



Norwegian
Meteorological
Institute

Homogenization of monthly precipitation series in Norway

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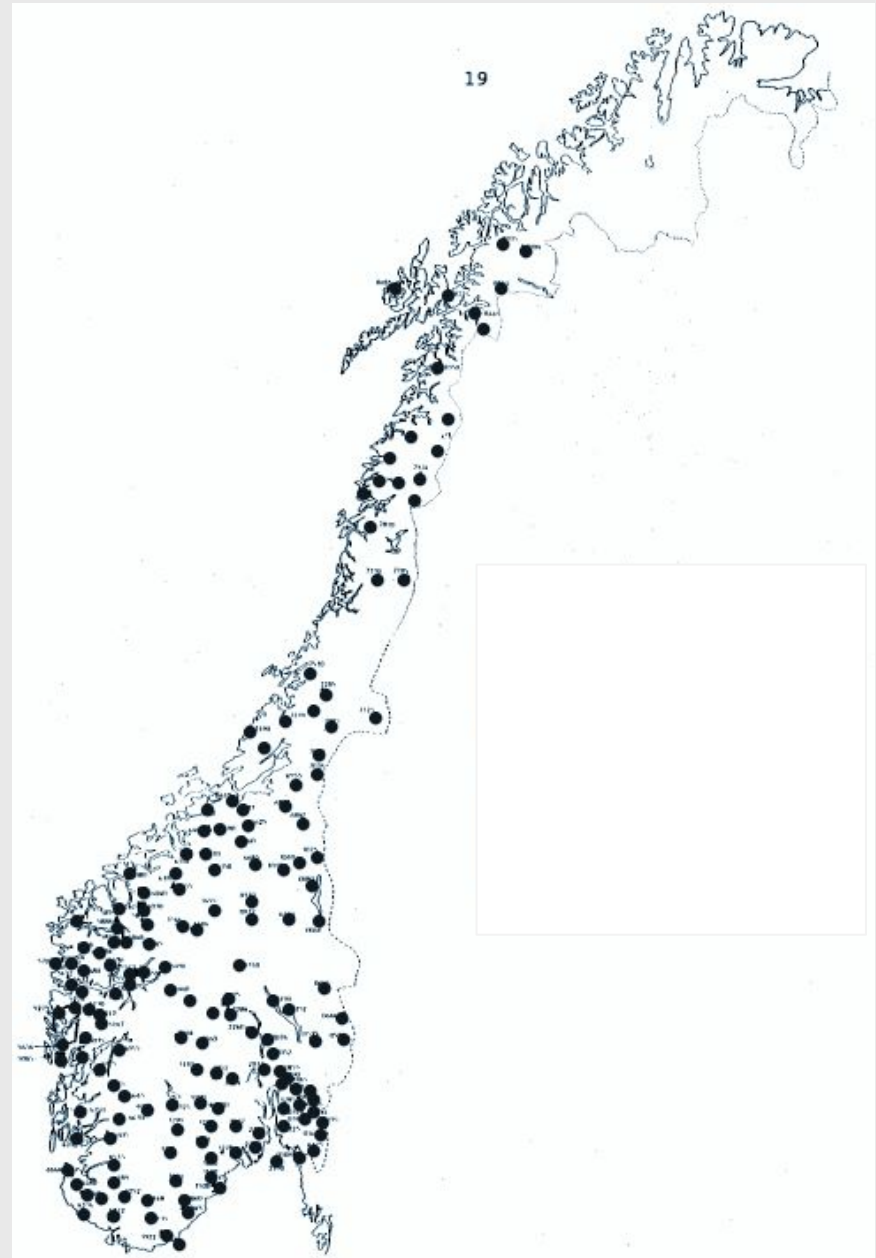
Previous work

165 precipitation series

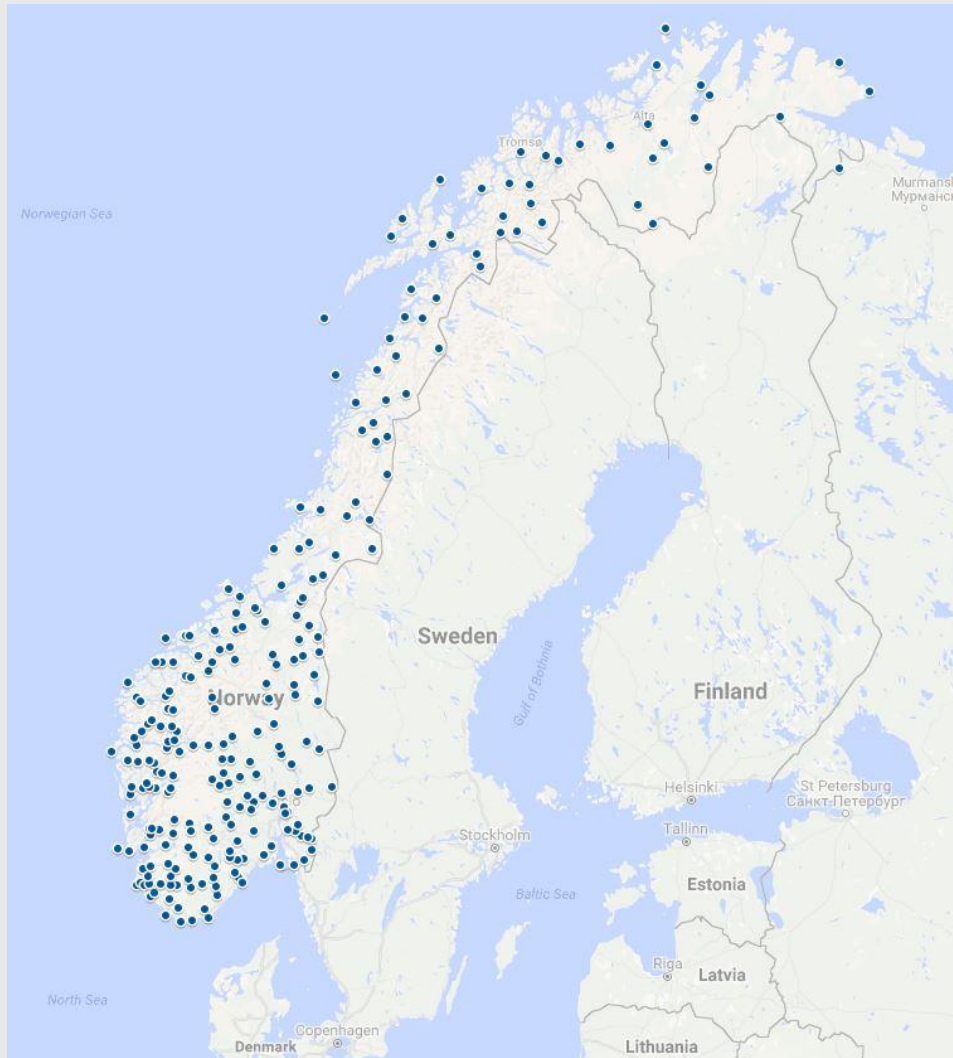
Long-term series (>75 years)
1895-1991

Double mass analysis
SNHT

Førland & Hanssen-Bauer 1992



Current work



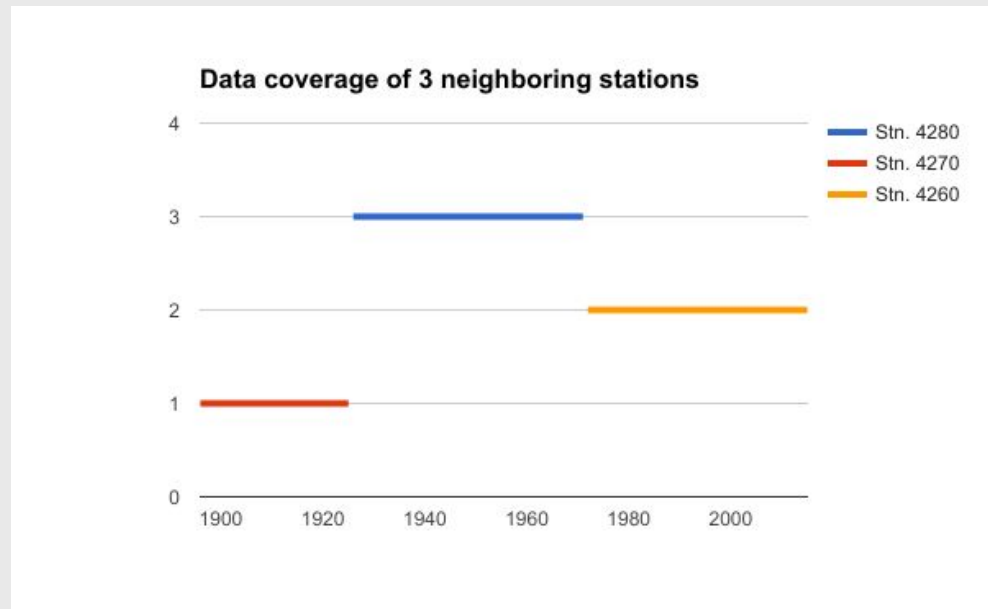
248 series

>80 years

1896-2015

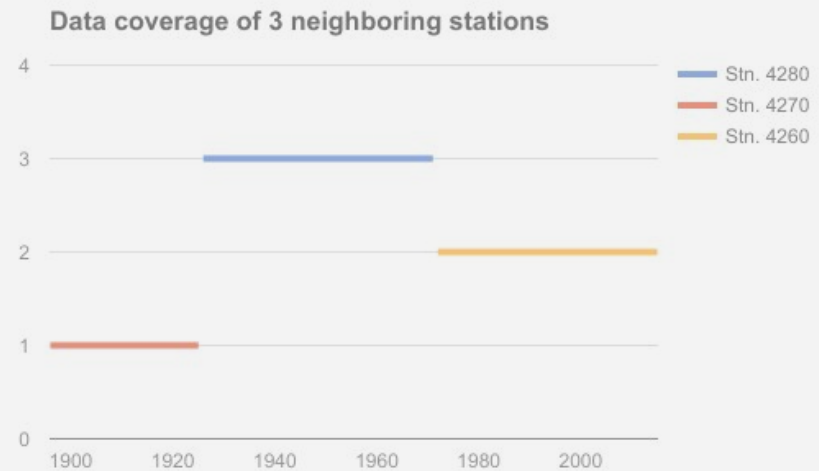
Data preparation

Nesting series -
130 of the 250 series
are merged series

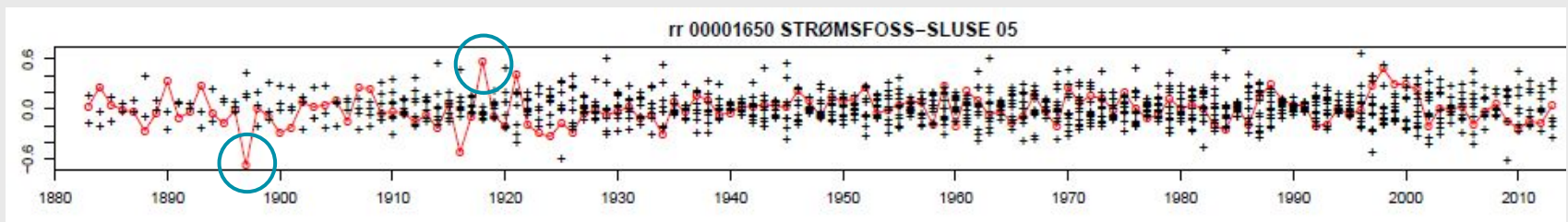


Data preparation

Nesting series -
130 of the 250 series
are merged series



Quality control



Softwares



Multiple Analysis of Series for Homogenization
(M A S H v3.03)



HOMER

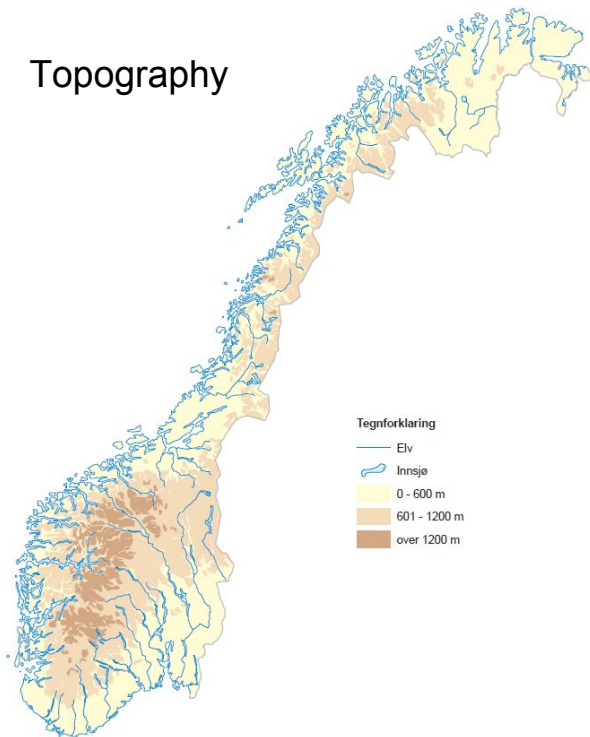
Climatol

ProClimDB

Challenges

Large spatial variability

Topography



Challenges

Large spatial variability



Photo: Ingve Djuvik

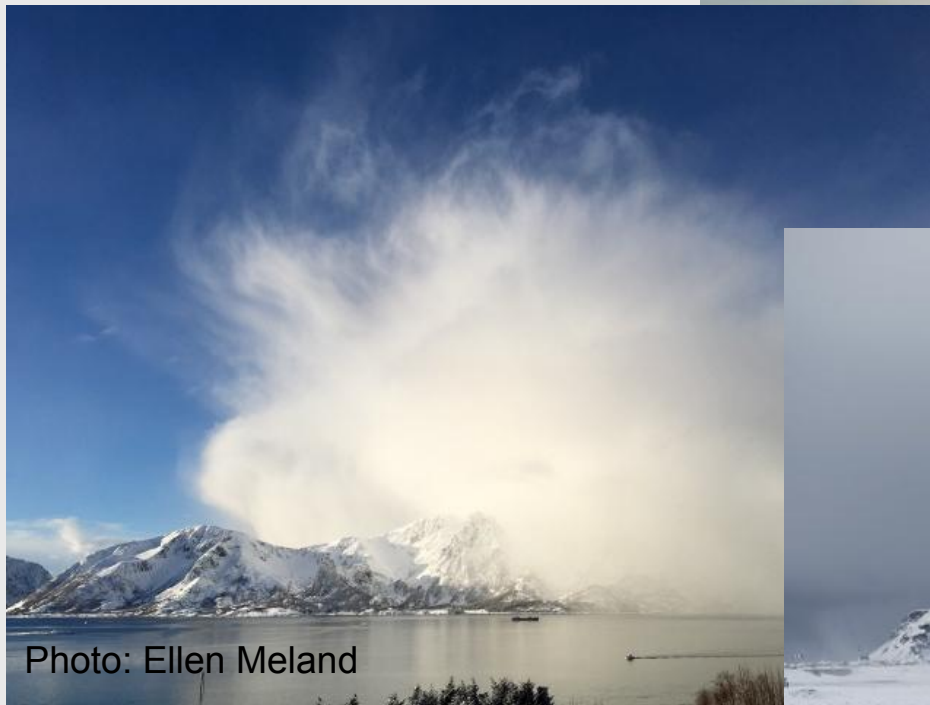


Photo: Ellen Meland



Photo: Johan Wildhagen

Challenges

Large spatial variability

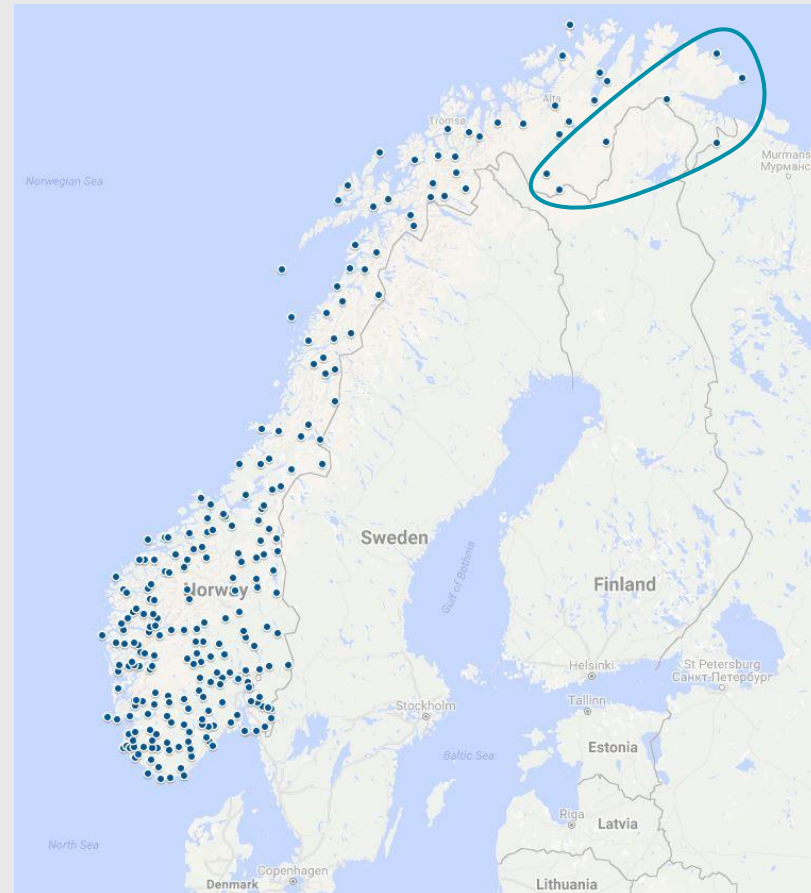
→ noise

→ low correlations

→ outliers detected as inhomogeneity

Challenges

Large spatial variability
Sparse network



Corr
0.71
0.72
0.73
0.76
0.77
0.77
0.79

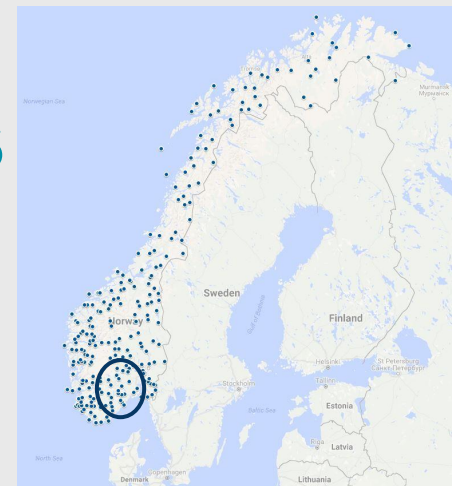
Challenges

Large spatial variability

Sparse network

Metadata

Comparison of test results



Tørdal

Break year	MASH	HOMER	Metadata
1898	0.97		missing
1919	1.01	1.07 (1920)	missing
1931	1.01		missing
1950	1.01	1.09 (1952)	Relocation 1952
1958	0.99		outlier may 1959
1959	1.01		outlier may 1959

Some preliminary results

70 stations:

27 % - homogeneous

23 % - 1 break

50 % - 2 breaks or more



Some preliminary results

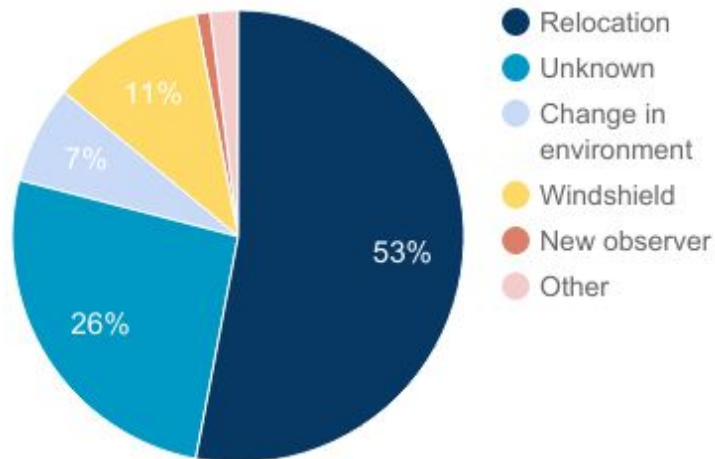
70 stations:

27 % - homogeneous

23 % - 1 break

50 % - 2 breaks or more

Main causes for breaks MASH

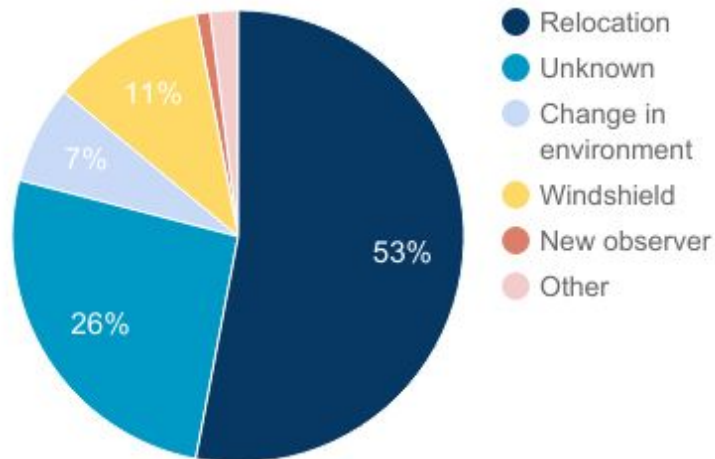


Some preliminary results

Windshields installed at 46 of 70 stations

Only 9 of these gave inhomogeneities

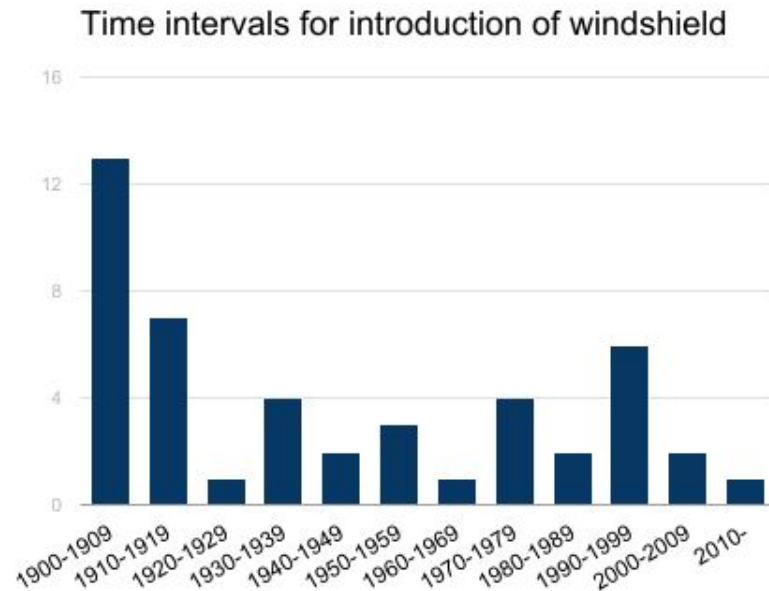
Main causes for breaks MASH



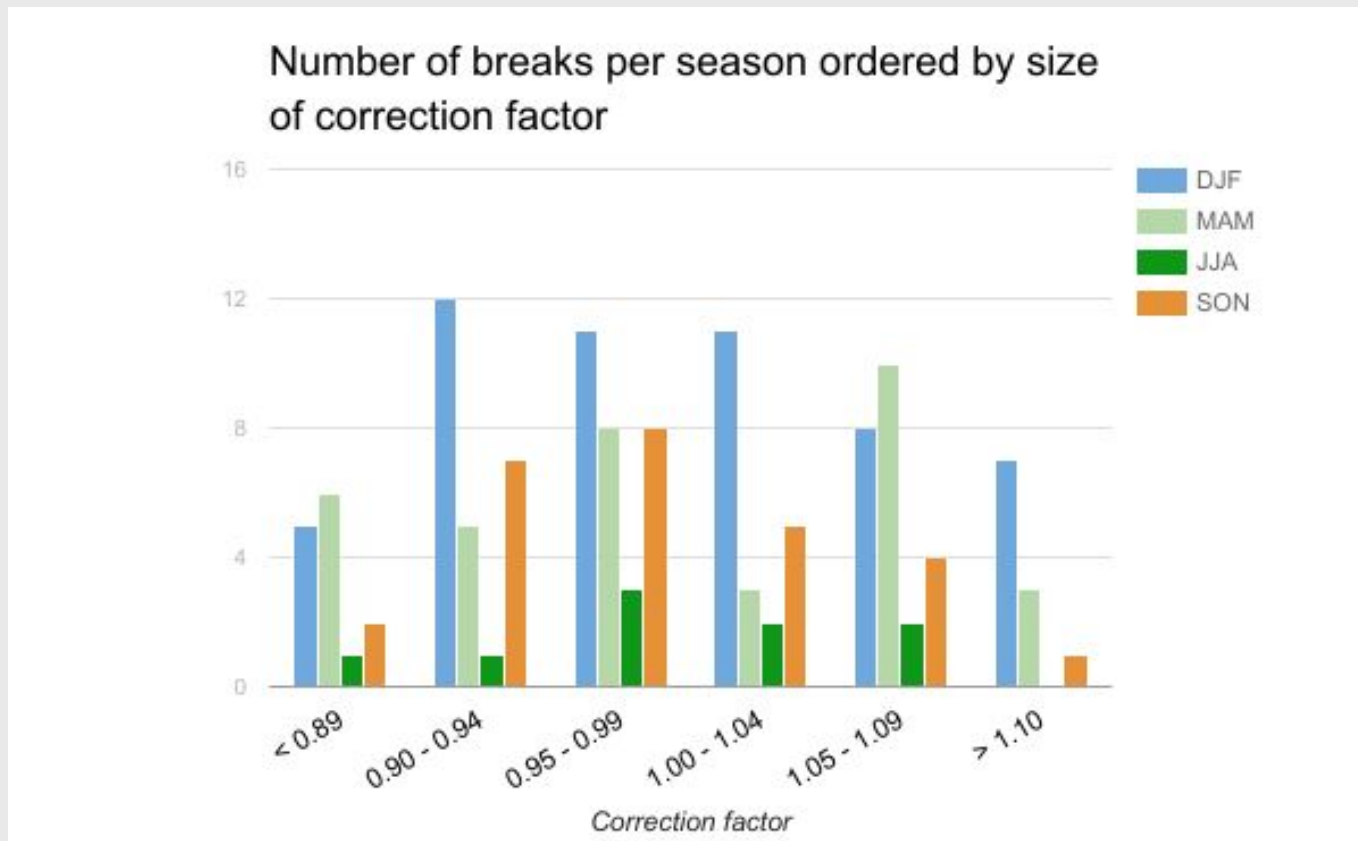
Some preliminary results

Windshields installed at 46 of 70 stations

Only 9 of these gave inhomogeneities



Some preliminary results



Outlook

Finish MASH and metadata

Climatol

ProClimDB



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Thank you for your attention!

