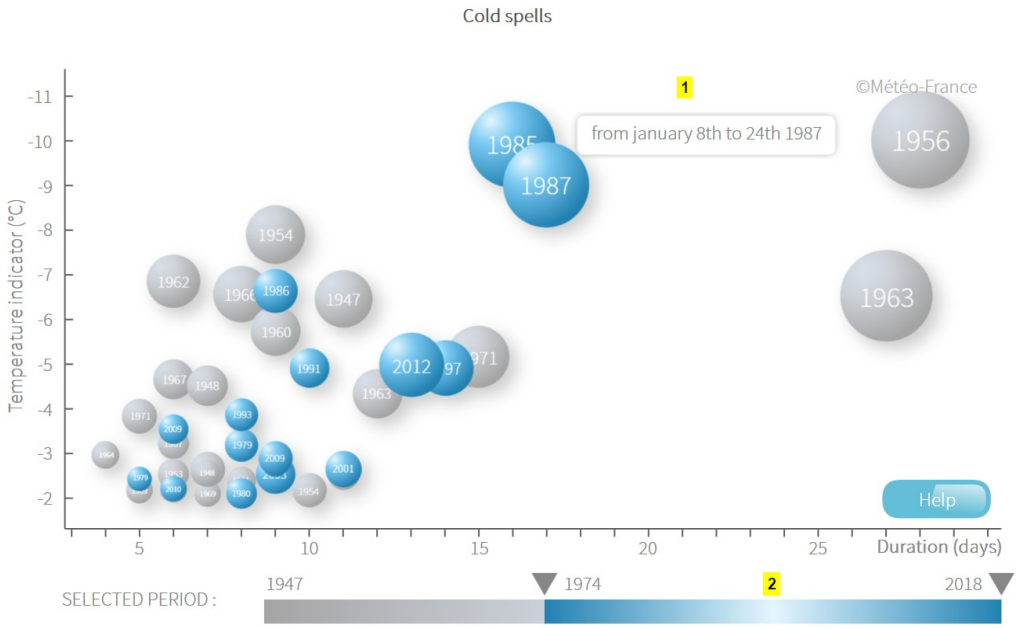
Evolution of cold spells
Past climate – metropolitan France

1. Graph reading aid



This graph presents the cold waves identified in metropolitan France since 1947.

Each episode is represented by a bubble. Its position and size indicate the characteristics of the cold wave :

- The horizontal position indicates the duration (in days) of the episode.
- The vertical position indicates the intensity of the cold wave: it is the minimum value of the daily national thermal indicator reached during the episode.
- Size indicates the severity of the cold wave : it is proportional to the cumulative cold during the episode.

The year is mentioned on each bubble and the precise dates of the cold wave appear when the mouse moves over it (1).

The selection bar (2) makes it possible to highlight cold waves in blue during a given period (here 1974-2018).

Note : only cold spells of 4 days or more are shown.

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2. Definitions

Daily average temperature :

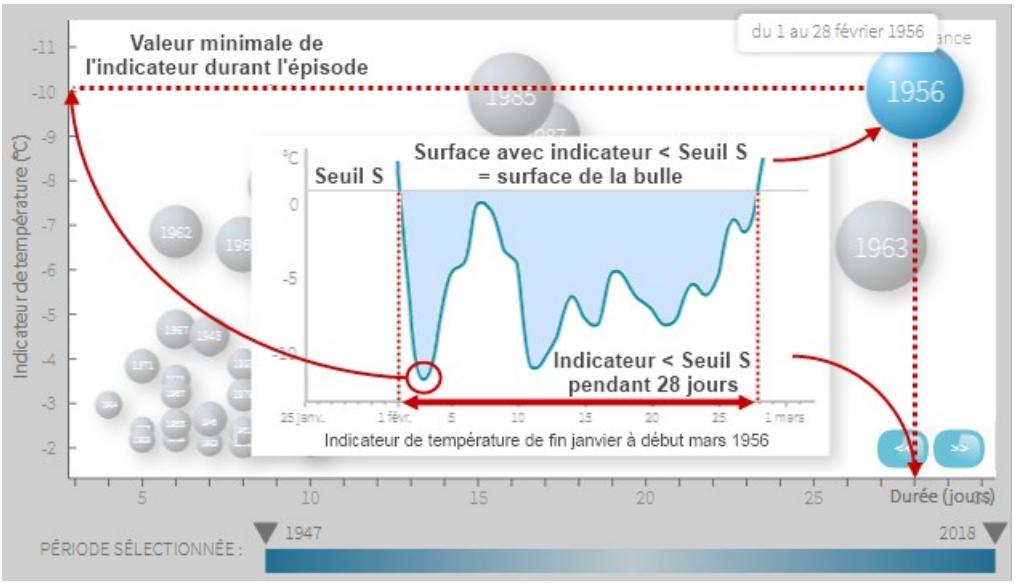
- Daily minimum temperature (TNq) = minimum temperature observed between J-1 at 18:00 UTC and J at 18:00 UTC
- Daily maximum temperature (TXq) = maximum temperature observed between J at 06:00 UTC and J+1 at 06:00 UTC
- Daily average temperature (TMq) = (TNq + TXq)/2

3. Data and methods

National thermal indicator :
The national thermal indicator is defined as the average of daily average air temperature measurements at 30 weather stations distributed in a balanced way over the metropolitan territory and selected from the work on homogenization.

Cold waves are identified from the national thermal indicator, over the period from 1947 to the present. Several criteria, based on the annual statistical distribution (calculated over the period 1981-2010), are applied :

- An episode is detected when a daily value of the thermal indicator reaches or falls below the 0.05 percentile.
- The episode includes days adjacent to the day(s) previously detected for which :
  - the daily thermal indicator does not permanently exceed the 2.5 percentile (referred to as the S threshold in the figure below). By long-term, we mean three or more days
  - the daily thermal indicator does not exceed the 5.0 percentile
- The magnitude of the episode corresponds to the intensity integrated over the duration of the episode.



4. References

Dandin P. et Schneider M. 2012. La vague de froid de février 2012, La Météorologie, 8e série – n° 87- Février 2012

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