World Meteorological Organization

Working together in weather, climate and water

GRUAN as an Integral Component of WIGOS

Bertrand Calpini
MeteoSwiss
On behalf of WMO WIGOS

The WMO INTEGRATED GLOBAL OBSERVING SYSTEM

- **Increasing Global Demand for Meteorological Information for the Delivery of Advanced Services**

- **Increasing Global Pressure on Resourcing of Meteorological Observations Networks**

→ **Urgent need to integrate observing systems to optimize economic efficiency**

GRUAN OBJECTIVES

Original Objectives:

- **Provide long-term high-quality upper-air climate records;**
- **Constrain and calibrate data from more spatially-comprehensive global observing systems;**
- **Fully characterize the properties of the atmospheric column.**

→ **None of these strictly requires near real time (NRT) data delivery, however….**

GRUAN OBJECTIVES

New Objective:

- **Routinely disseminate vertical profile data of provisional quality in near real time (NRT) via the WIS.**

Why?

FUTURE EVOLUTION OF GRUAN

- **Existing stations need to attract ongoing funding for the long term future.**

- **Need to attract additional participants to grow the network to 30-40 stations.**

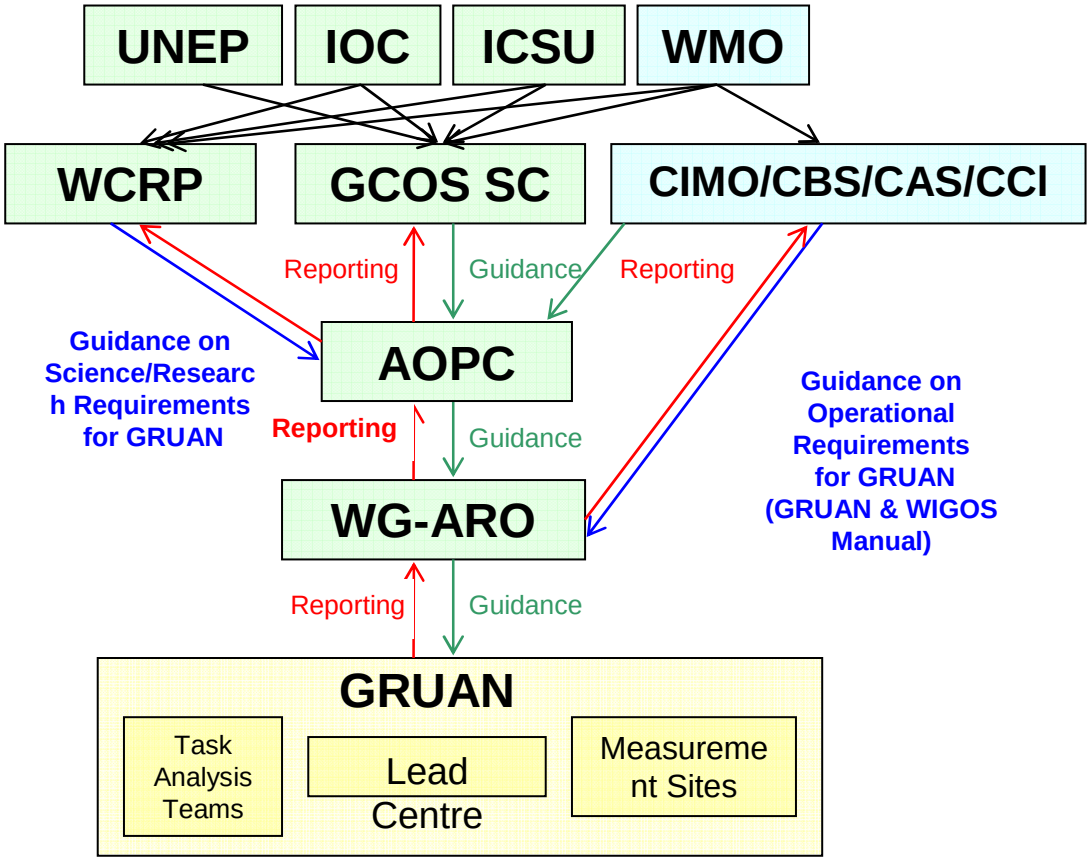
→ **Strengthen WMO connection to GRUAN;**

→ **Introduce an independent NRT operational data stream;**

→ **Include GRUAN as an integral part of WIGOS.**

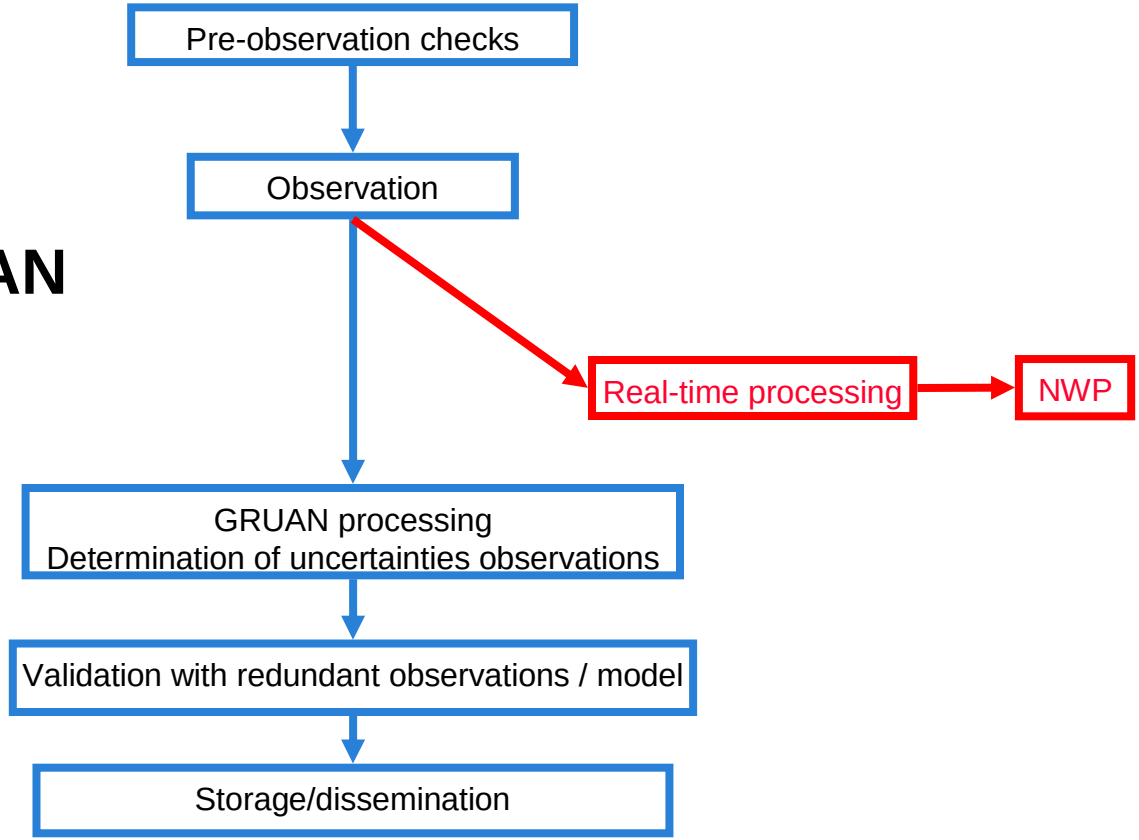
CHANGES TO GRUAN 1

Modify Governance Structure:



CHANGES TO GRUAN 2

Introduce an Independent NRT Operational Data Stream (not GRUAN quality data):



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The importance of the # of samples, both in time and space:

Crossvalidation of Daily Temperature Gridding

Christof Frei, MeteoSwiss

February 2012

Gridding Method

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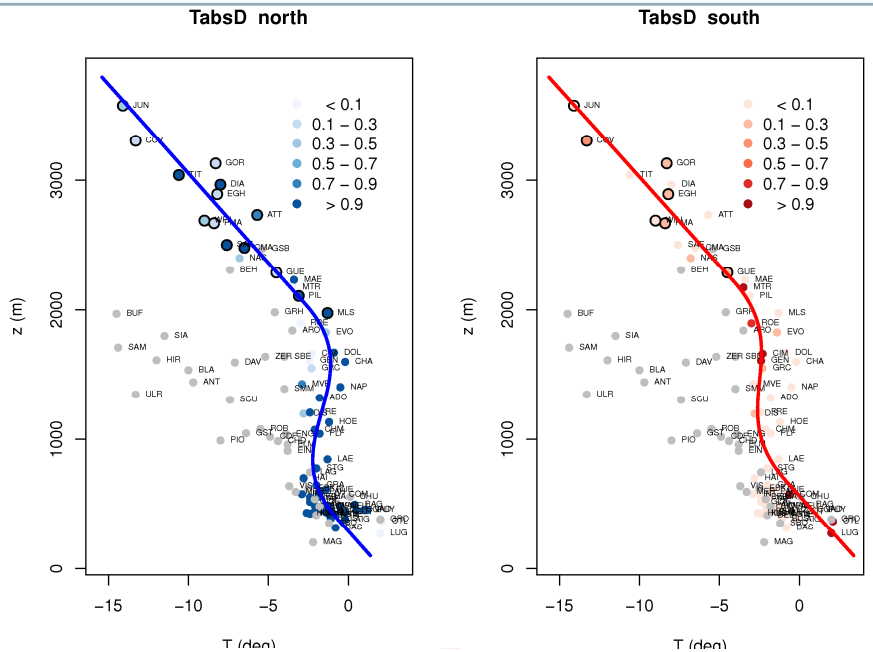

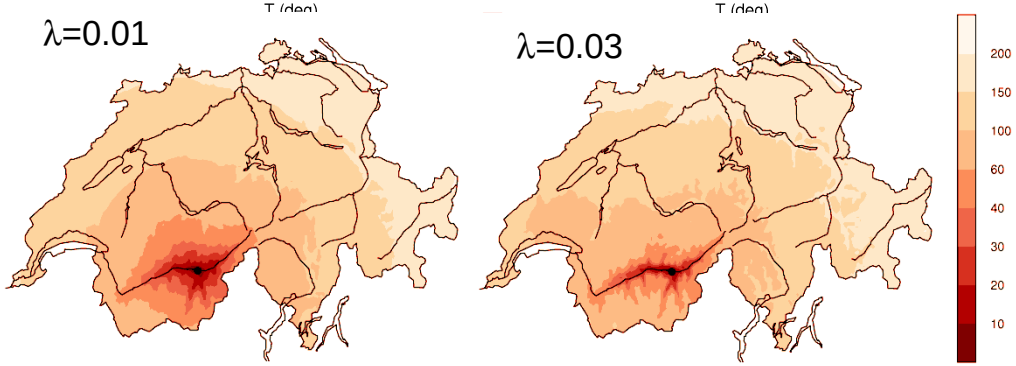

- Vertical Profiles
  - non-linear (inversions)
  - regional (N / S of Alps) with gradual transition
- Residual Interpolation
  - Non-Euclidean distance weighting
  - Data driven distance scheme

Station Data Used

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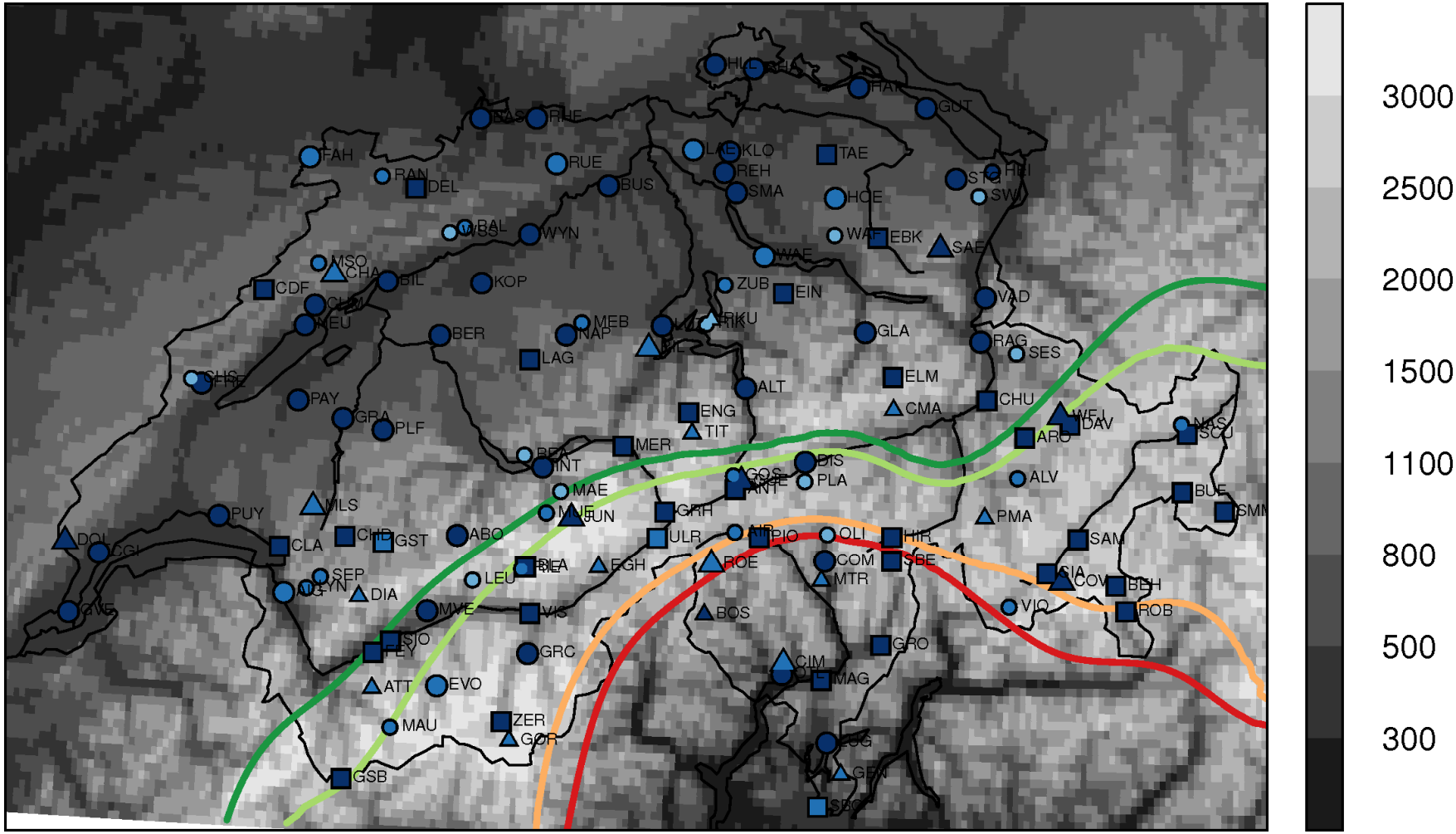

Crossvalidation

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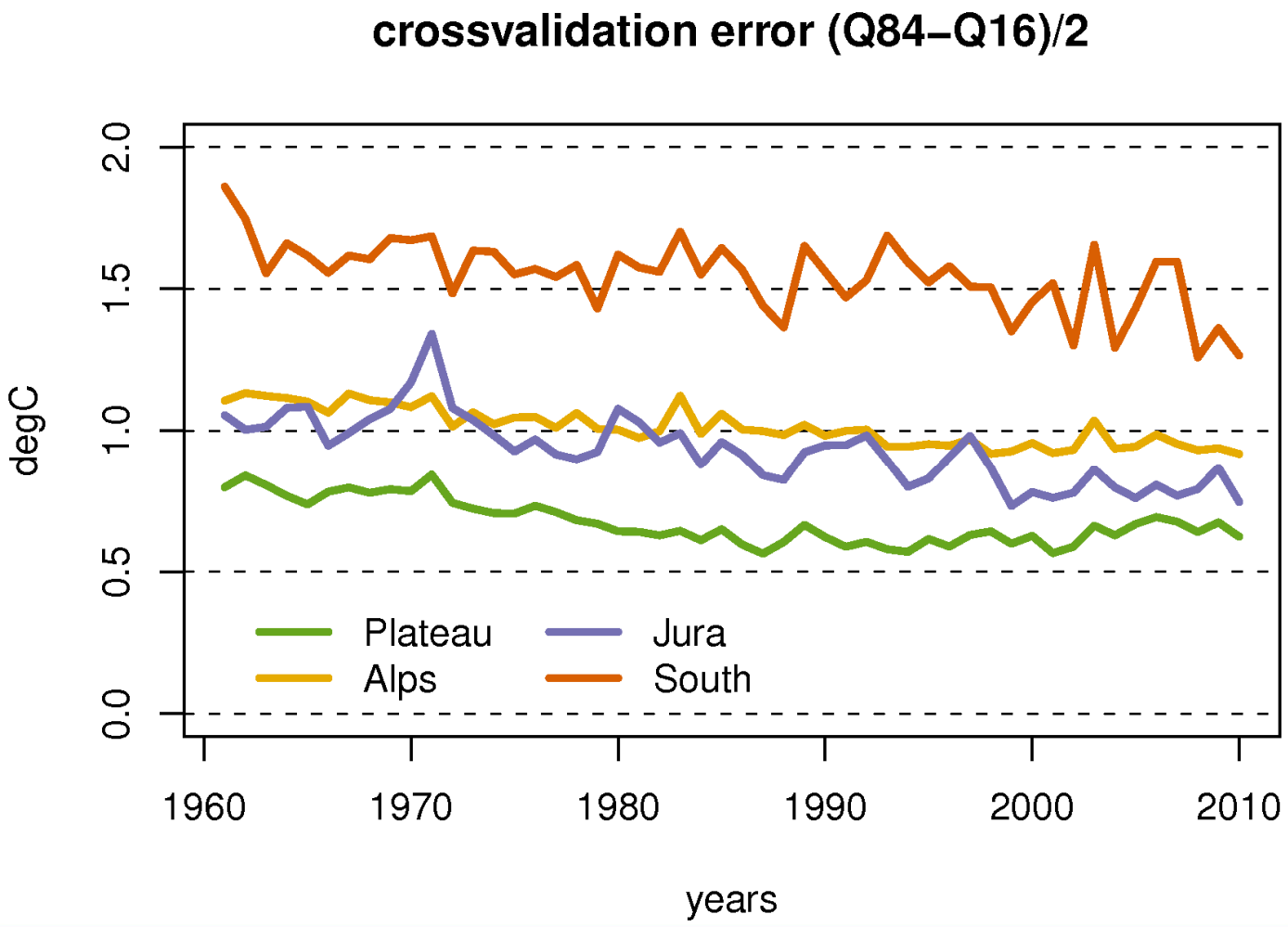

Crossvalidation

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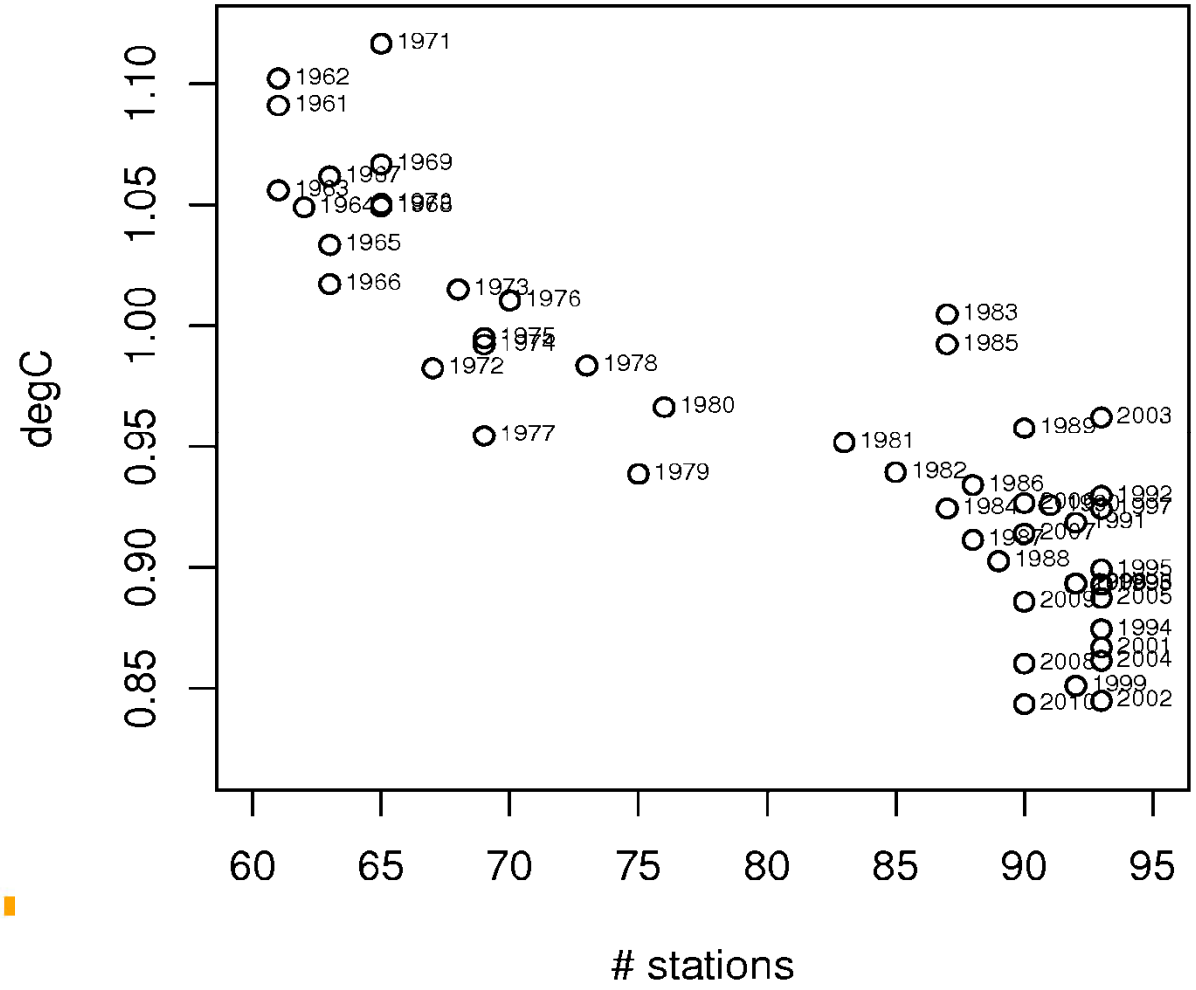
crossvalidation error (Q84–Q16)/2



30 more stations reduced error by 20%

T trends in CH

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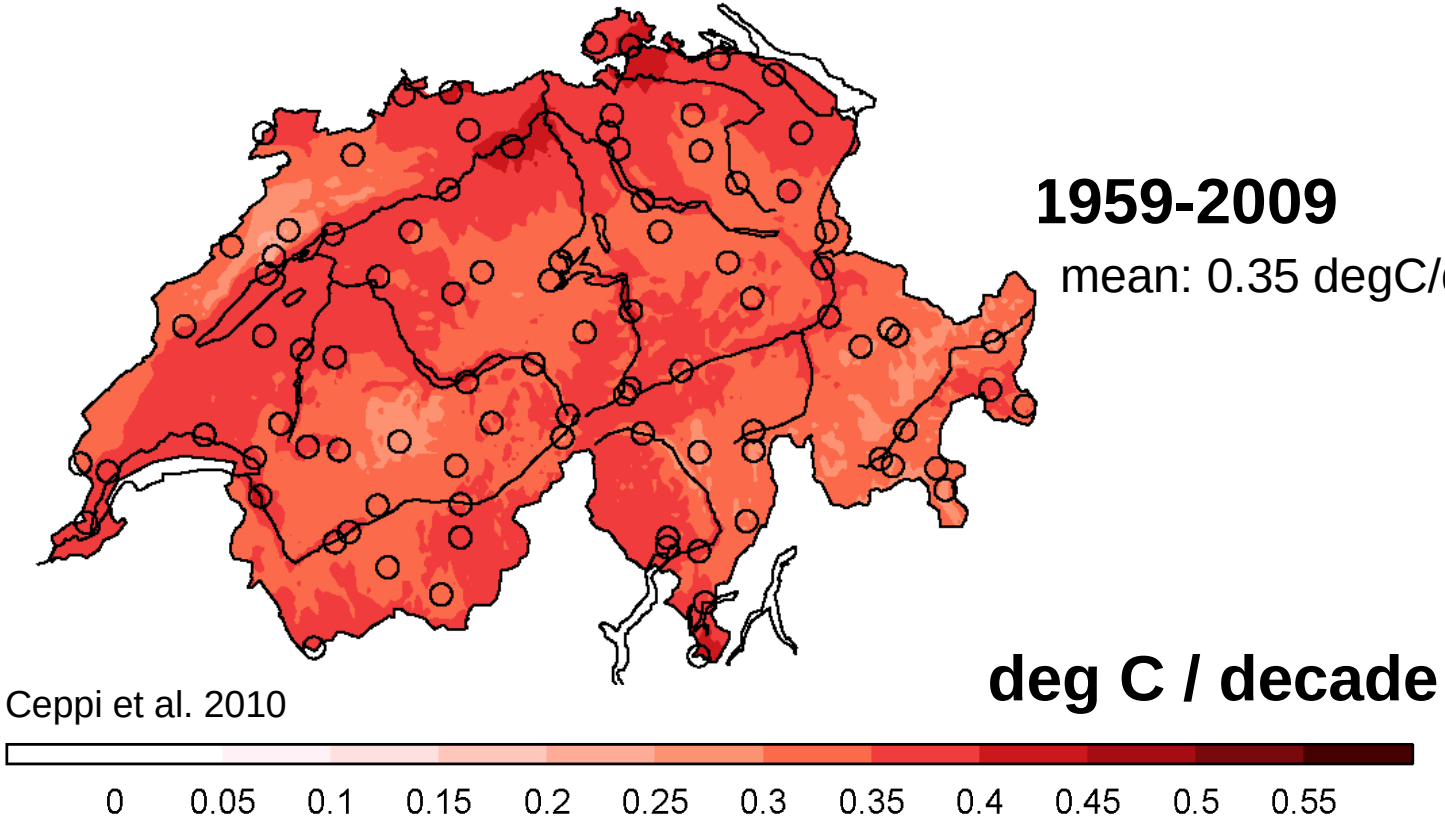

Ceppi et al. 2010

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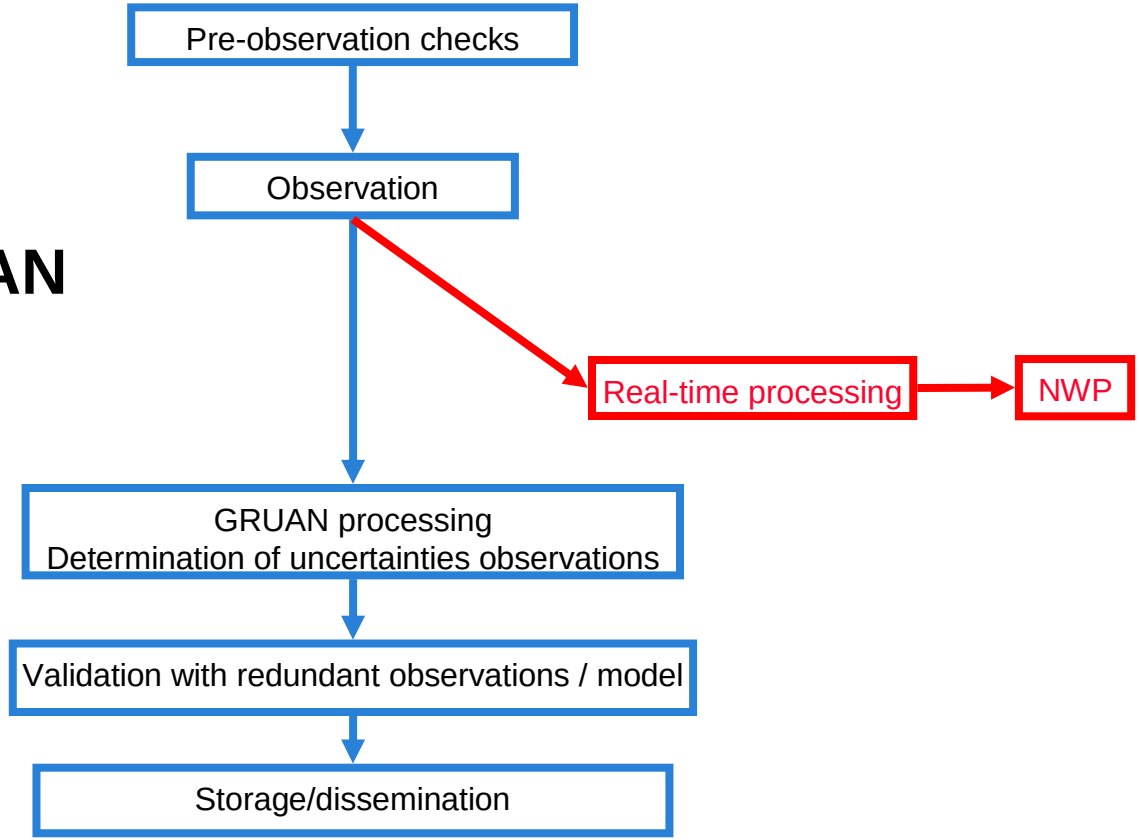


CHANGES TO GRUAN 3

Modify Regulatory Material To Reflect the Changes:

a) GRUAN Documentation:

- **Split into separate Manual (mandatory requirements) and Guide (optional requirements)**
- **Include changes to governance**
- **Include allowance for NRT data stream**

CHANGES TO GRUAN 3

Modify Regulatory Material To Reflect the Changes:

b) WIGOS Documentation (a WMO responsibility):

- **Include GRUAN information in GOS Manual and Guide (for later tranlation into WIGOS Manual and Guide)**

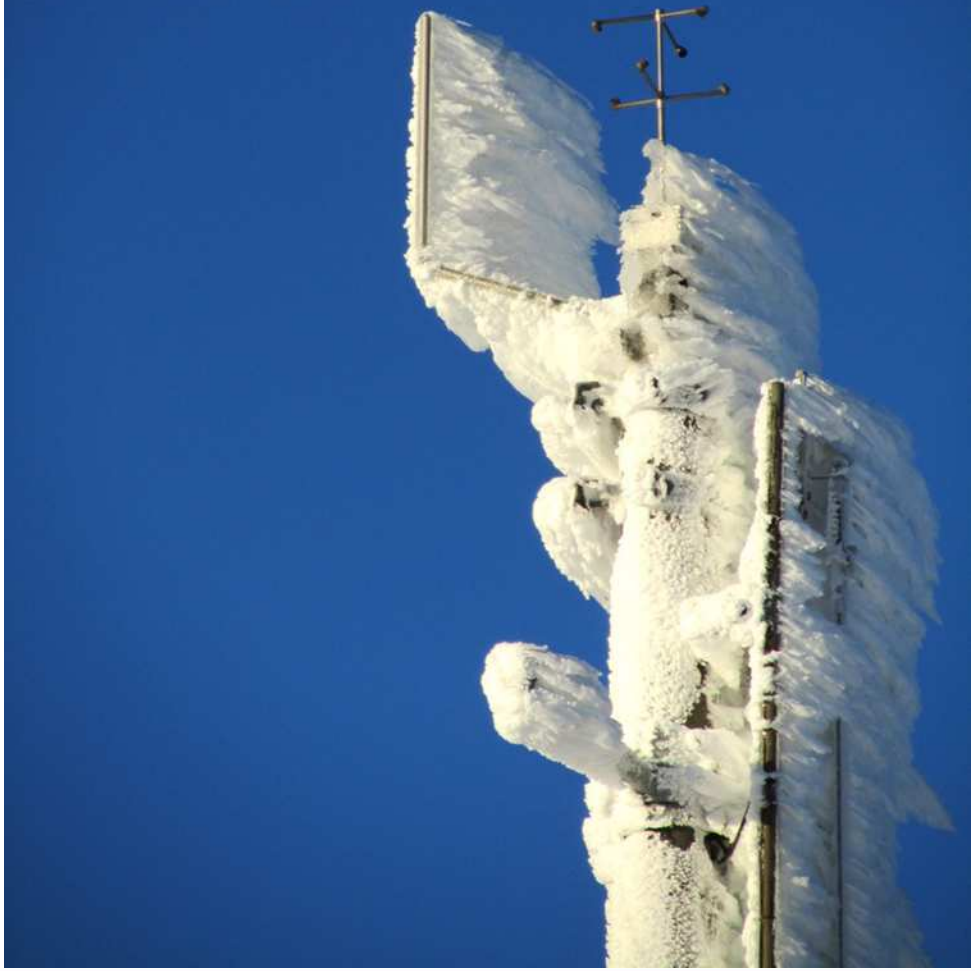
IMPACTS ON GRUAN

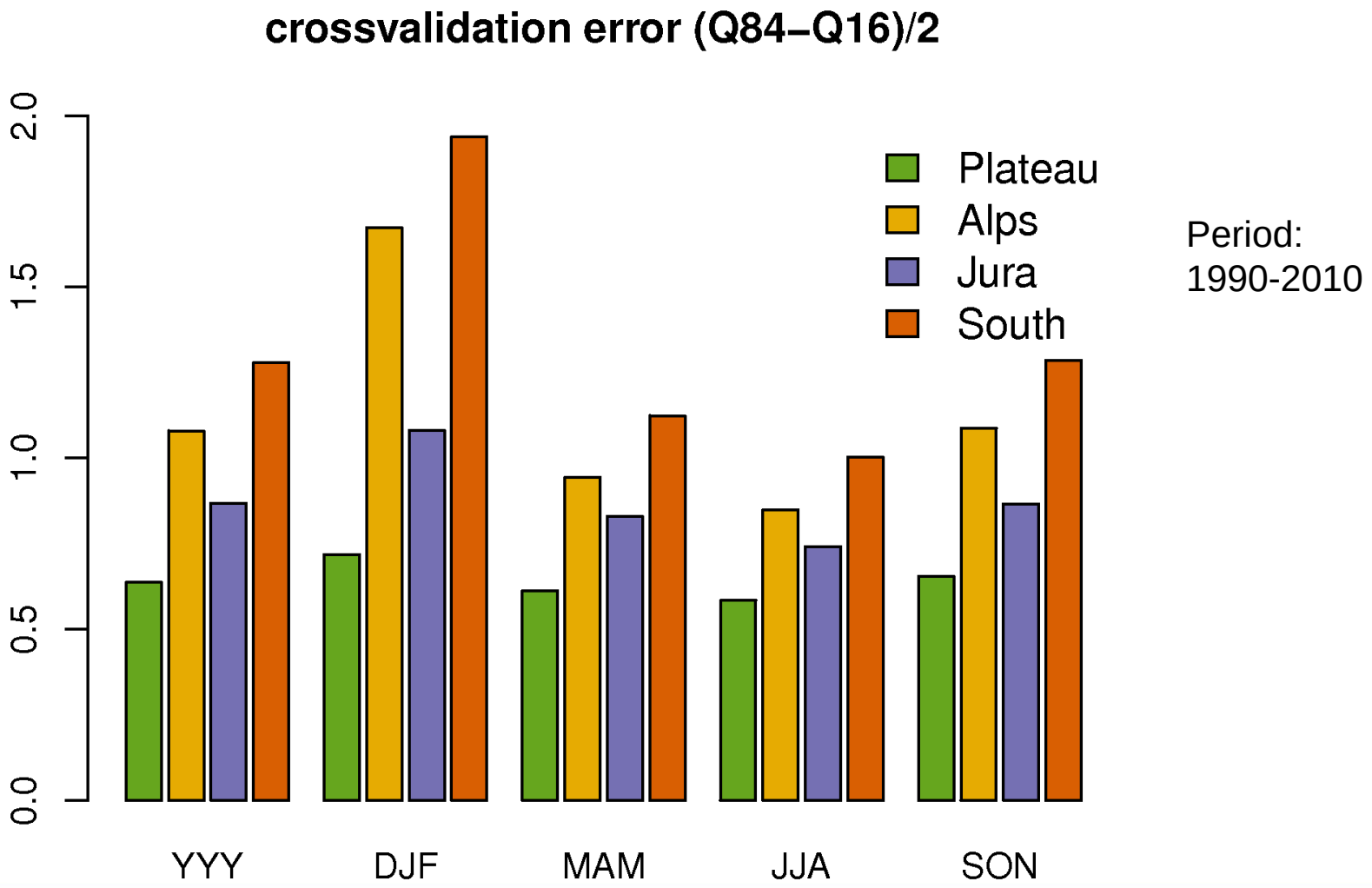
- **Increases integral value of GRUAN sites to funding agencies**
- **Enables increased GRUAN participation by NMHSs**

→ **Helps to secure ongoing funding or existing sites**

→ **Helps to attract new participants to expand the network**

Thank you for listening



Crossvalidation

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