Koninklijk Nederlands
Meteorologisch Instituut
Ministerie van Infrastructuur en Waterstaat

Towards quantifying why, when and where to engage citizens to participate in weather observation networks

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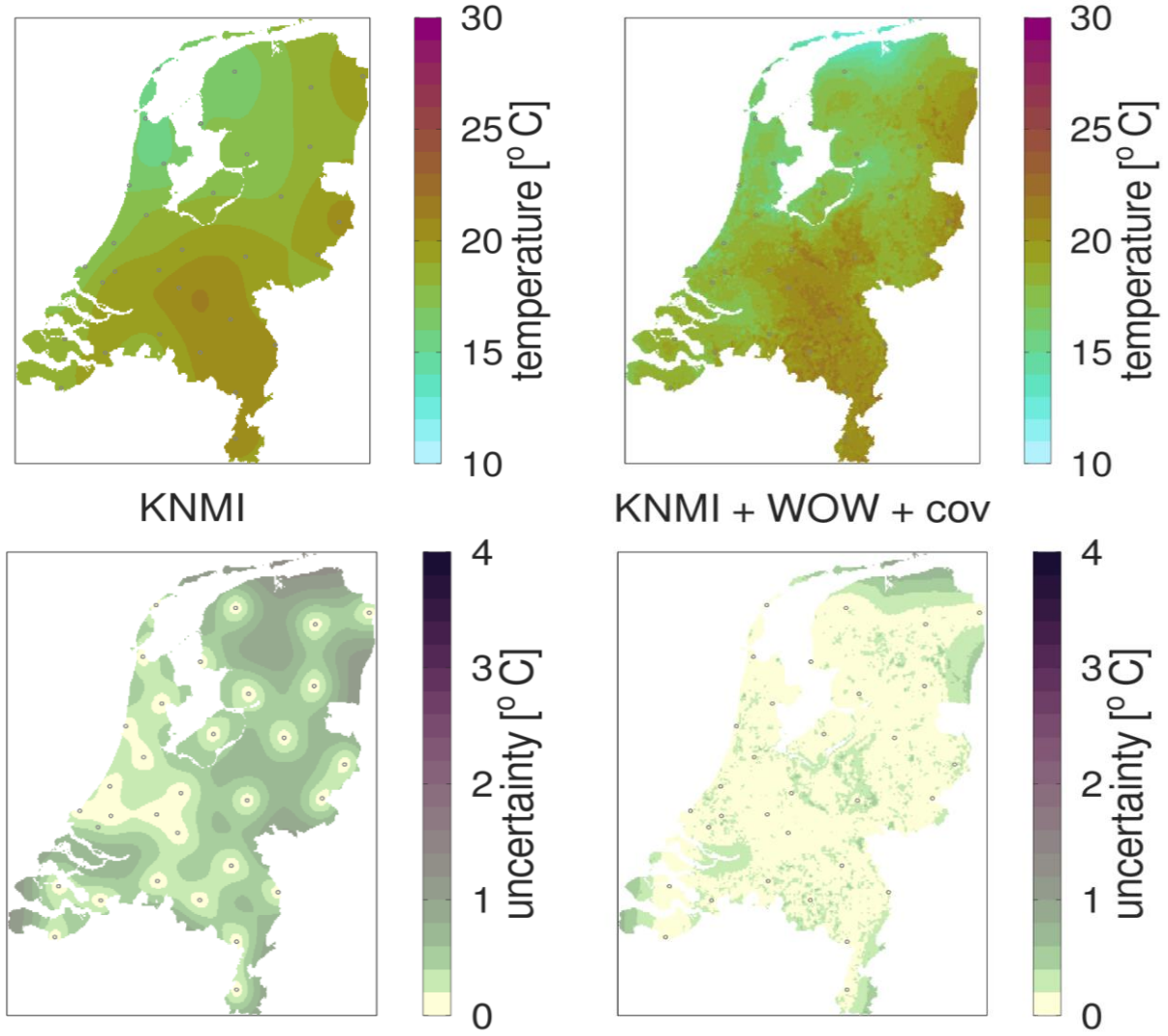
Introduction



Conventional ‘social contract’

- Society provides funding and high level of autonomy
- Science provides authoritative results and recommendations

Towards partnership?

- Society is involved in providing data
- Stronger feeling of a shared responsibility? (for example for climate mitigation and adaptation)

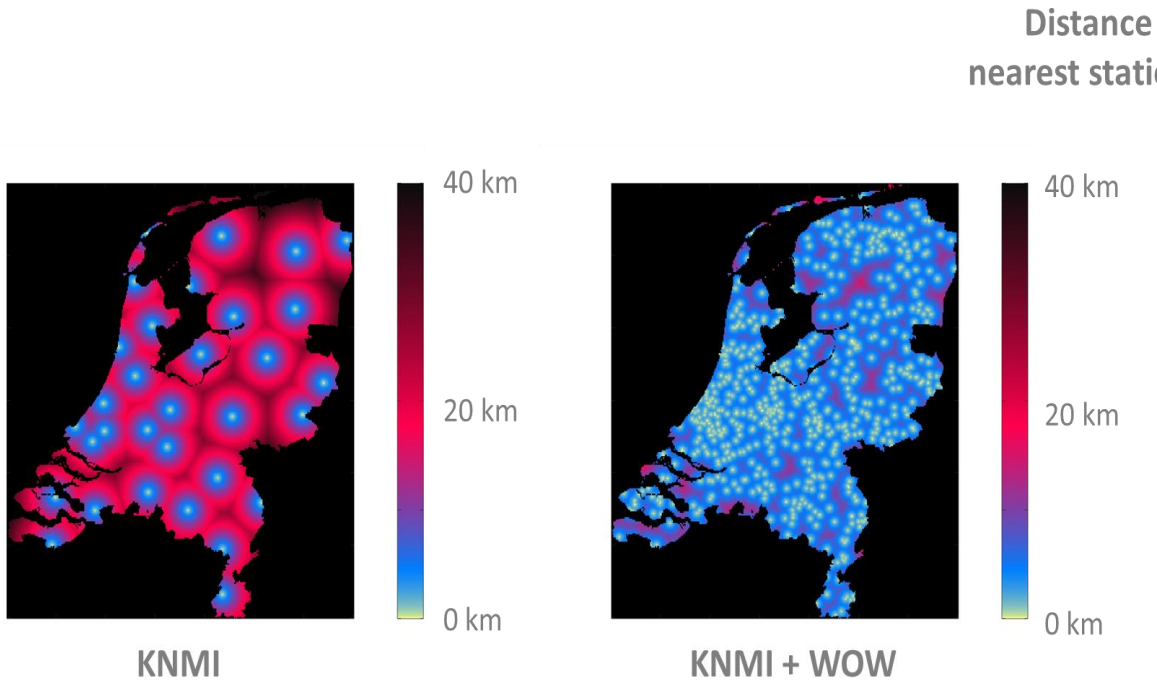
‘Community Climatology’

- Blend official data with crowd-sourced data and land use
- Hi-res weather / climate maps

Source: De Baar, Garcia-Marti, Van der Schrier, EMS2022-53

Introduction

question



In the future, one might like to let ‘grow’ the station network

Can we grow a multi-fidelity network?

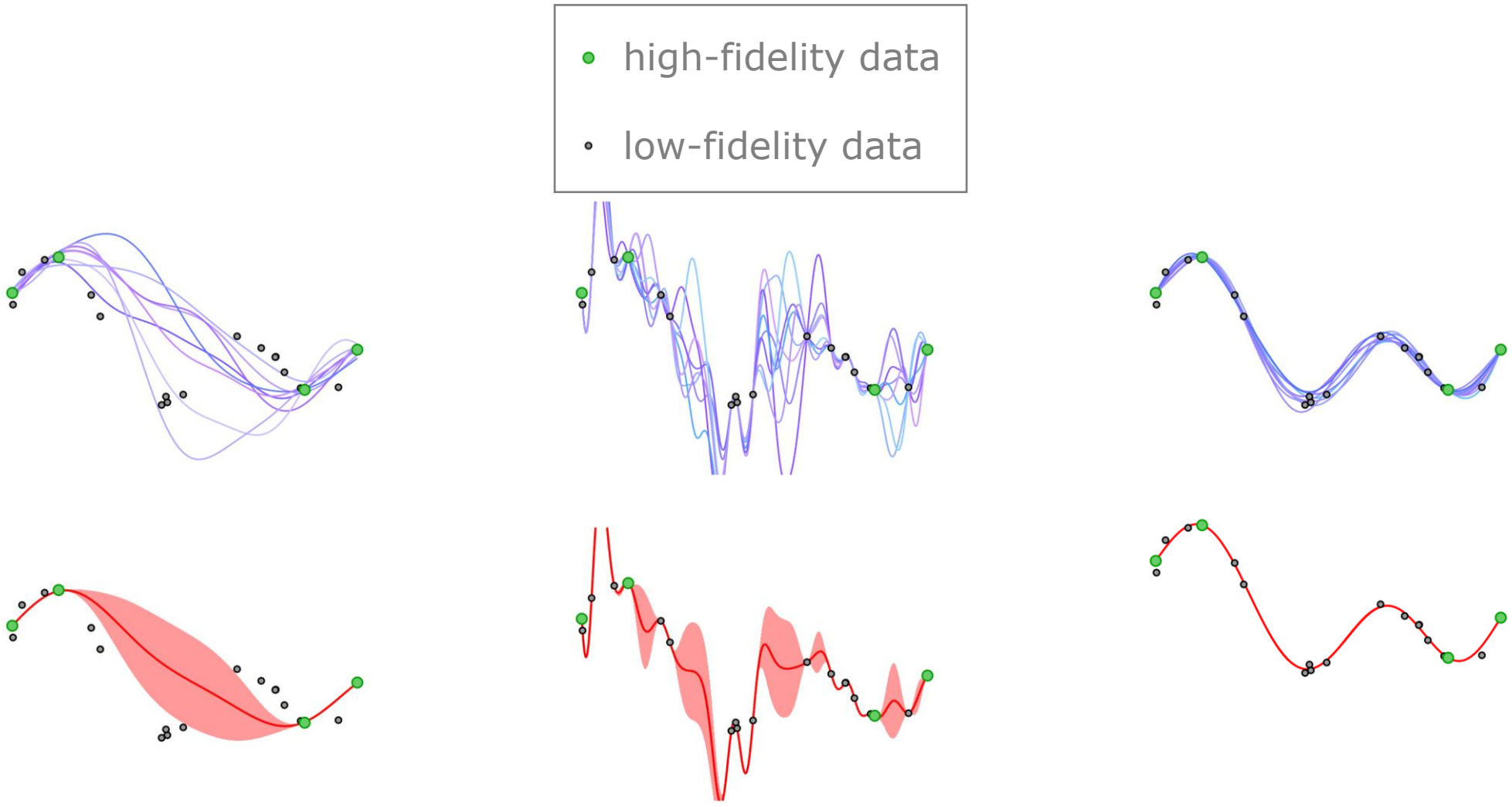
- High-fidelity: official KNMI stations
- Low-fidelity: citizen WOW stations (Weather Observation Website)

How should we efficiently grow a multi-fidelity network?

- New station: KNMI or WOW?
- What is the most optimal location for a new station?
- How much improvement can we expect from adding stations?

Methodology

multi-fidelity regression kriging



ignoring low-fi data

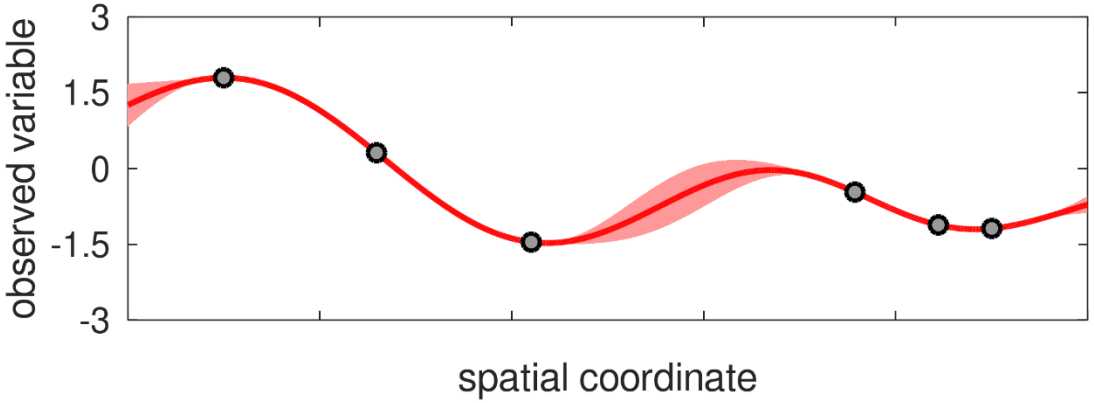
exact interpolation

regression with noise treatment

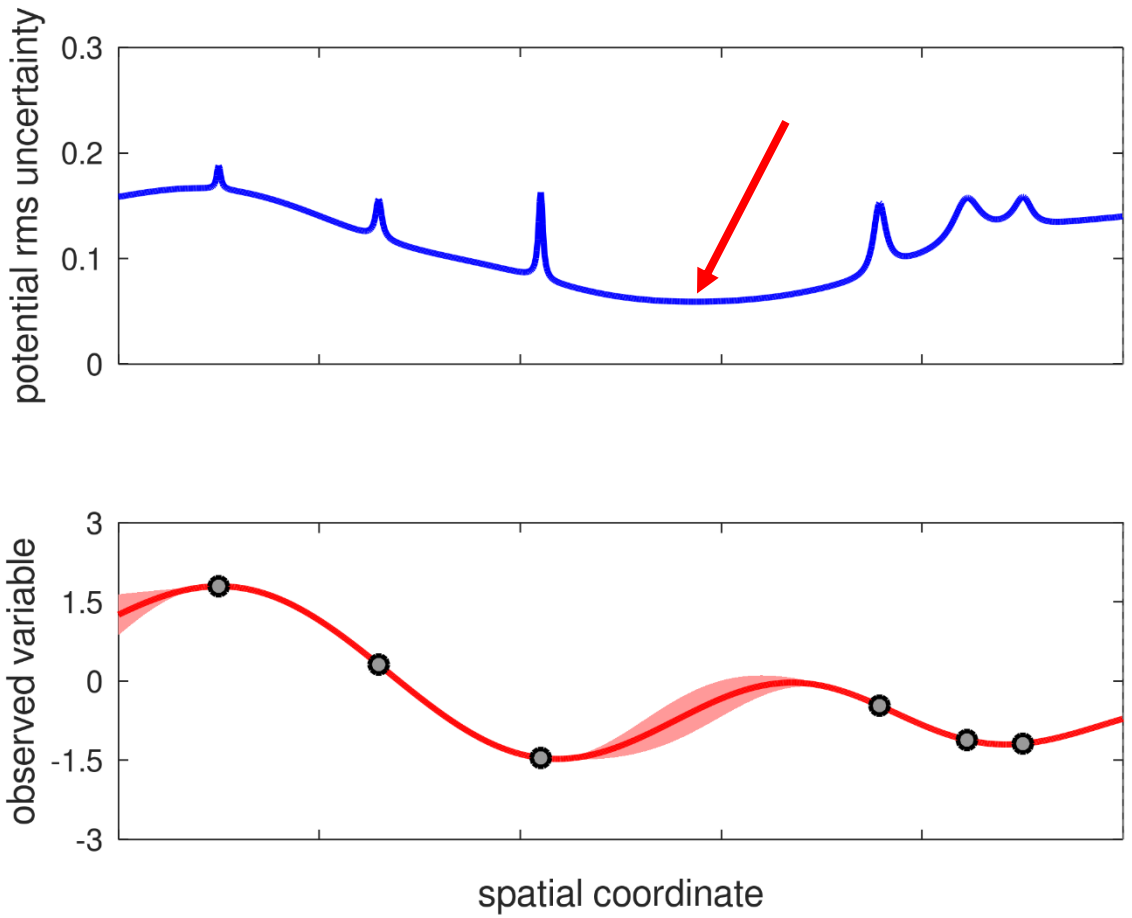
Methodology

explicit adaptive sampling

original map

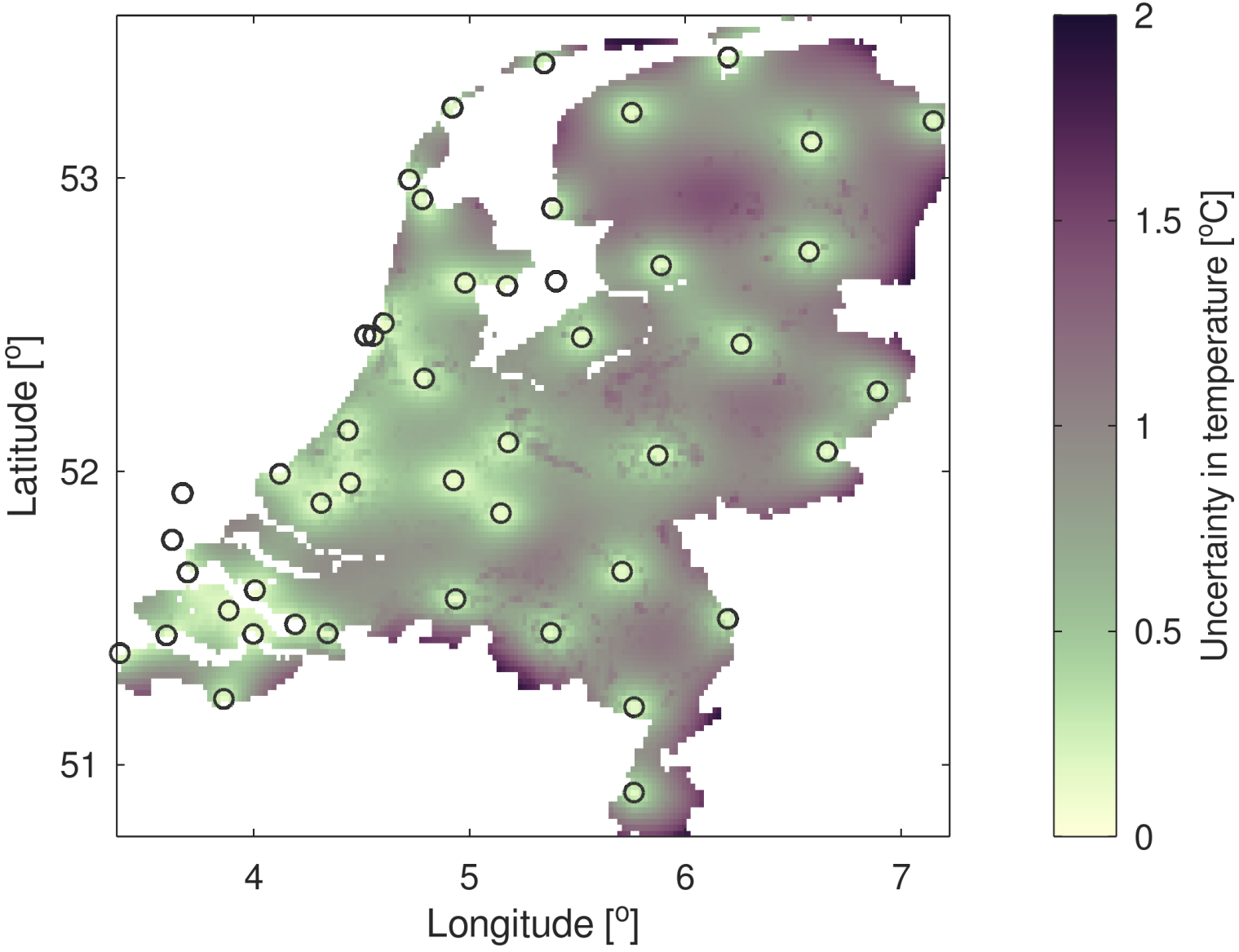


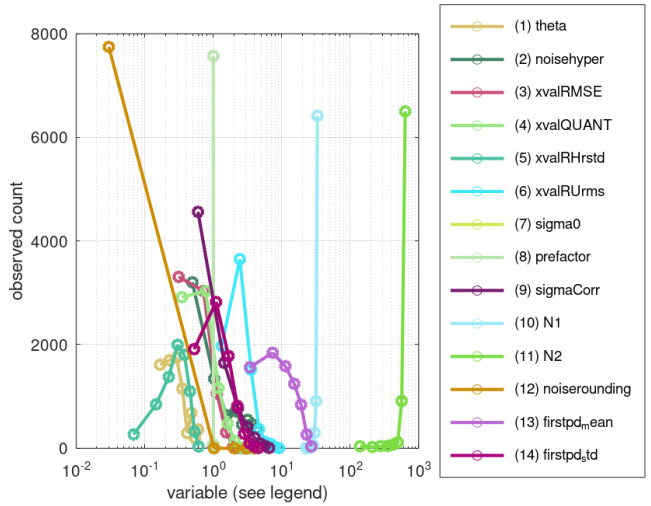
scanning for new station location

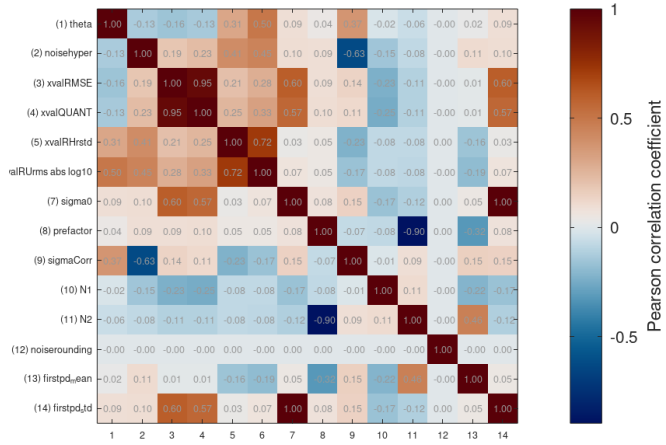


Results

year of *in situ* observed air temperature

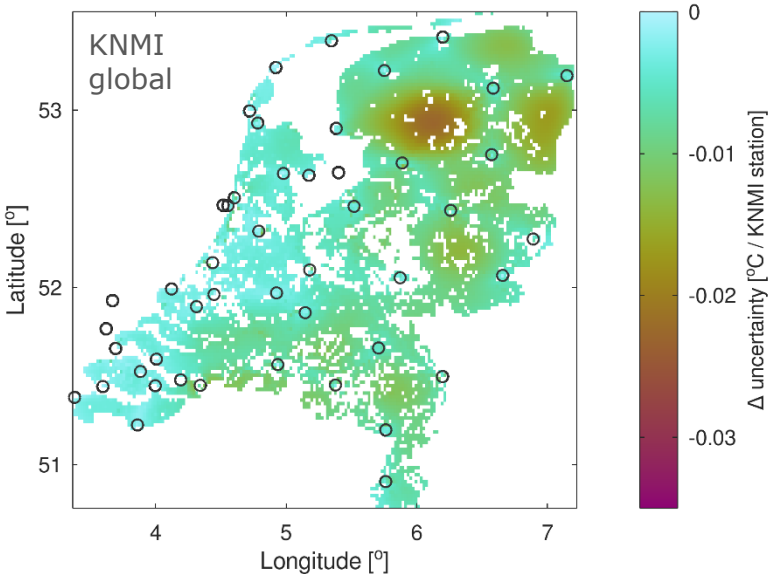


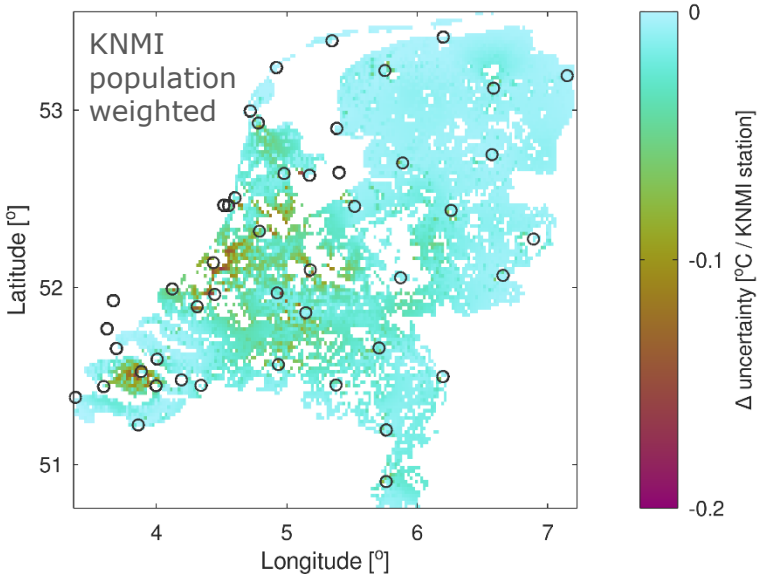


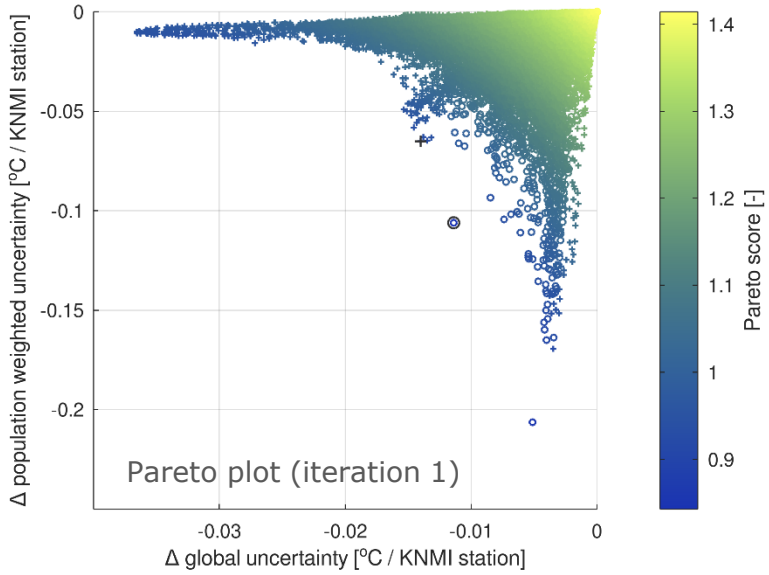


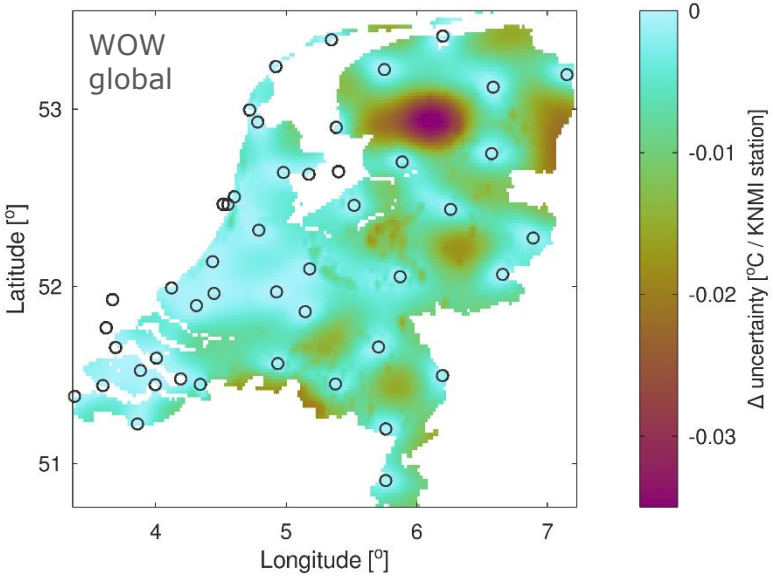
Results: Iteration 1

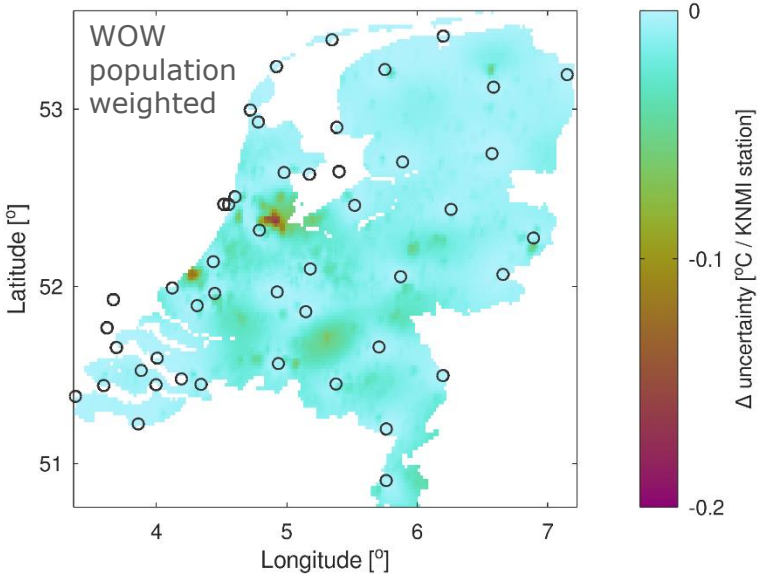
scanning for new station location









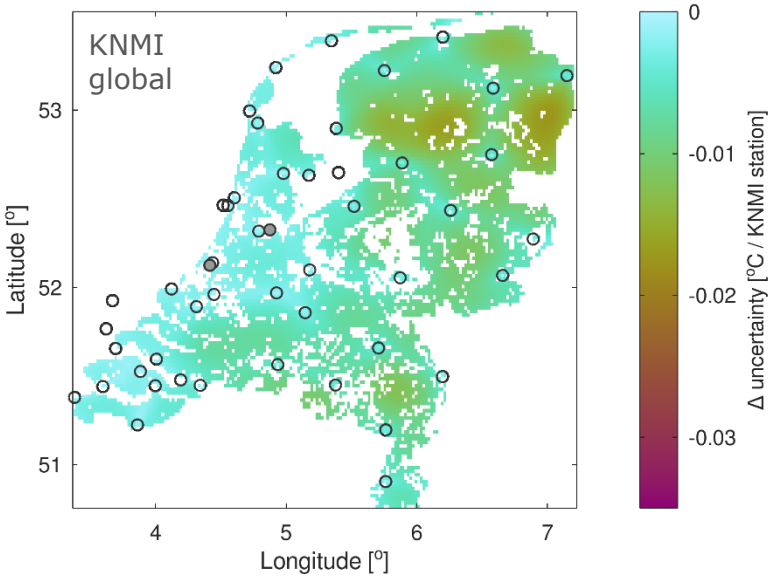


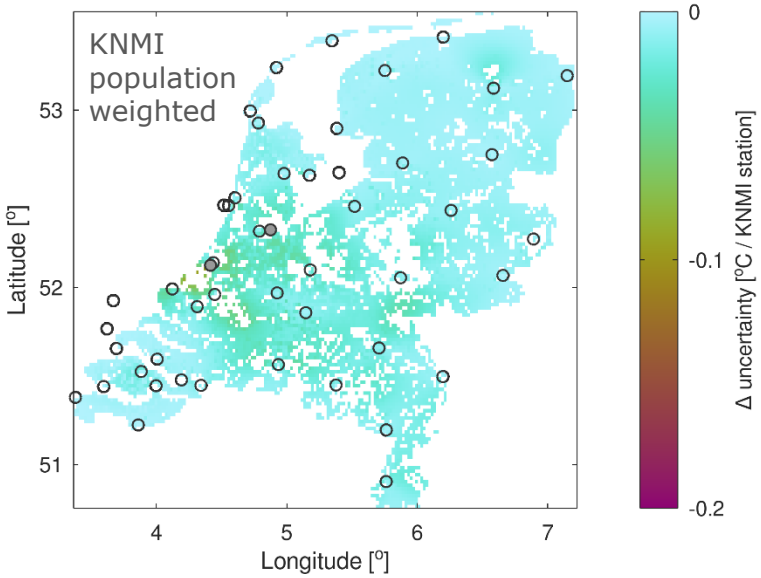
Need to make assumption about cost of WOW station

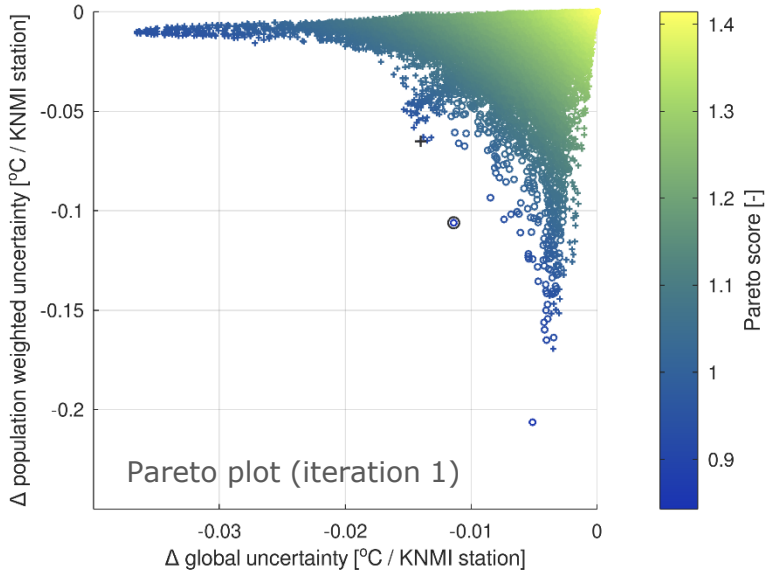
Assumption:
WOW cost = 5 % KNMI cost

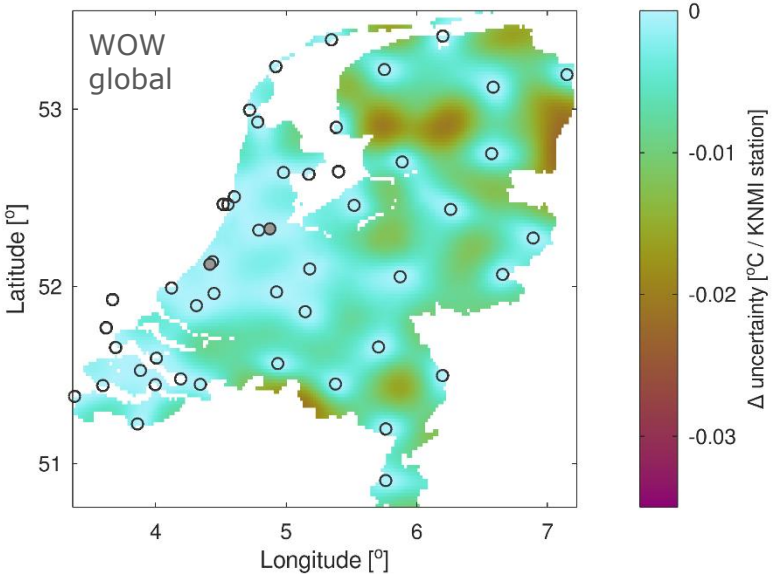
Results: Iteration 8

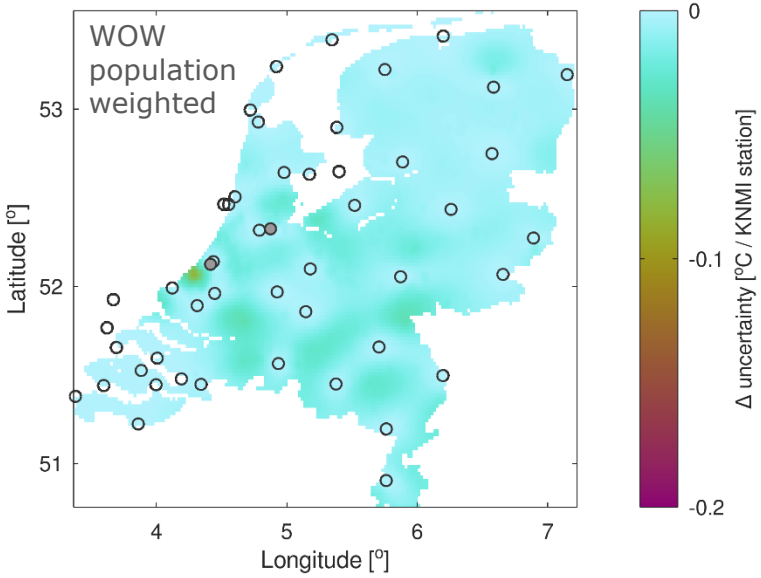
scanning for new station location

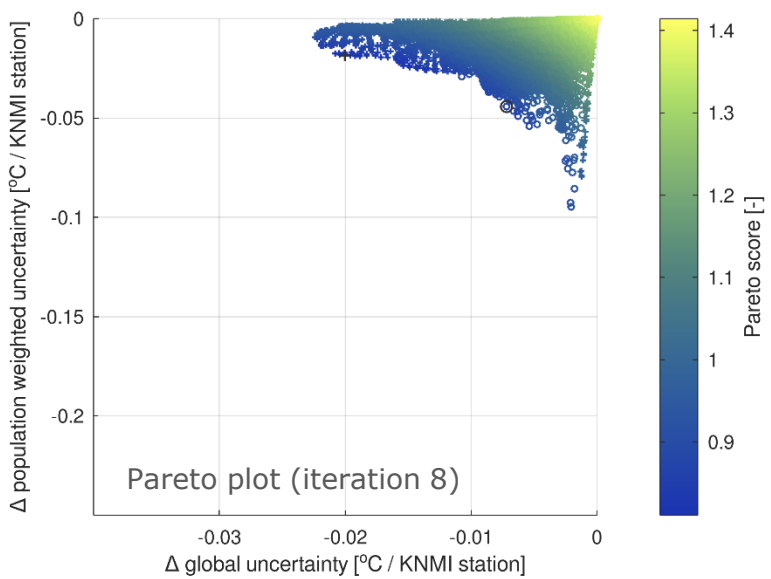






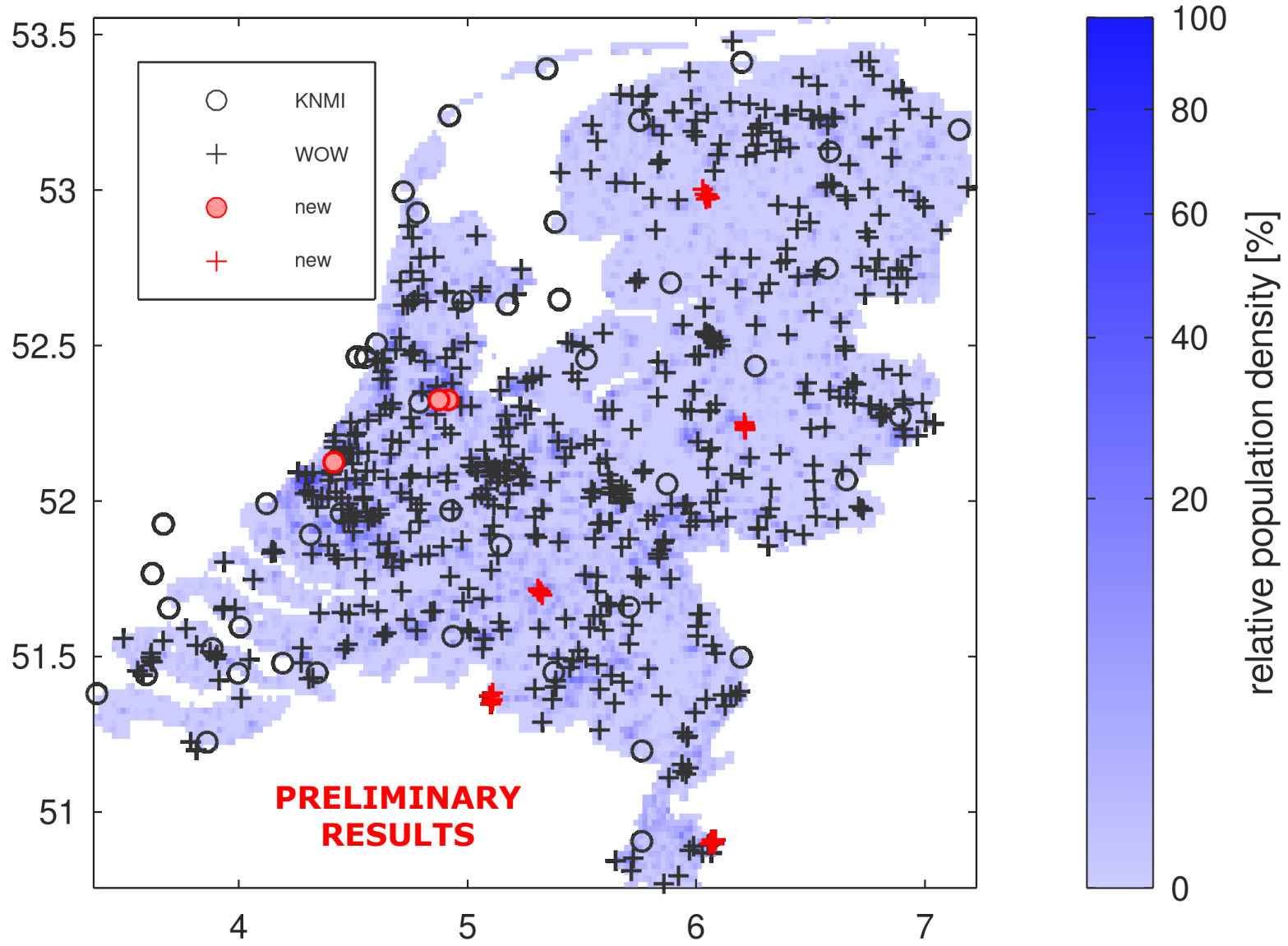






Results

adapted multi-fidelity network



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Thank you very much for your kind attention

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