

# Survey on homogenization practices within WMO members

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Databases *et alia* (Budapest, May 5-8, 2026)

# Introduction

Online consultations on homogenization of climate series were held within the World Meteorological Organization (WMO) on November 19 and 20 under the leadership of Peer Hechler (Scientific Officer), Denis Stuber and Reinaldo Silveira (chairs of the Expert Team on Data Development and Stewardship).

More than 200 participants attended to each of the two sessions held (for Western and Eastern hemispheres), which consisted in an introduction to the problem of spurious biases on climate series and possible approaches to correct them, followed by interventions of representatives of Argentina, Hungary, Madagascar and Australia with examples of applications and challenges of homogenization in their regions.

The sessions ended with questions and answers, and an invitation to participate in an online survey implemented by Denis Stuber, which is summarized in the following slides.

# Survey participation overview

72 answers were received from 54 WMO Members (38.3% of all 188 Members):

WMO Region	% of respondents
Region 4: North America	32
Region 6: Europe	32
Region 3: South America	23
Region 2: Asia	19
Region 1: Africa	13
Region 5: Pacific	11

Repeated per country participation: Indonesia (4), Peru (4), Mongolia (3), Burkina Faso (2), El Salvador (2), Fidji (2), Germany (2), Guatemala (2), Ivory Coast (2), Kazakhstan (2), Mexico (2), Panama (2), Romania (2).

## Summaries of four questions

- *Does your organization currently perform homogenization of climate data?*

70 answers: 64.3% Yes; 35.7% No

- *Is your homogenized data free of charge for external users of your organization?*

70 answers: 38.6% Yes; 22.7% Don't know; 20.5% No; 18.2% Other

- *Do you have plans to implement homogenization in the future?*

24 answers: 41.7% Yes 1-2 years; 29.2% Yes >2 years; 16.6% No/Don't know; 12.5% Other

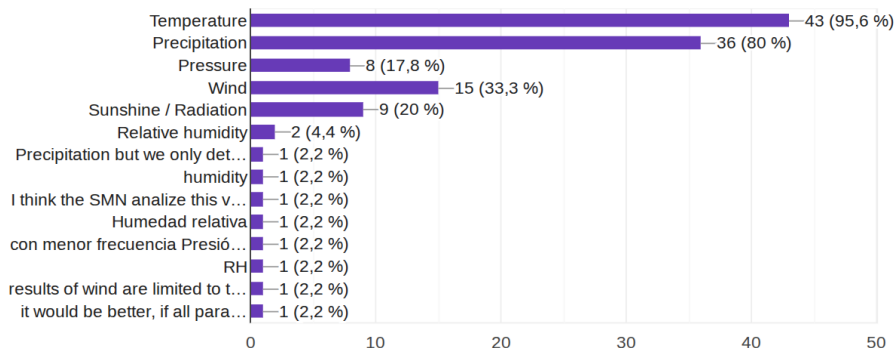
- *Which type of support would you find the most useful?*

45 answers: 44.4% Training; 22.2% Expert network; 15.6% Documentation; 17.8% Other

# Which parameters? 4.1

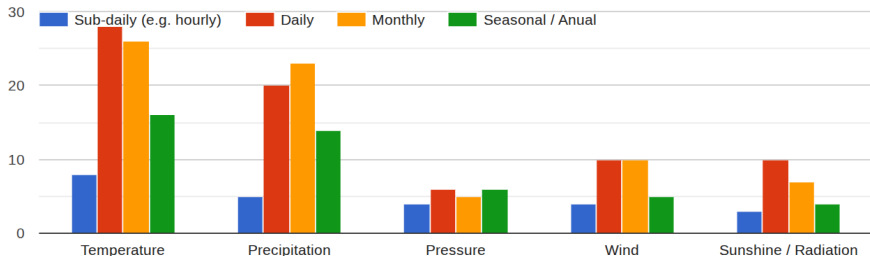
Q4.1 For which climate parameters do you apply homogenization?

45 respuestas



# Time resolution 4.2

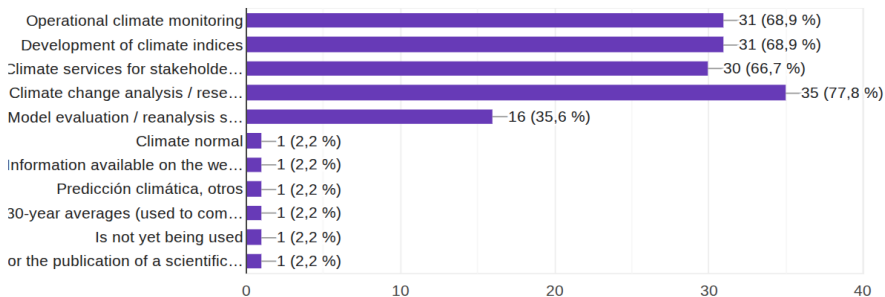
Q4.2 On which time resolution(s) is / are your homogenization process applied?



# Purposes of homogenization 4.3

## Q4.3 For which purposes are your homogenized data used?

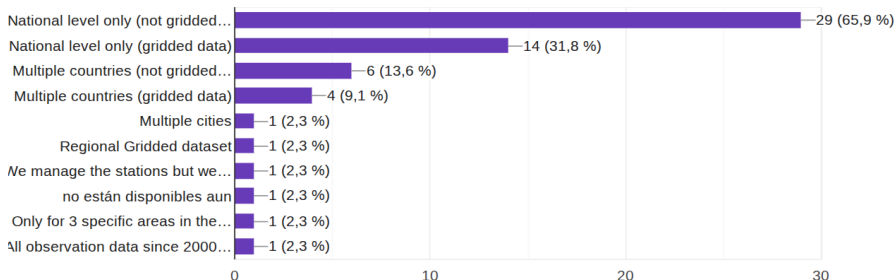
45 respuestas



# Geographic scale 4.4

## Q4.4 At which scale are your homogenized datasets available

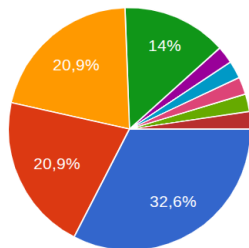
44 respuestas



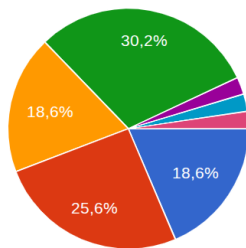
# Update frequencies 4.6/4.7

Q4.6/4.7 What are the minimum and maximum update cycles of your homogenized series?

Minimum



Maximum

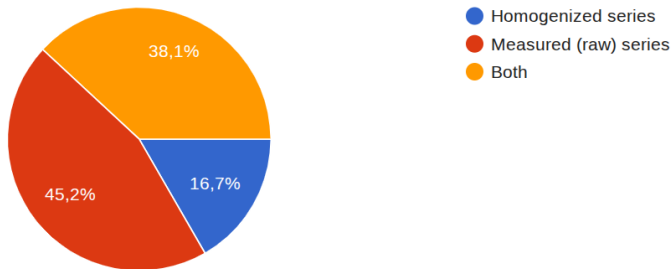


- Every year
- Less than every 5 years
- Less than every 10 years
- 10 years and more
- I don't have that information
- períodos de referencia climática, aprox cada 30 años
- This is our first experience

## Use for record values 4.9

Q4.9 Do you use homogenized or measured (raw) series for defining record values? (e.g. Long Time record values, heat and cold wave, etc.)

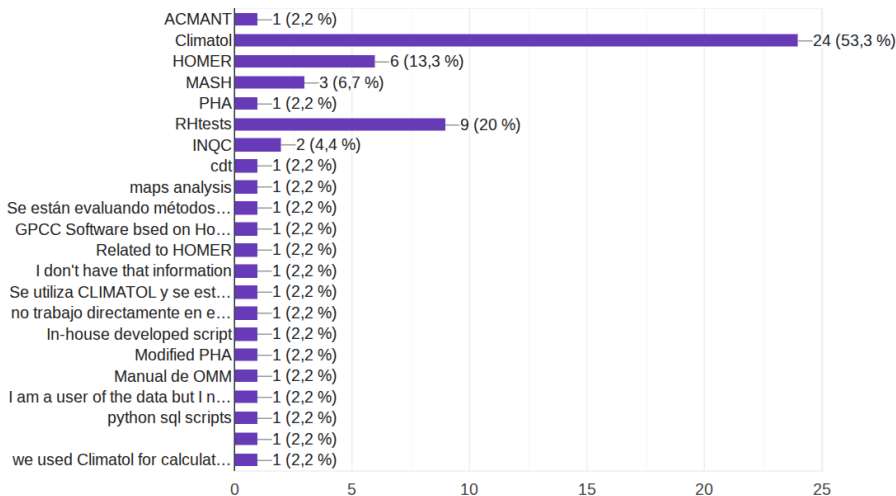
42 respuestas



# Methods used 4.10

Q4.10 Which software or methods do you use?

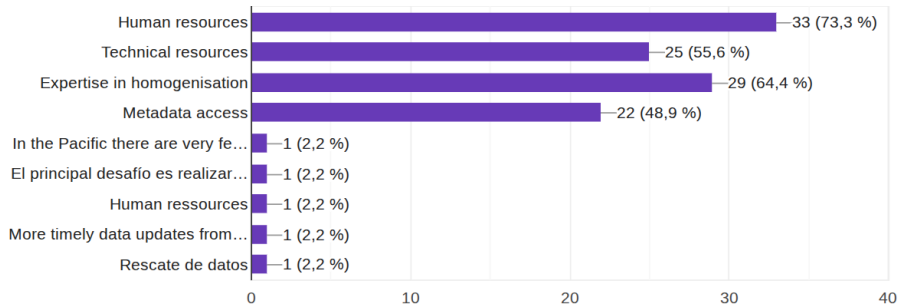
45 respuestas



# Main challenges 4.14

Q4.14 What are the main challenges you face in homogenization?

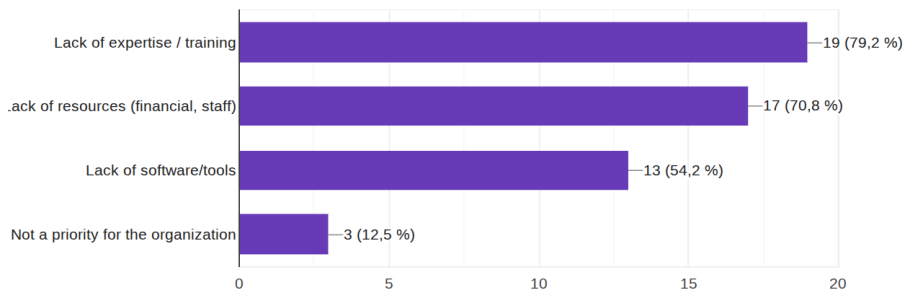
45 respuestas



# Barriers to homogenization 5.1

Q5.1 What are the reasons for not applying homogenization?

24 respuestas



# Conclusions

- 64.3% of organizations (of the 54 WMO members which participated in this survey) are performing homogenization of climate data.
- Most of them are homogenizing both monthly and **daily** series.
- From those not doing homogenization, 41.7% are planing to implement it within 1 or 2 years.
- Training and network support are requested to overcome faced challenges, although lack of human resources is often a barrier.

Many thanks for your attention!!!

This presentation will be available through all year 2026 at  
<https://climatol.eu/survey.pdf>