks in measurement series in order to produce reference series adapted to quantify climate change.

Homogenized series are produced for a specific period of time, for example 1970-2013. On the graph, they are extended to a more recent date by the raw data, represented in a lighter colour.

On Reunion Island, there are 11 homogenized monthly series of minimum temperature and 10 monthly series of maximum temperature.
3 homogenized series were selected according to quality and representativeness criteria.

4. References

HOMER: a homogenization software ‐ methods and applications. Idojaras, Quarterly journal of the Hungarian Meteorological Service, 117, no. 1, 2013.
Mestre, O., P. Domonkos, F. Picard, I. Auer, S. Robin, E. Lebarbier, R. Böhm, E. Aguilar, J. Guijarro, G. Vertachnik, M. Klancar, B. Dubuisson, and P. Stepanek.