

Automated Homogenisation of monthly precipitation series for France using Climatol

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**12th Seminar for Homogenization and Quality Control in Climatological
Databases (Budapest, May 5-8, 2026)**

Outline

- **Introduction**
- **Goal**
- **Method**
- **Results**
- **Conclusion**

Introduction

- **Until now at Météo-France:**
 - homogenisation with Prodigé and HomeR
 - processing series in batches based on geographical distribution
- **Last homogenisation of monthly precipitation data for France: 2015-2022**
- **Large number of series for this parameter, limited number of human resources available for this activity -->**
 - **decision to use a more automated homogenisation method** with large-scale processing for the new update homogenisation for these precipitation series
 - choice of **Climatol** software by Jose A. Guijarro : free and possible use of metadata

Goal

- **To update french long homogenised monthly precipitation series using a more automated approach**
- **Homogenisation:**
 - **data: 980 monthly precipitation series in France**
 - **period: 1950-2024**
 - **software: Climatol, version 4.4-2**

Method

- **Configuration No. 1: fully automatic**

Breakpoints detected by Climatol

- **Significant work done to automate the retrieval of metadata for this series set from our climatological database**

- **Configuration No. 2: inclusion of metadata for some breaks**

For the breaks where the SNHT is below a certain threshold (25), detected breakpoints are modified to match metadata within +/-2 years range.

- **Configuration No. 3: full inclusion of metadata**

Detected breakpoints are modified to match metadata within +/-2 years range, without condition on SNHT of the break.

Results

- **Comparison of the results obtained according to these 3 configurations**

- **Percentage of modified break dates by a metadata date according to the 3 configurations:**
 - configuration No. 1: number of detected breaks: 1336, 0 %
 - configuration No. 2:
 - ▶ 324 dates of breaks modified by a metadata date, 24%
 - ▶ 126 not replaced by a metadata date (SNHT break > threshold specified).
 - configuration No. 3: 450 dates of breaks modified by a metadata date, 33,7 %.

Results

Various statistics calculated on the breaks

- **Total number of breaks:**
 - configuration No. 1: 1336
 - configuration No. 2: 1314
 - configuration No. 3: 1310

- **Number of series without breaks:** 306 for the 3 configurations

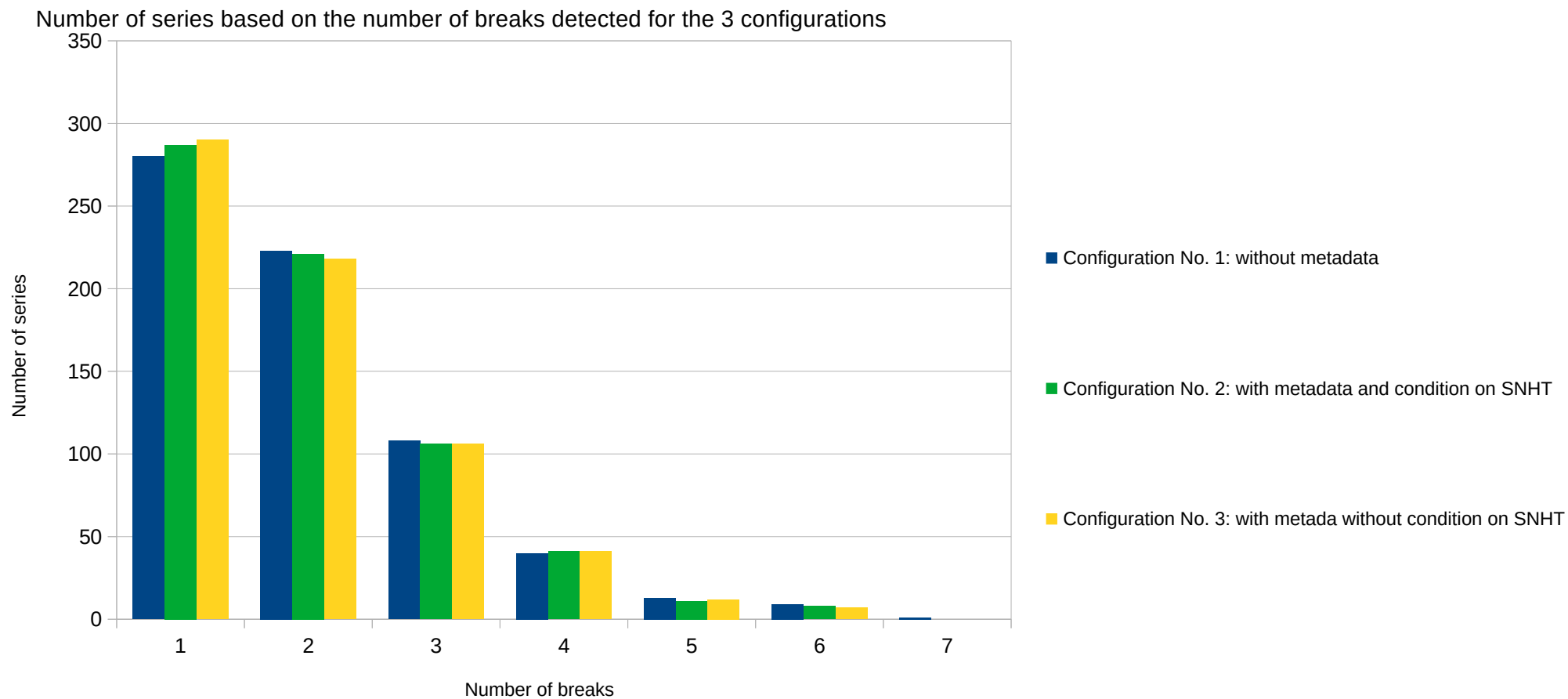
- **Number of series with breaks:** 674 for the 3 configurations

- **Average number of breaks:**
 - **for series with breaks:** 2 for No.1, 1.95 for No.2, 1.94 for No.3
 - **taking all series into account:** 1.36 for No.1, 1.34 for No.2 and 3.

- **Average duration of a homogeneous period:** 32 years for the 3 configurations

Results

Climatol outputs: number of breaks per series



Results

Trends:

— calculation in homogenised series derived from the selected configuration over the previous homogenisation period

— consistent with previous results

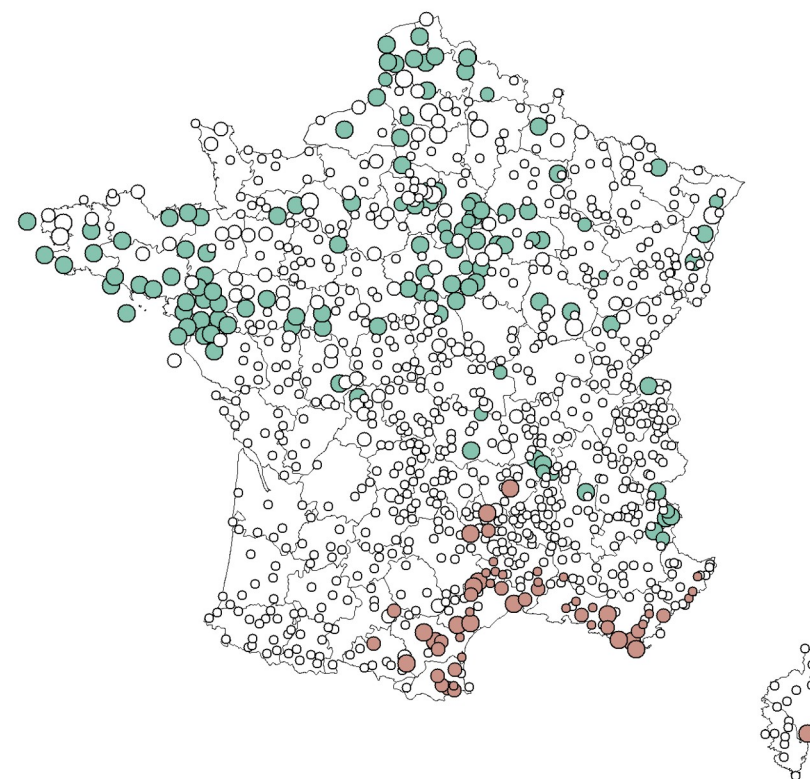
— with these new homogenised monthly precipitation series resulting from this work, new updated trends calculated for this parameter in France

Colour of the symbols

- increase
- low increase
- no change
- low decrease
- decrease

Size of the symbols

- high confidence
- moderate confidence
- low confidence



Evolution of annual total rainfall on period 1961-2024

Conclusion

- **The 1st time at Météo-France:**
 - use of Climatol in operations
 - homogenisation of many series in a single batch
 - required development of automated metadata extraction

- **Quite similar results for the 3 configurations**

- **Selected configuration: No. 2 configuration with metadata and an SNHT value below a set threshold**

- **A new homogenised precipitations dataset in France, and new updated trends for this parameter**

Many thanks for your attention.