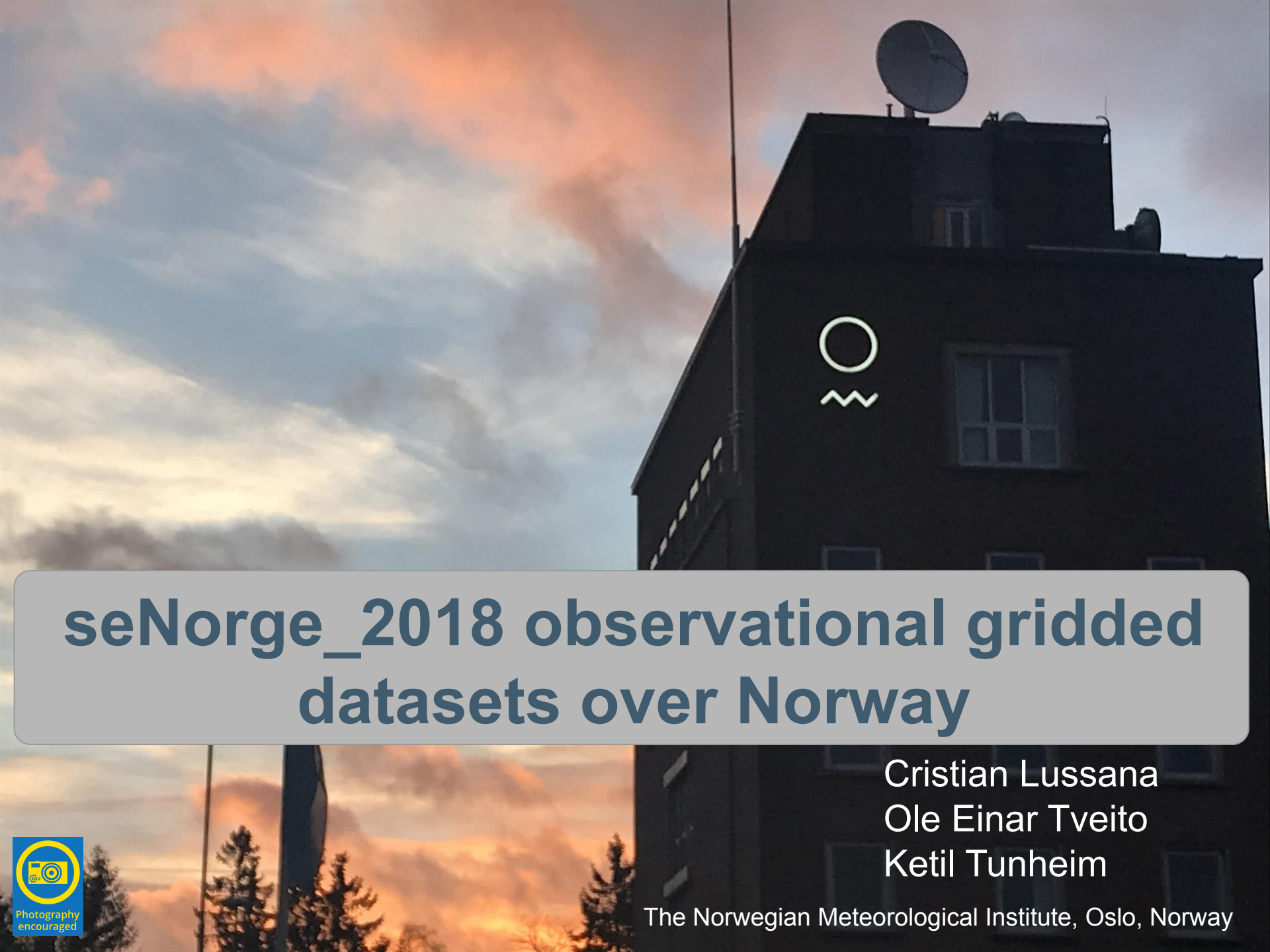

seNorge_2018 observational gridded datasets over Norway

Cristian Lussana
Ole Einar Tveito
Ketil Tunheim

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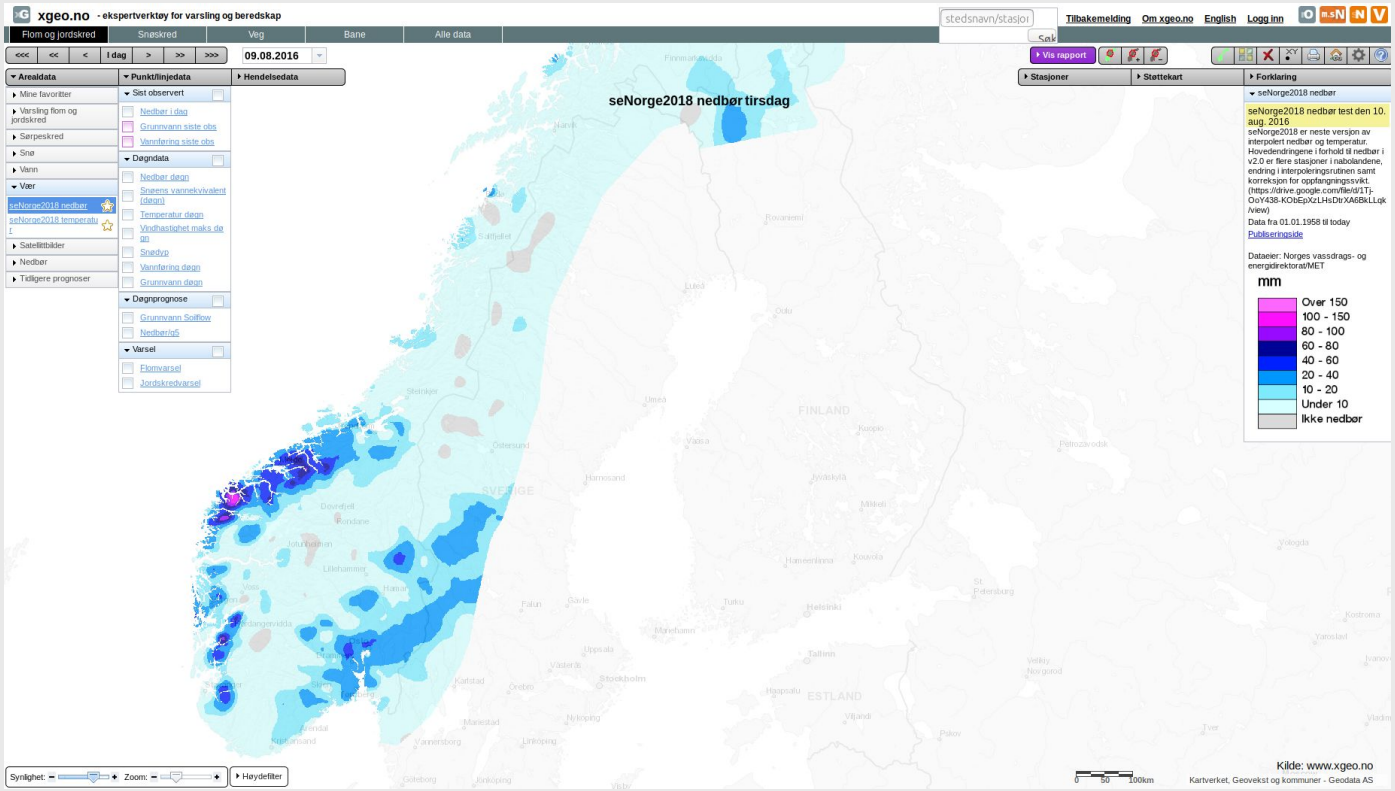
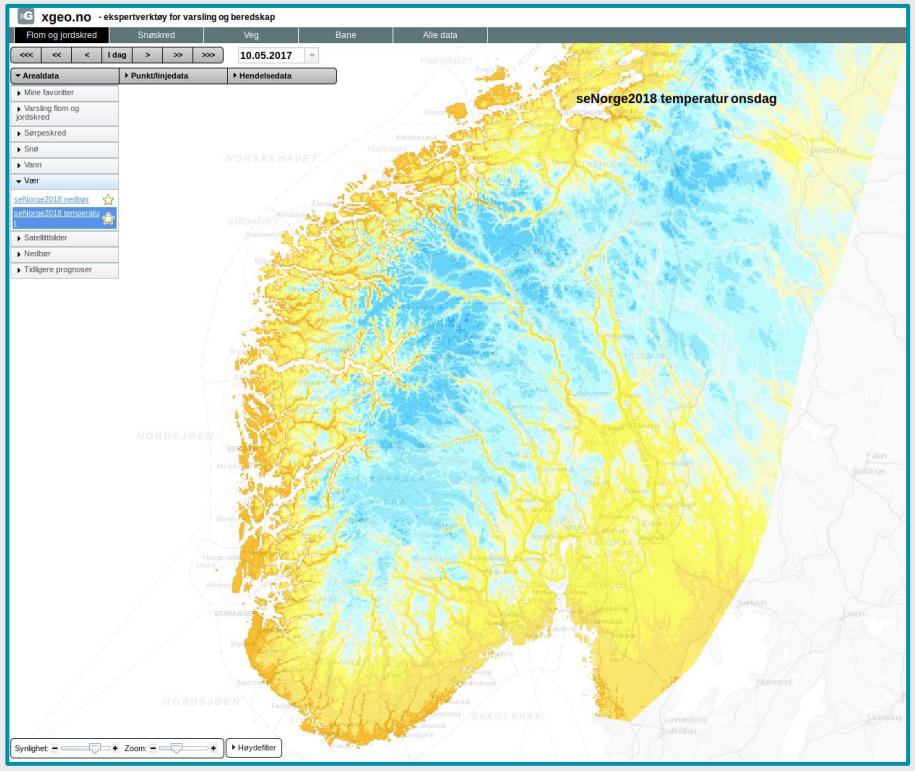
Background

- Observation-only gridded datasets
- Delivered since 2002
- Used in climatology, meteorology and hydrology



Characteristics

- Daily Temperature mean, **min, max**
- Daily total precipitation
- 1 km covering Norwegian mainland (bits of Sweden, Finland, Russia)
- 1957 - 2017 + updated daily



Observational Dataset

- MET Norway's Climate Database
- SMHI, FMI data through ECA&D
- Observation density varies in time and space

Open Data

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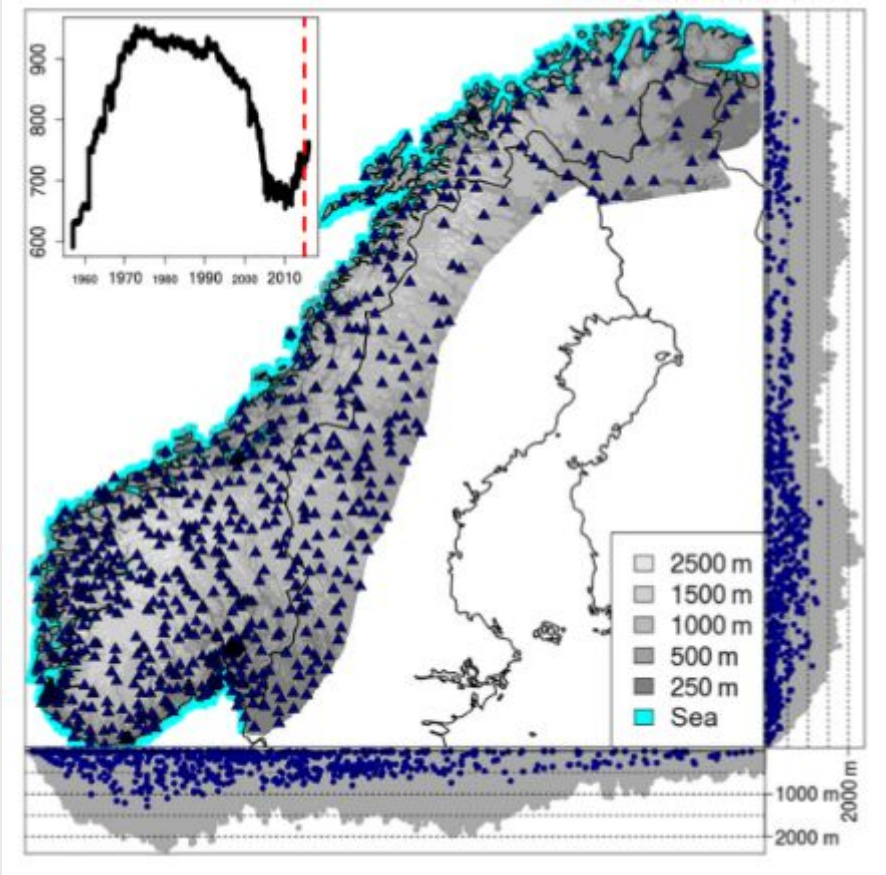
WHAT IS FROST | HOW TO USE FROST | API REFERENCE | CHANGELOG

What is Frost?

The Frost API provides free access to MET Norway's archive of historical weather and climate data.

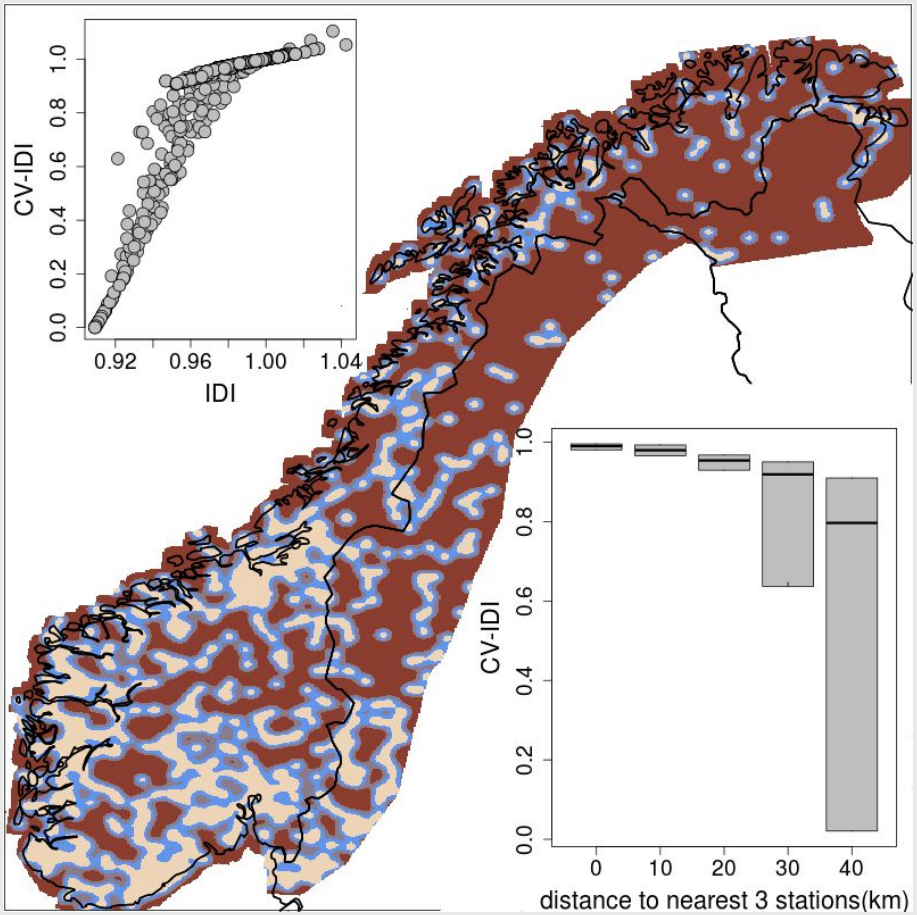
Similar APIs are made available by SMHI and FMI

ECA&D European Climate Assessment & Dataset



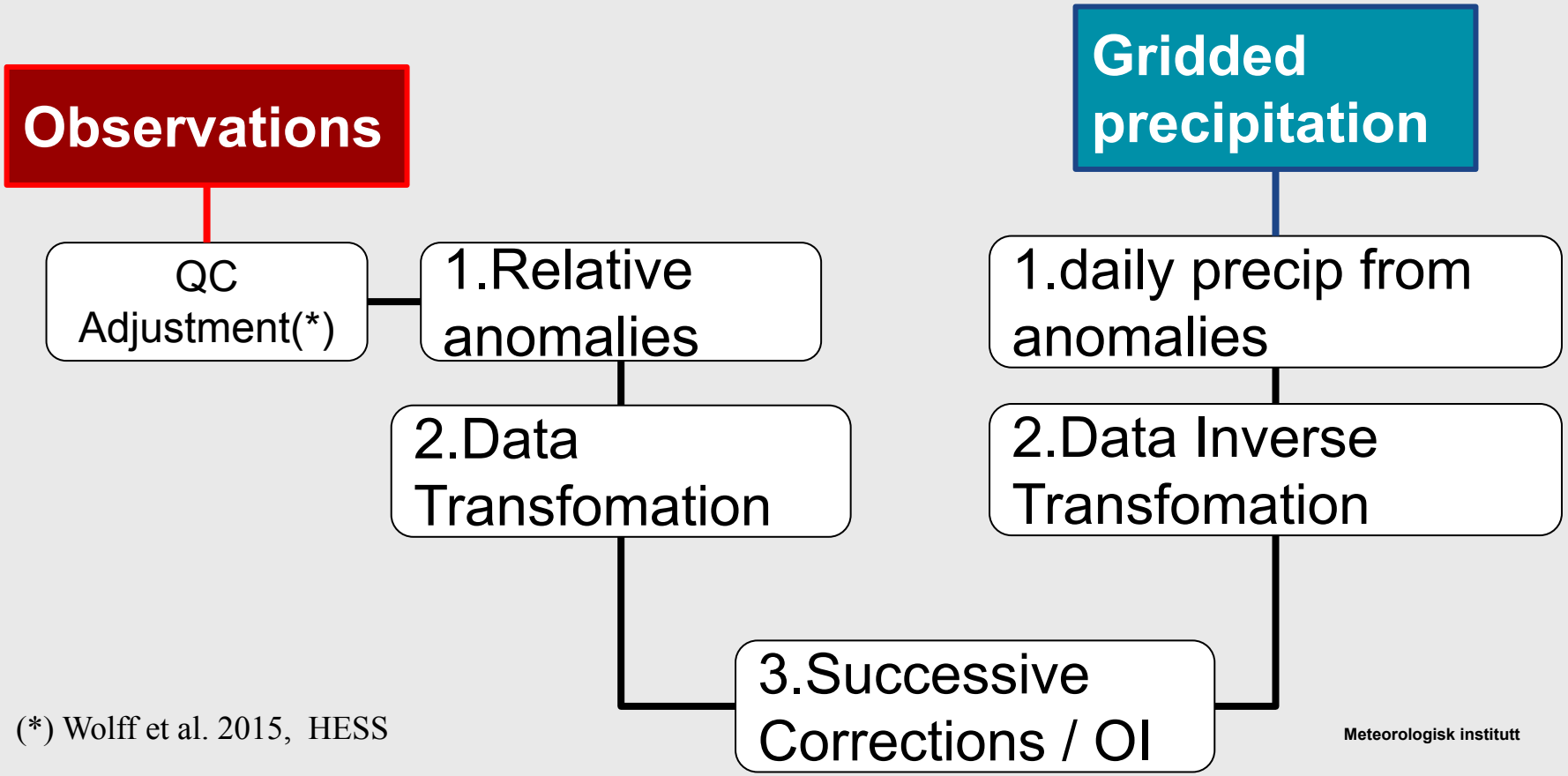
Station Density

- Integral Data Influence (IDI) represents the observation influence on the analysis given a predefined metric



Interpolation Method, 3 steps

- Relative anomalies, data-sparse region
- Data transformation, normality
- Successive corrections / OI



(*) Wolff et al. 2015, HESS

Method 1/3 Reference field

- Combination of model output and observations proved successful in reconstructing monthly precipitation climatologies over Norway (Crespi et al., 2019, IJoC)

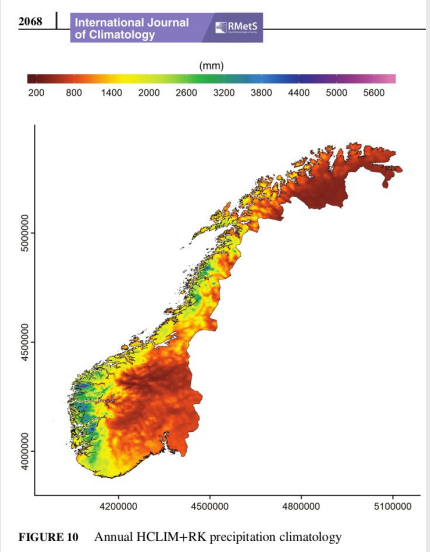


FIGURE 10 Annual HCLIM+RK precipitation climatology

- Spatial Interpolation consider relative anomalies
- (daily observation) / (3-month model average centered over that month)

Method 2/3 Data Transformation

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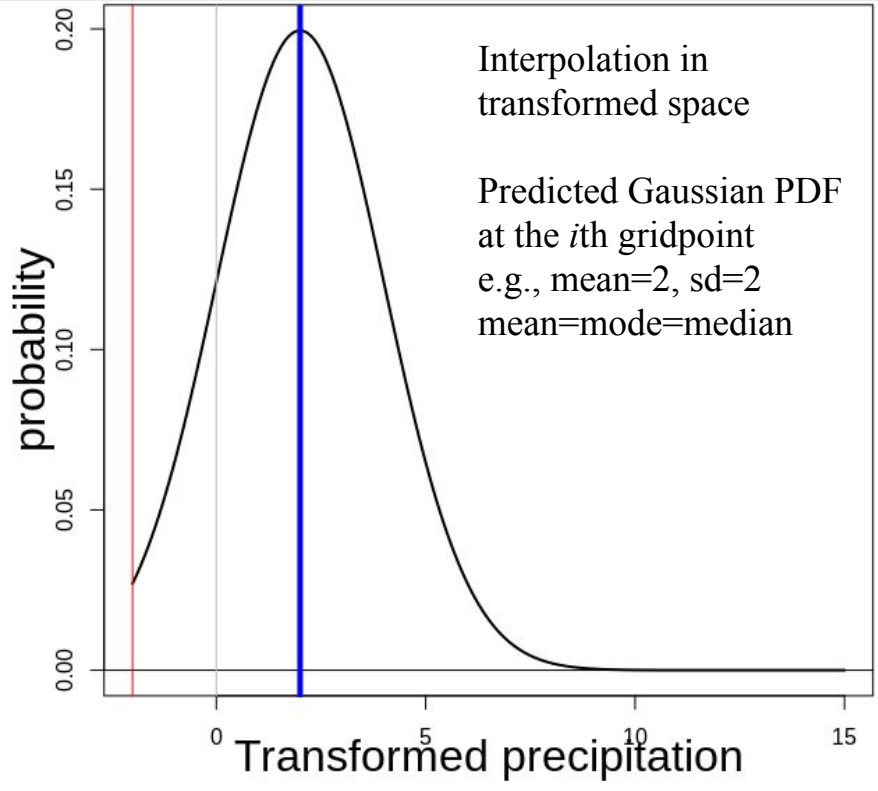
- Square-root transformation (Box-Cox with λ=0.5)
- Get the data into a normal shape
- Be careful with the inverse transformation of the PDF
- Our estimate is the mean of the precipitation PDF



inverse transformation

Method 2/3 Data Transformation

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- Square-root transformation (Box-Cox with λ=0.5)
- Get the data into a normal shape
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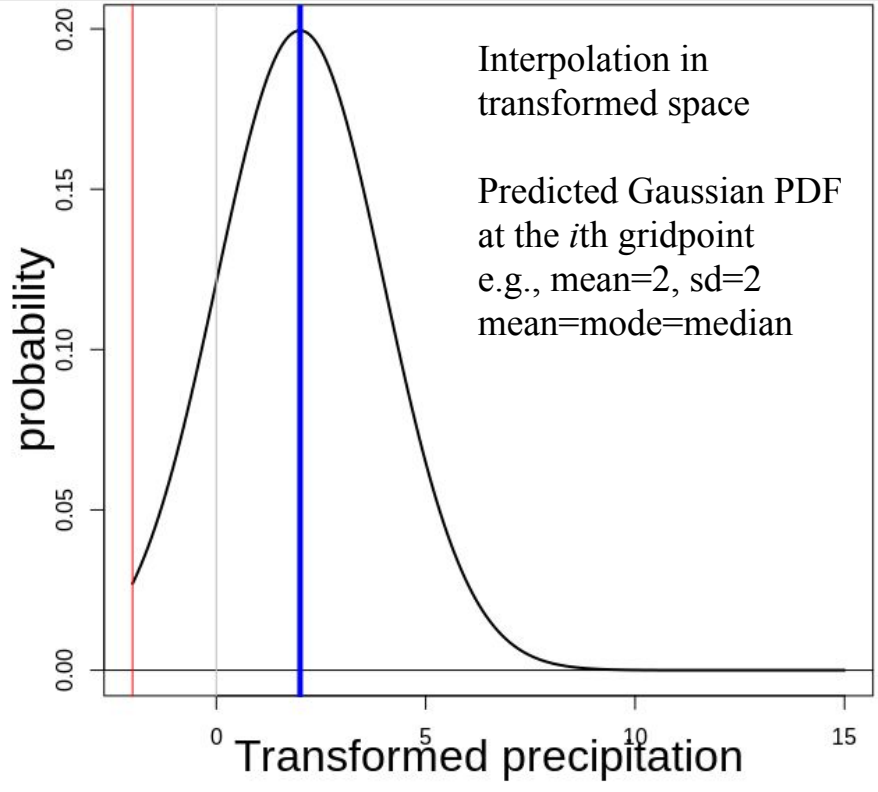
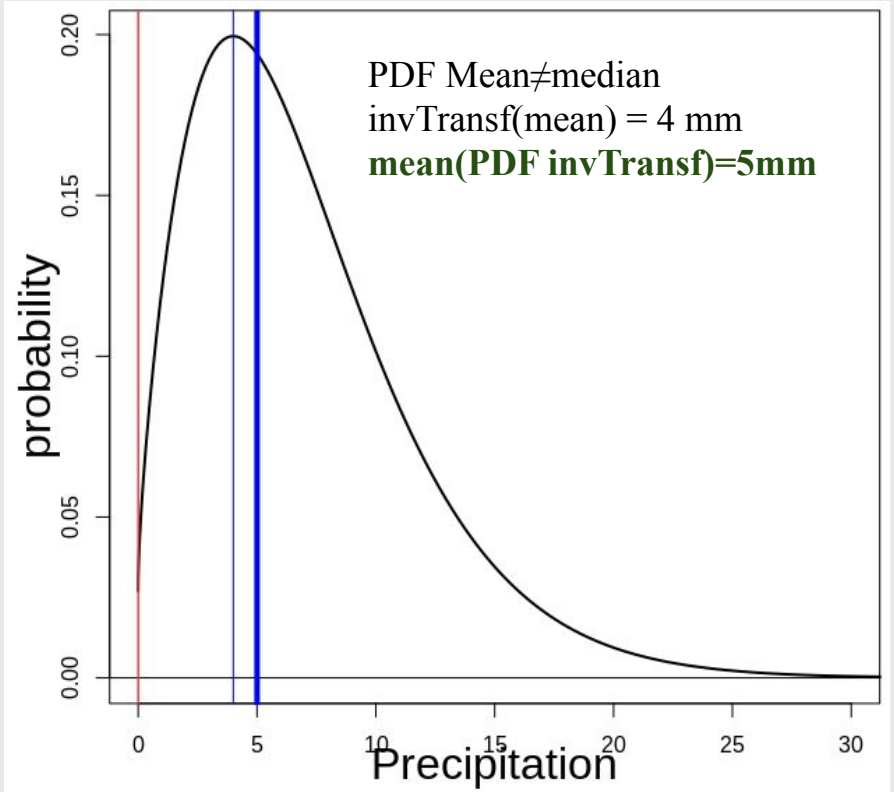
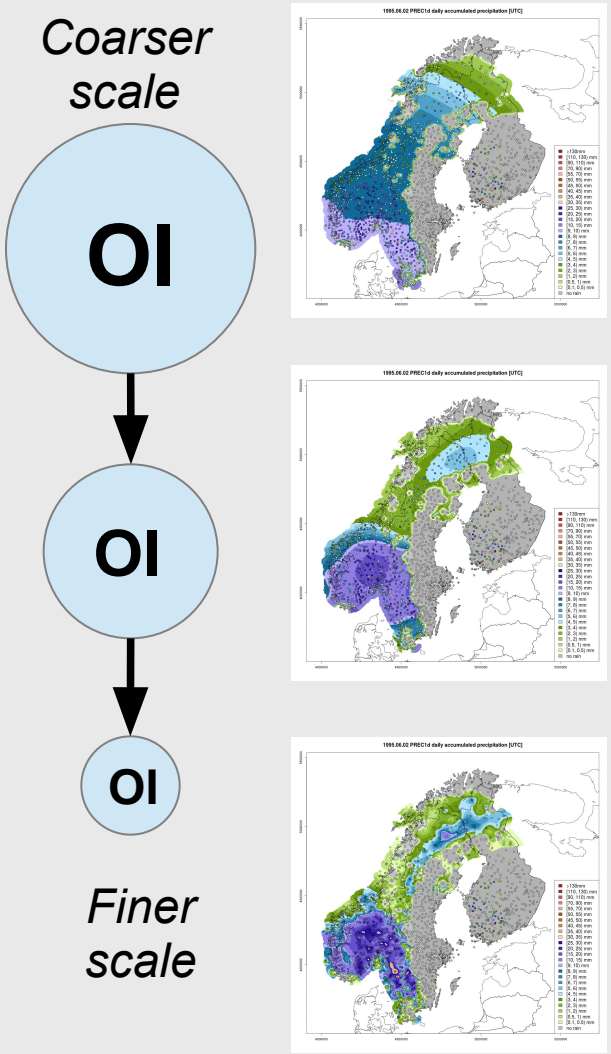




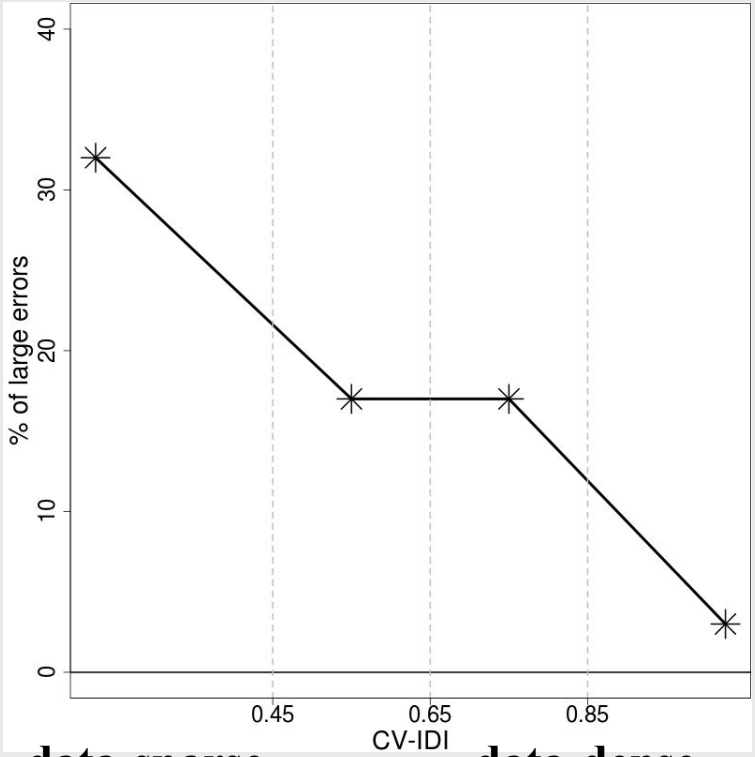
Method 3/3 Successive Corrections

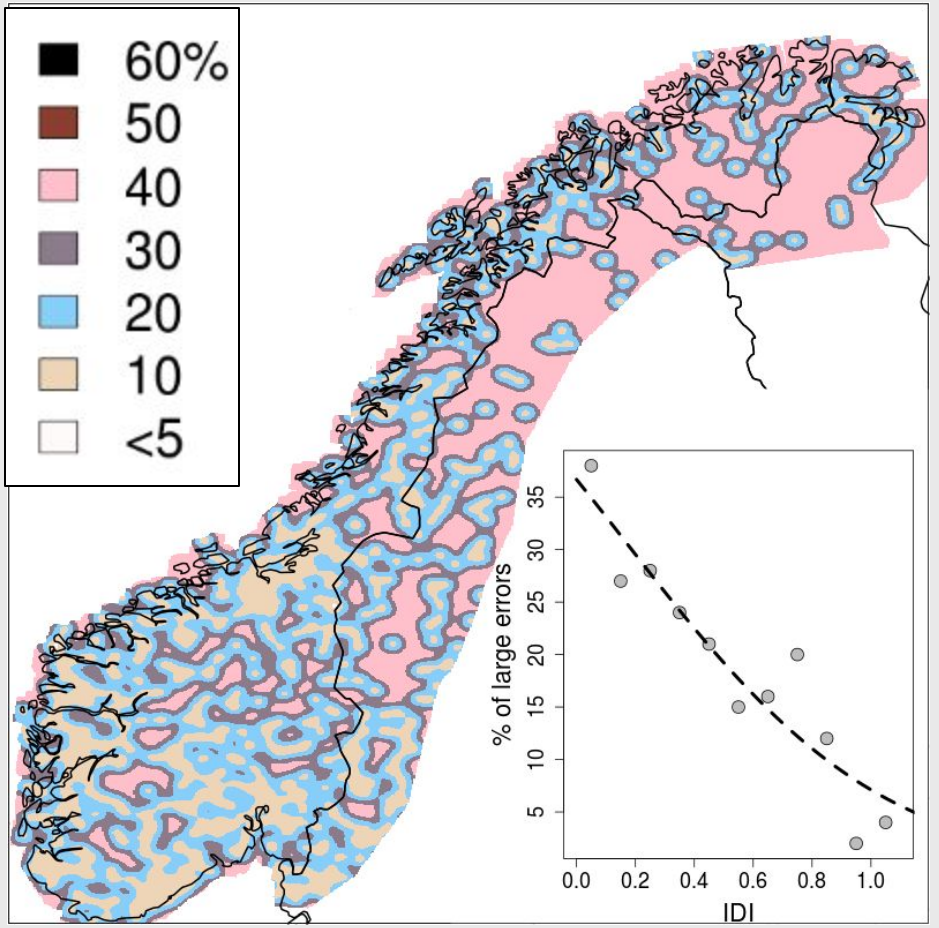
- the spatial interpolation is based on an *iterative* procedure



Evaluation 1/3 Scores

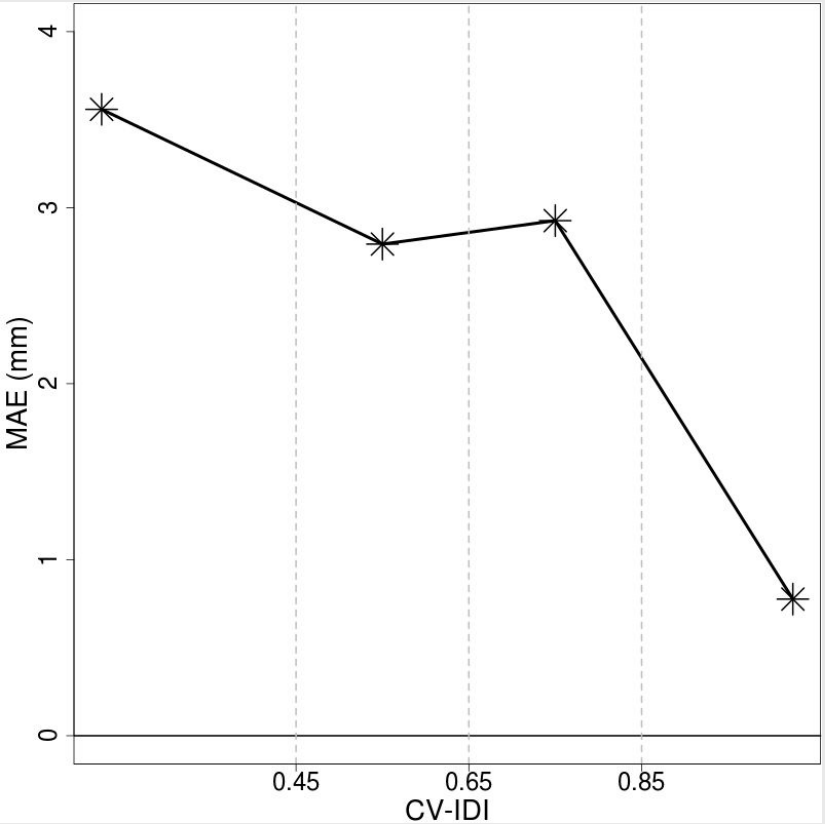
- Cross-validation (10% observations)
- Large Errors for intense precipitation, obs>10mm & |pred-ref|>ref/2



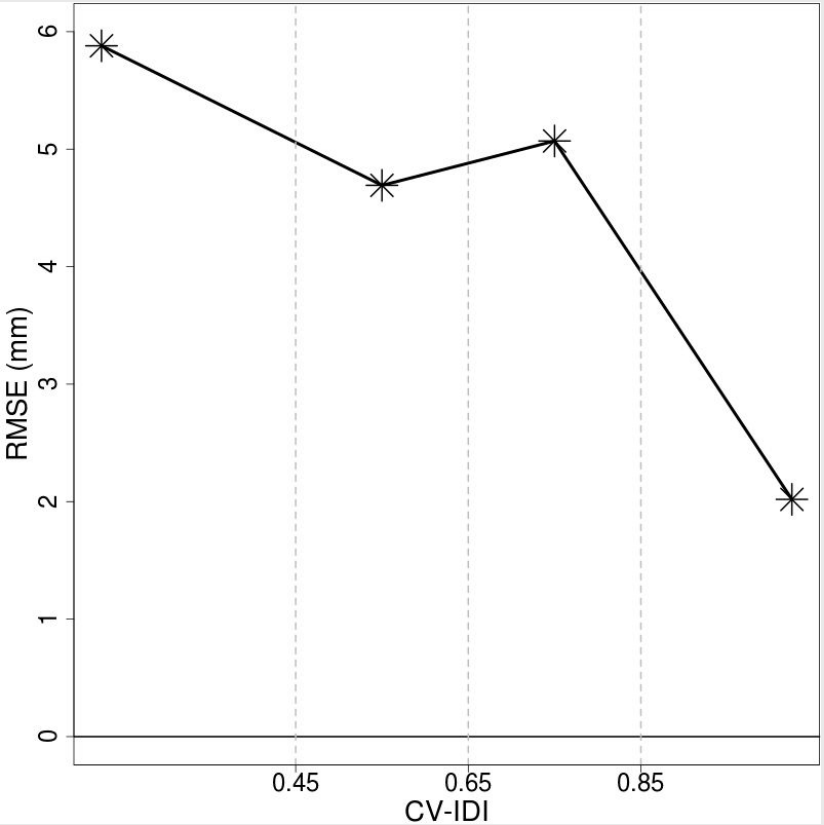


Evaluation 2/3 Scores

- Mean Absolute Error & root mean square error



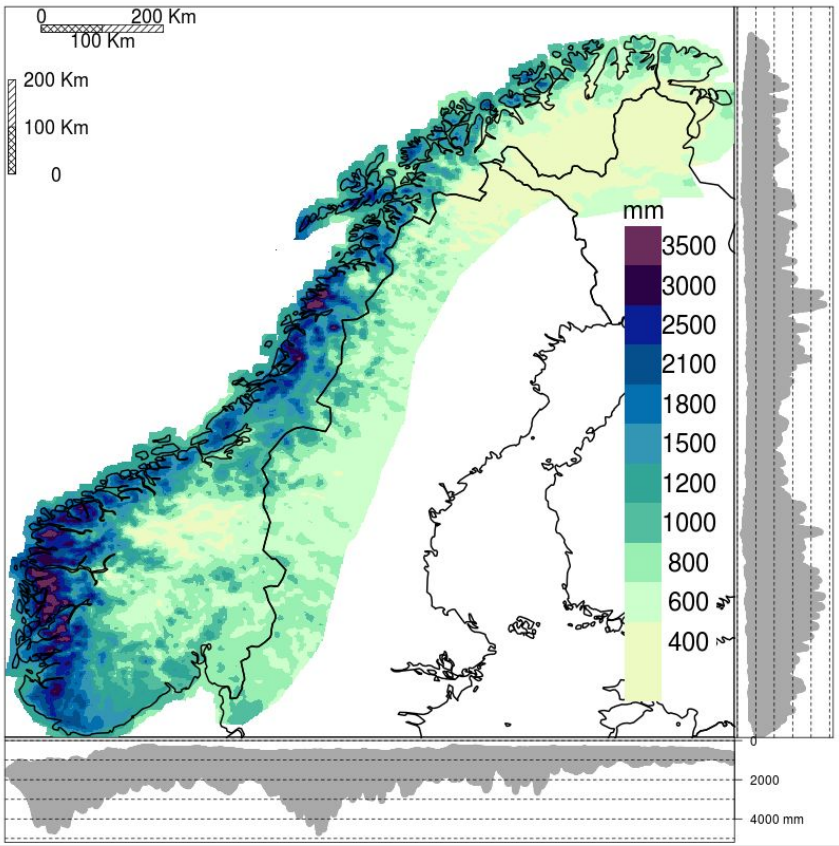
data-sparse data-dense

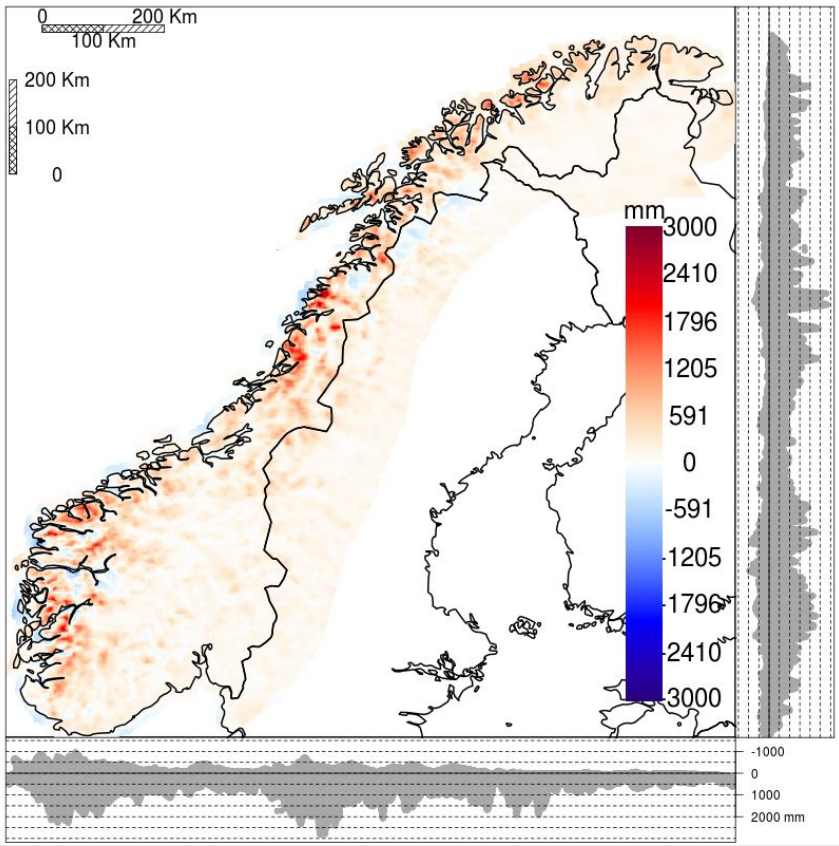


data-sparse data-dense

Evaluation 3/3 Comparison

- Comparison against previous version
- Previous version underestimates precipitation

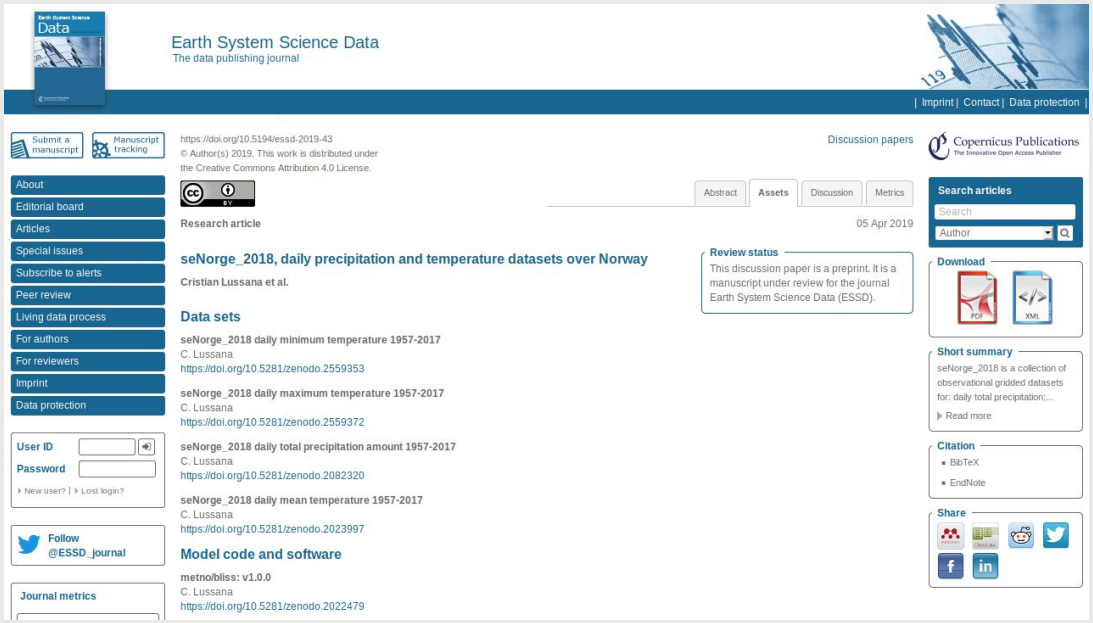




Conclusions

- Spatial Interpolation method provides fields with the highest effective resolution given the local station density

- Information in data-sparse regions integrated with long-term averages from numerical model output



manuscript available for public review and discussion

Earth System Science Data

Fresh New Data

Norwegian Meteorological Institute

Catalog http://thredds.met.no/thredds/catalog/senorge/catalog.html

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Evaluation 2/4 Scores

- Distinguish between prec / no-prec
- Equitable Threat Score (1mm)