Barcelona Supercomputing Center
Centro Nacional de Supercomputación

EXCELENCIA SEVERO OCHOA

Status of QC for tall tower wind data

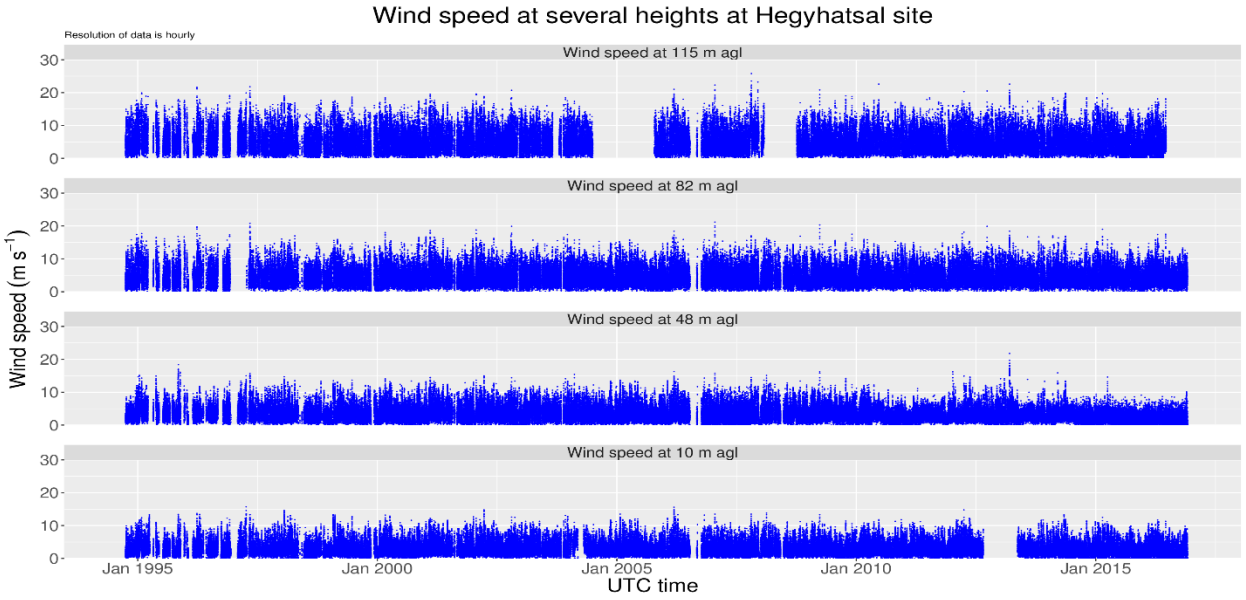
Jaume Ramon
Llorenç Lledó

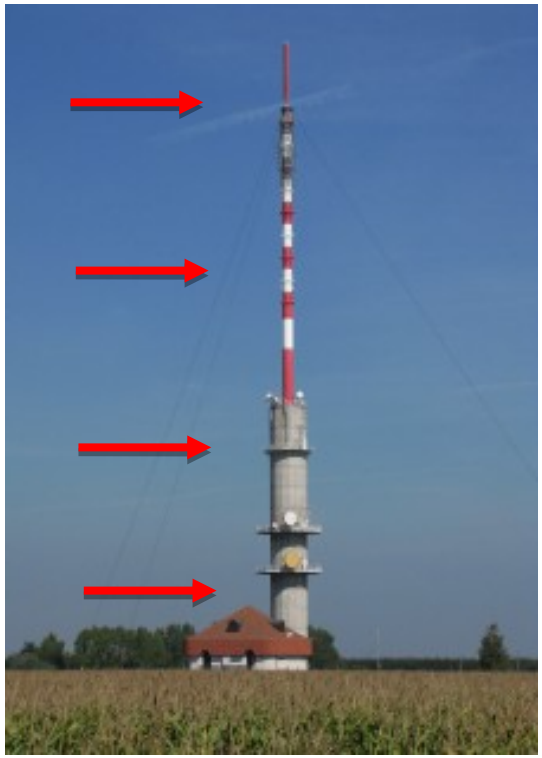
13/11/2018

INDECIS 2nd GA, Dublin

Tall tower data singularities

1. Parallel measurements at several heights

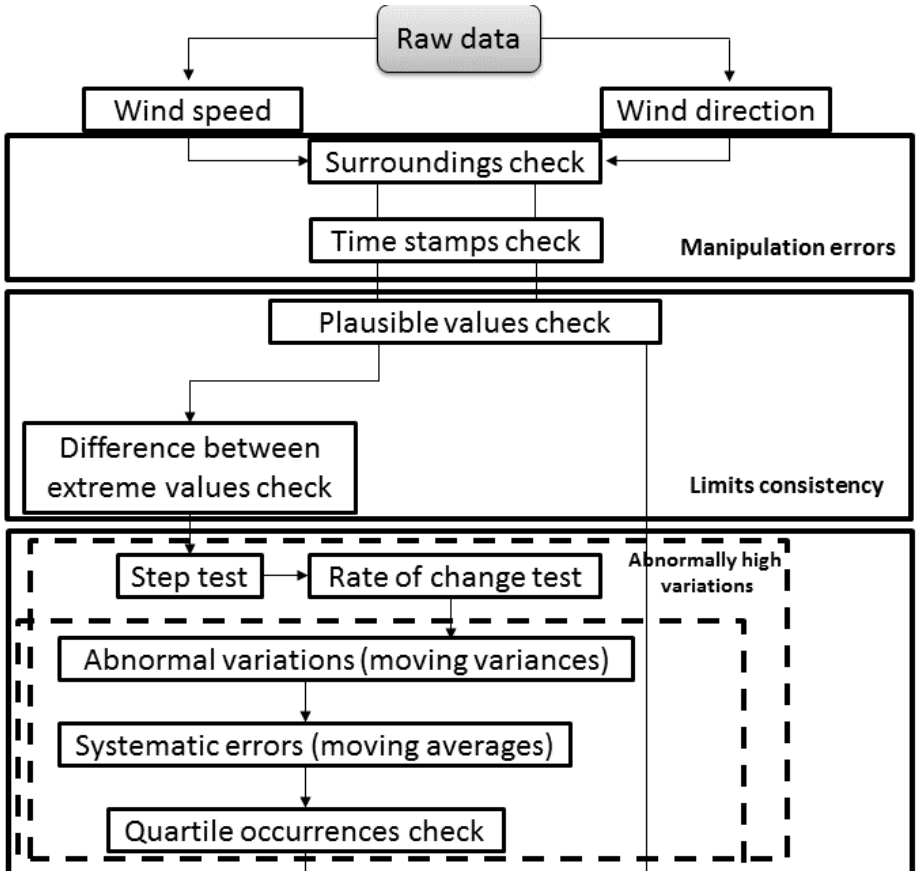


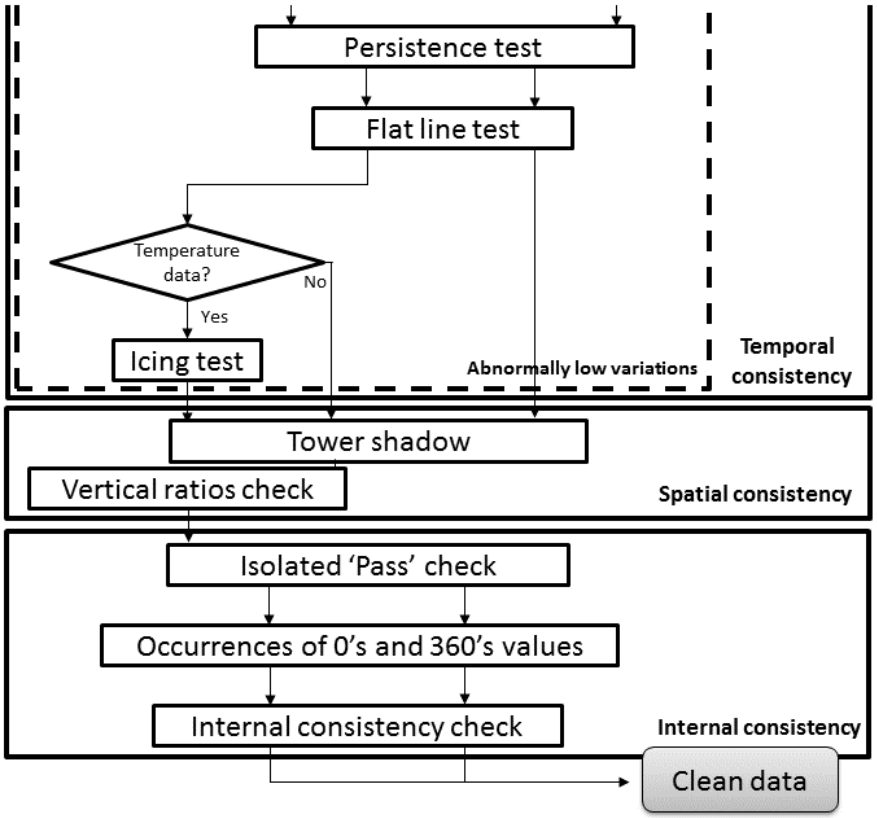


Hegyhatsal tower, Hungary

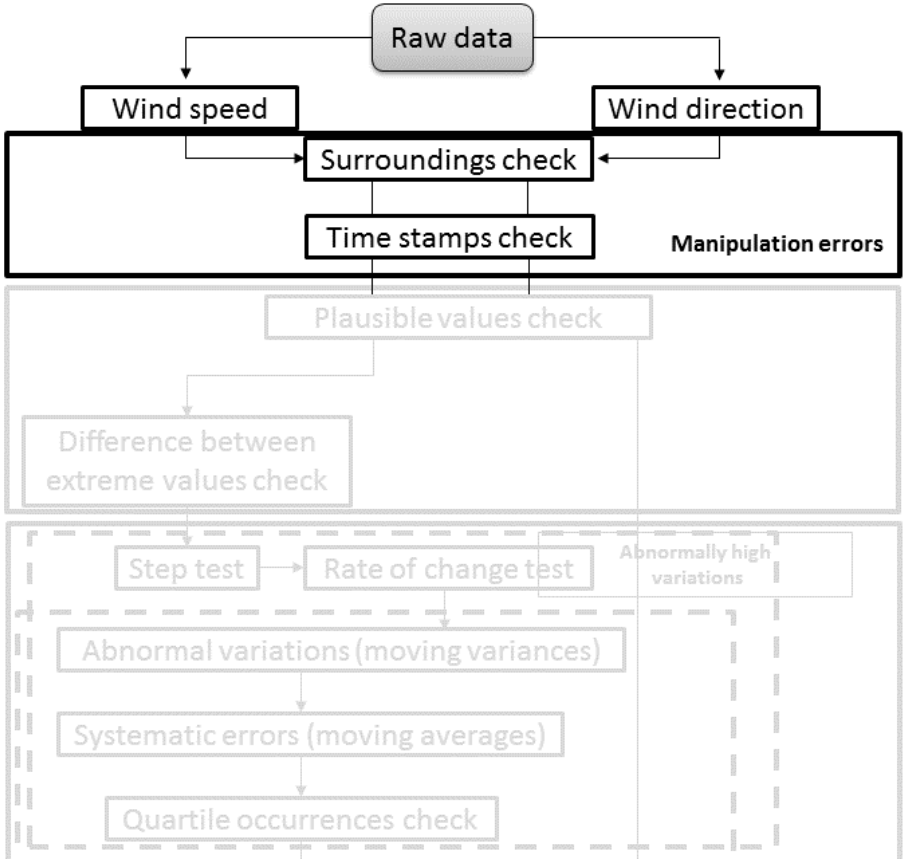
2. Sensor redundancy

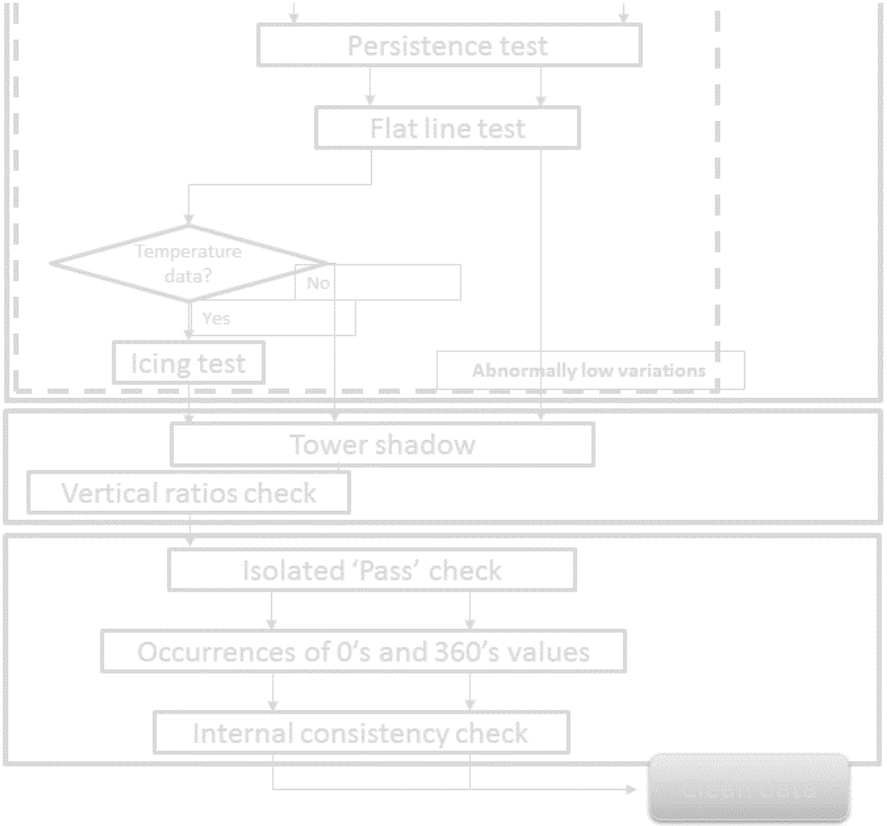
Quality Control routines





Quality Control routines





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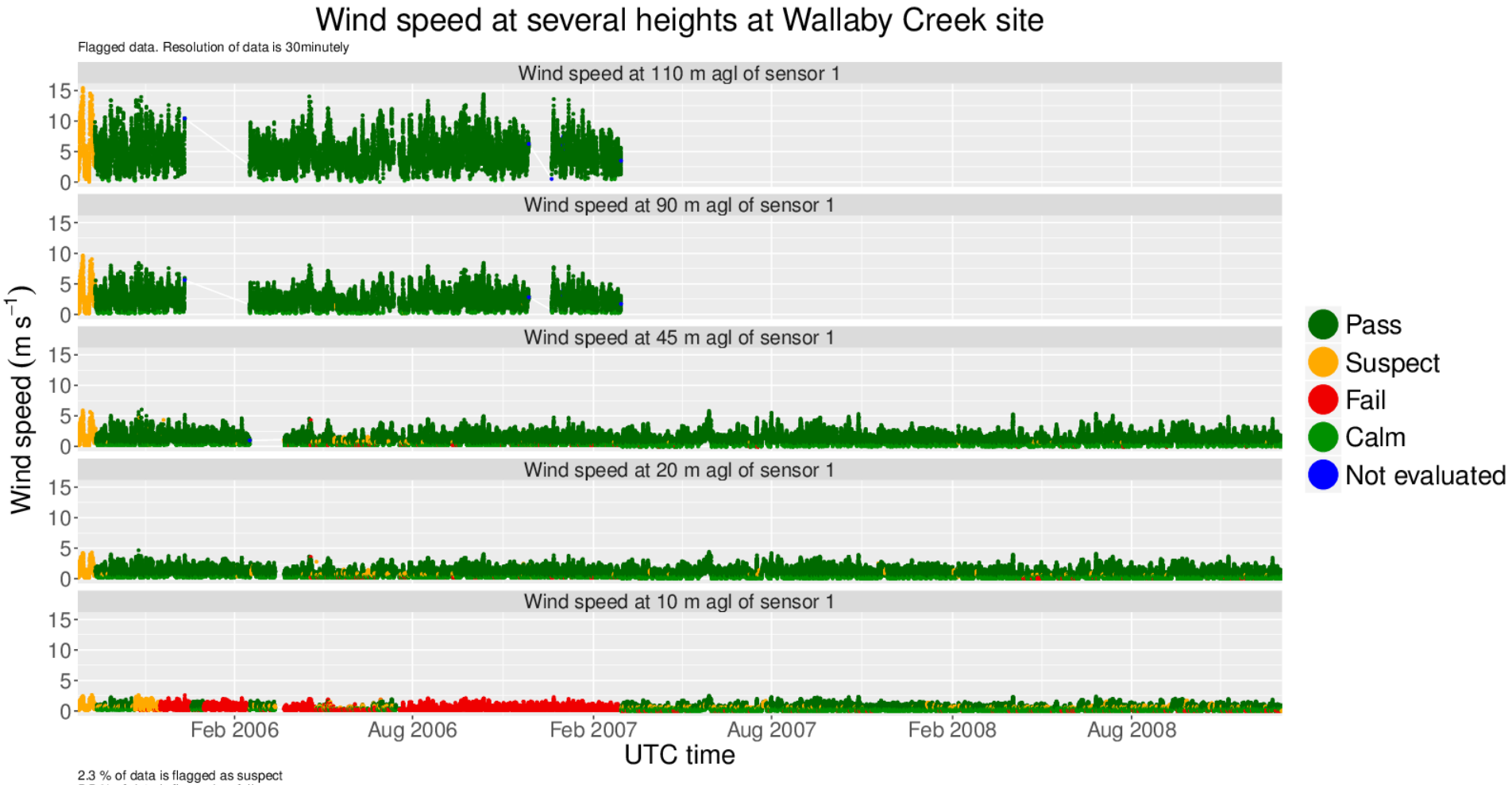
Quality Control routines



Wallaby Creek, Australia

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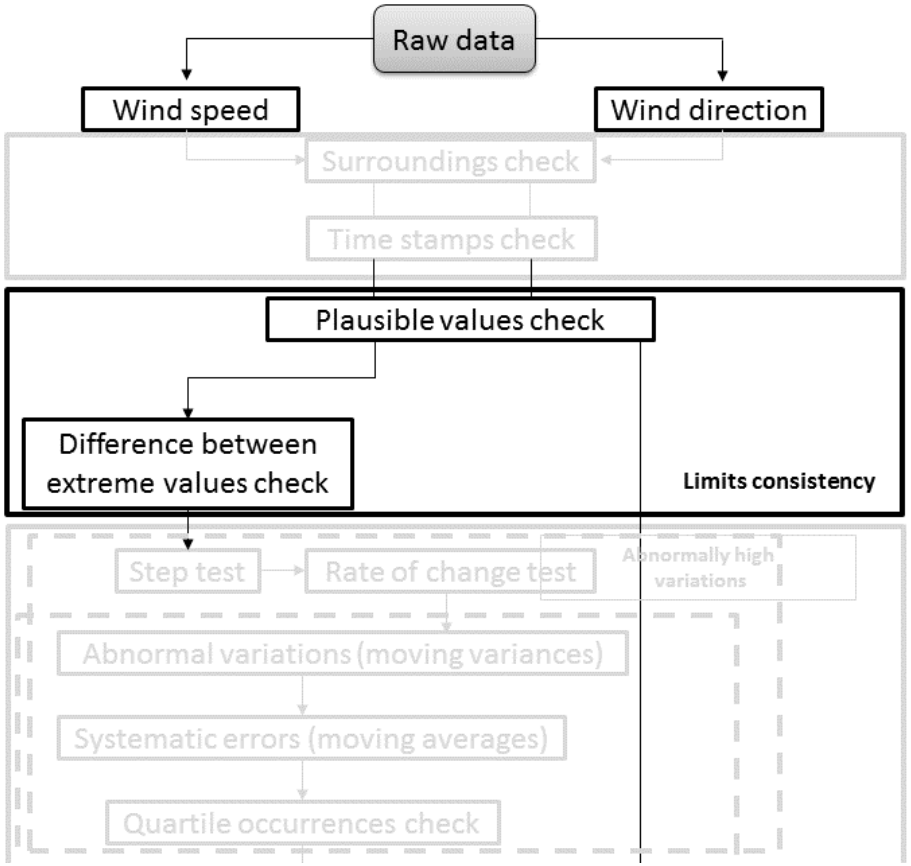
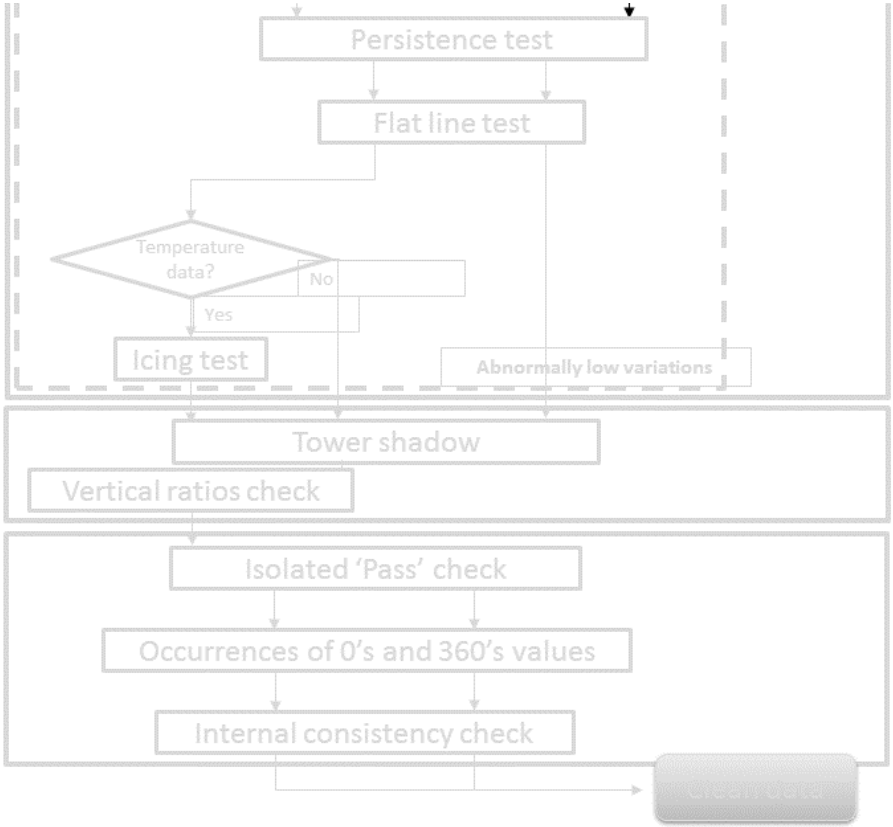
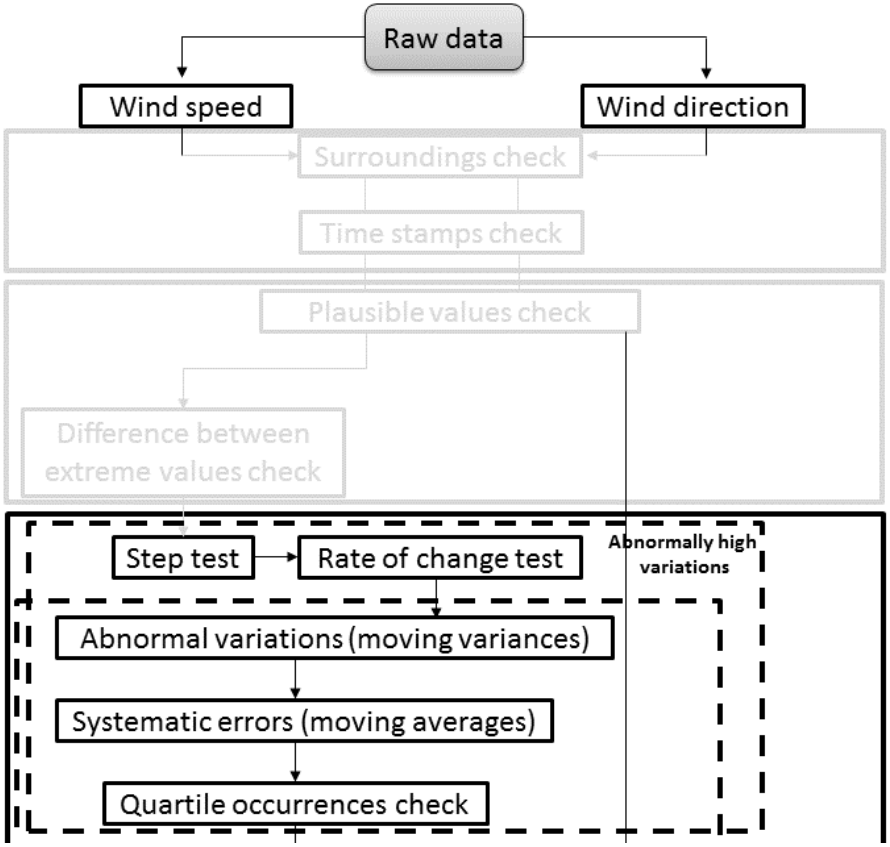
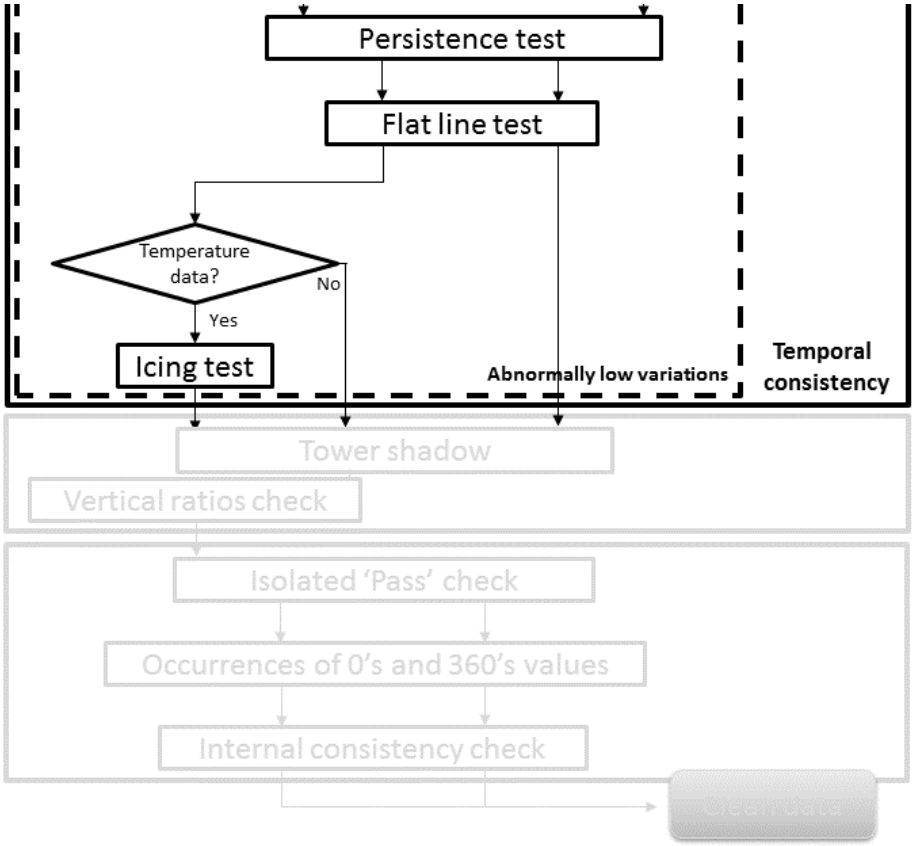
Quality Control routines



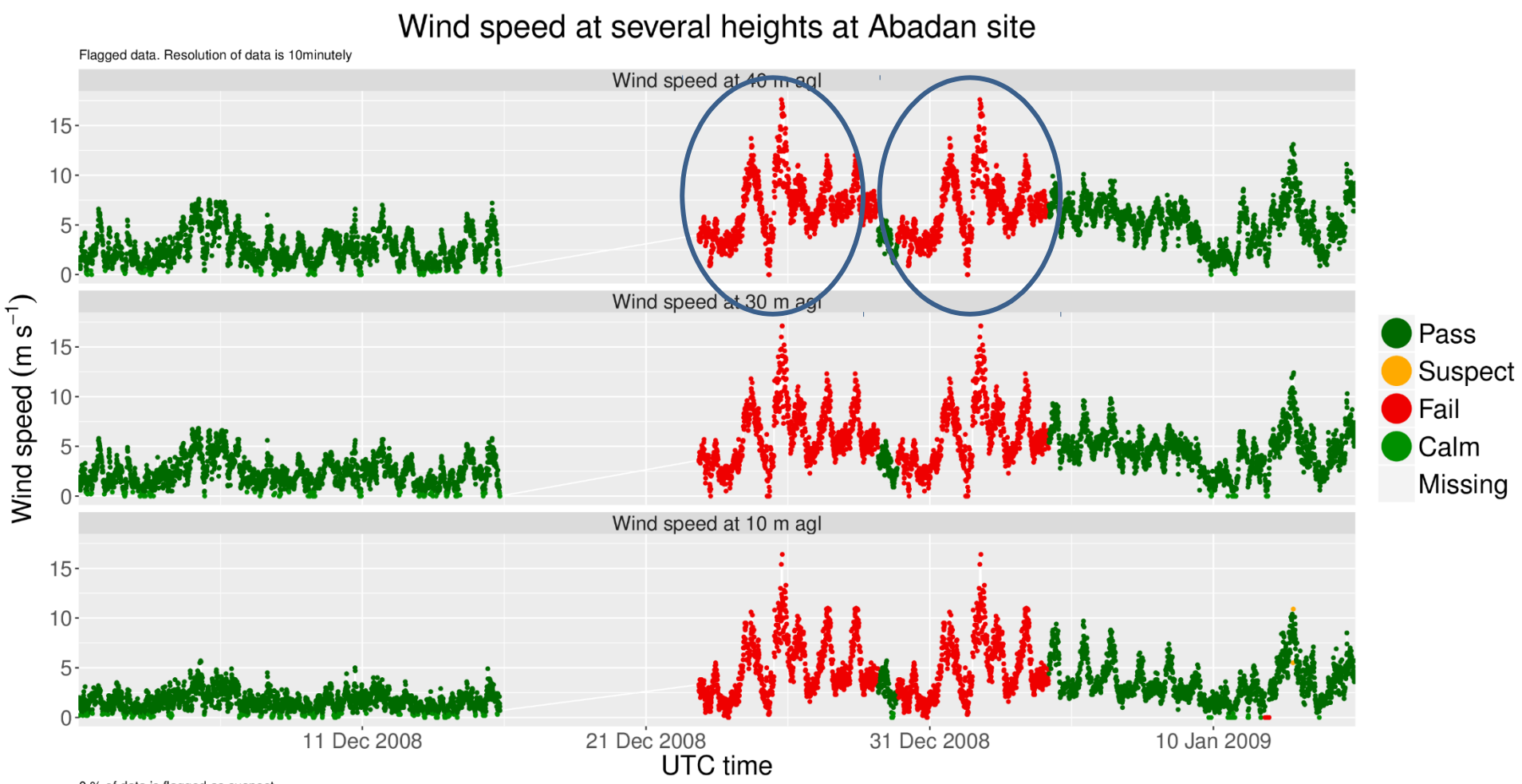


Quality Control routines





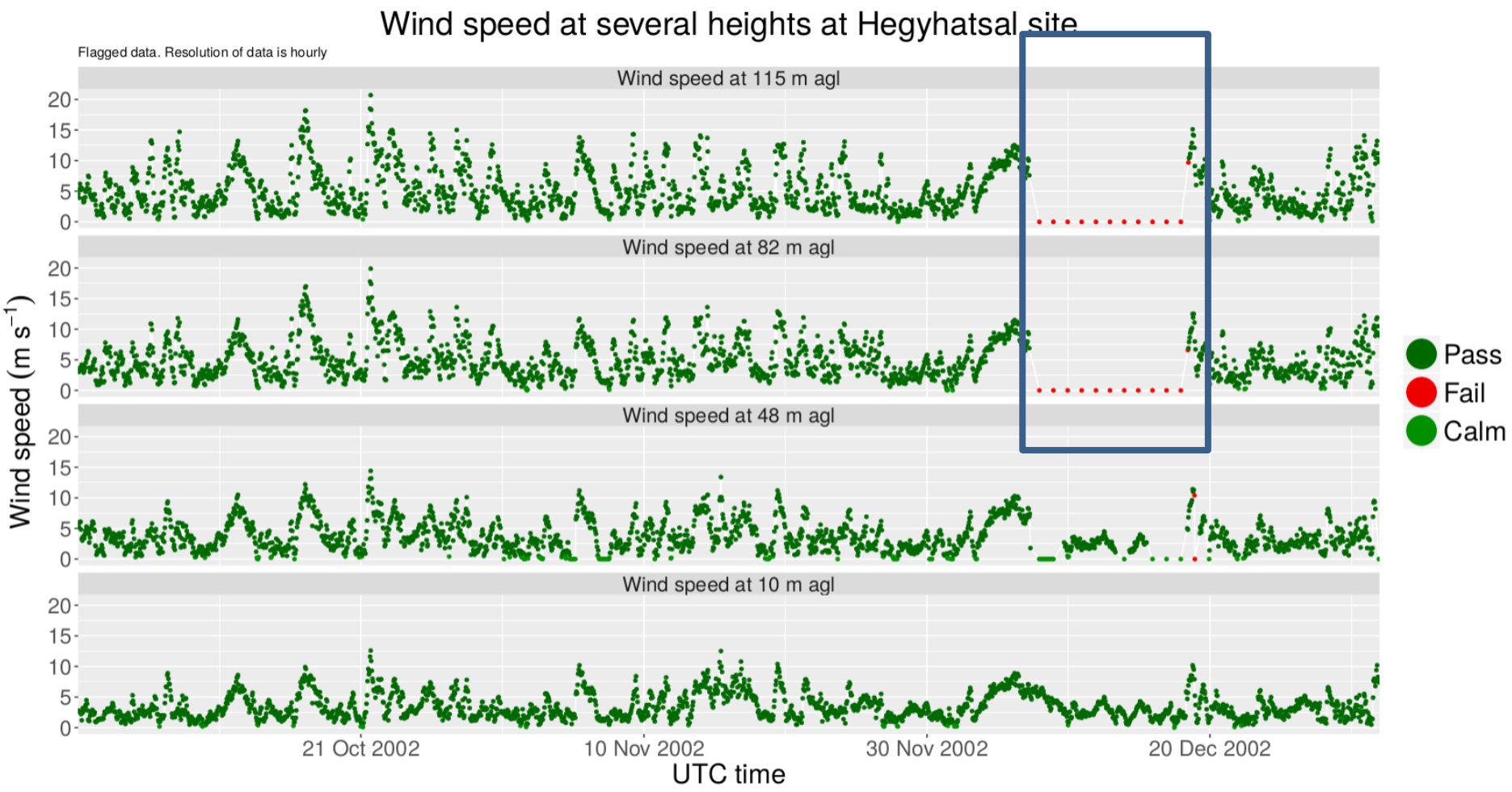
Quality Control routines



0 % of data is flagged as suspect
18.8 % of data is flagged as fail
1.4 % of data corresponds to calm periods
0 % of data have not been evaluated by 3 or more tests
15.7 % of data corresponding to these time series is missing

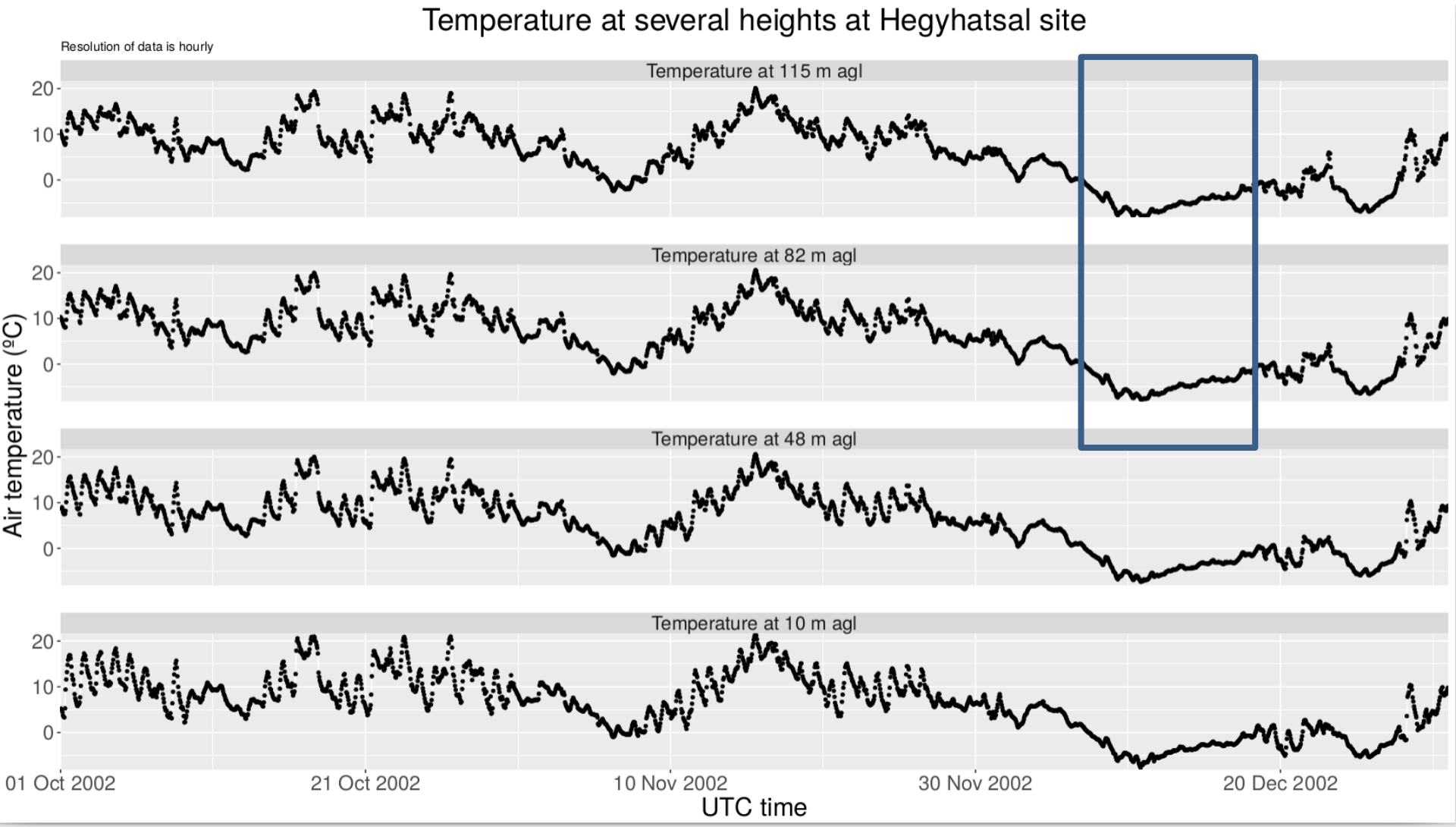
Abadan, Iran

Quality Control routines

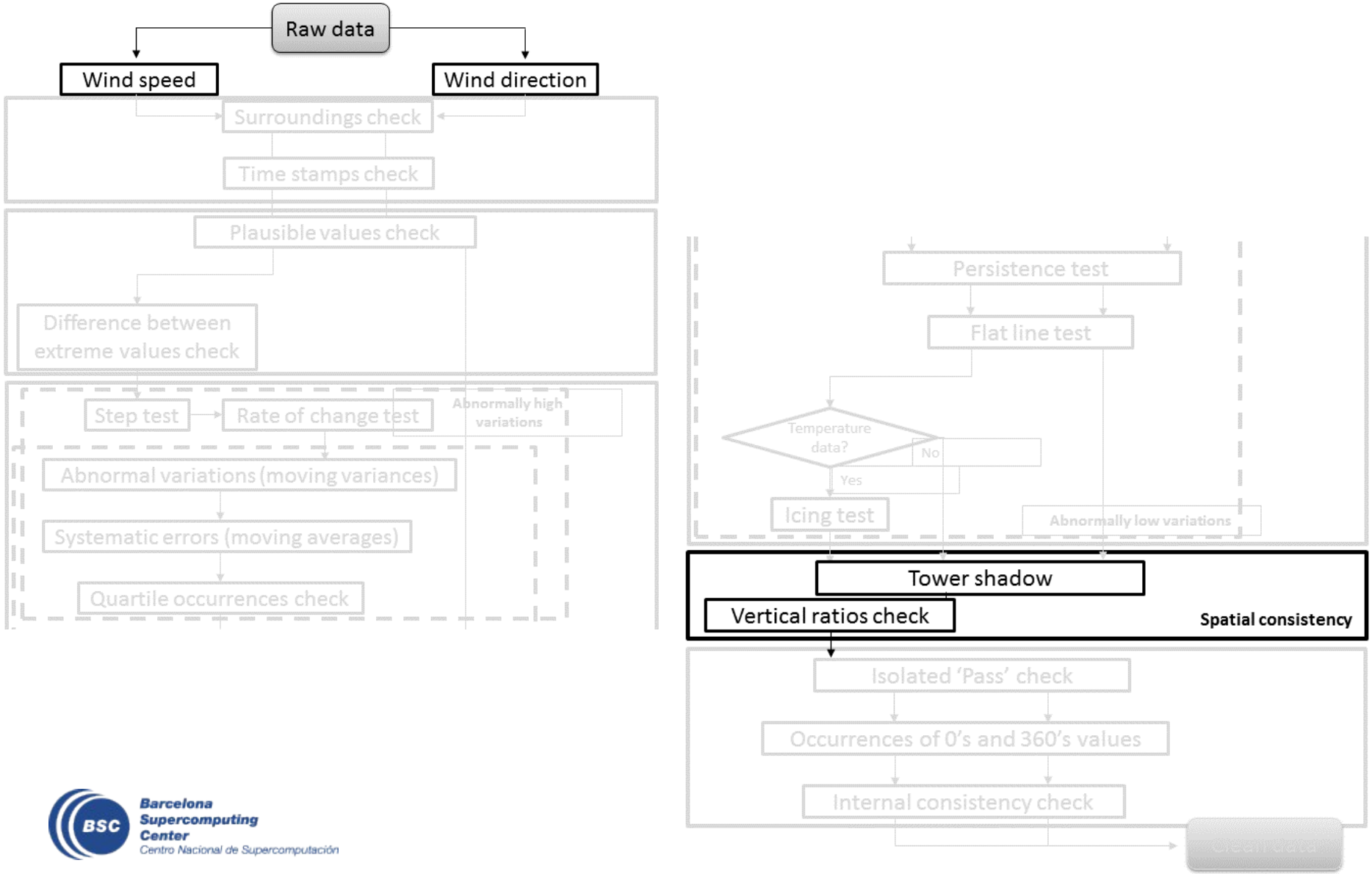


Hegyhatsál, Hungary

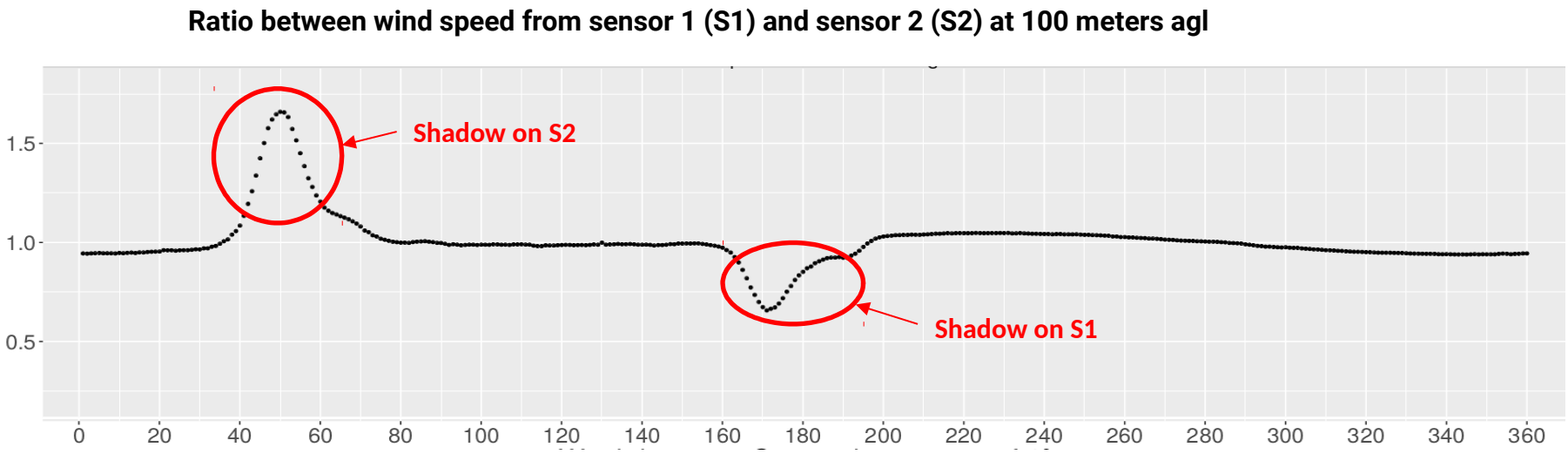
Quality Control routines

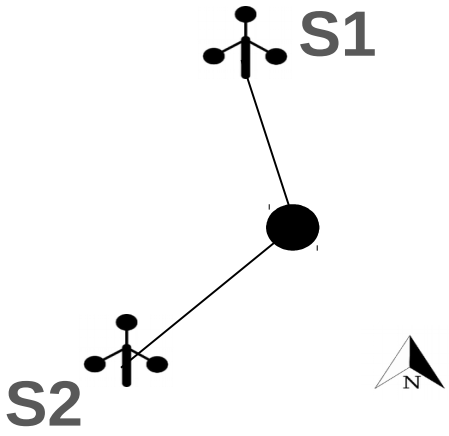


Quality Control routines



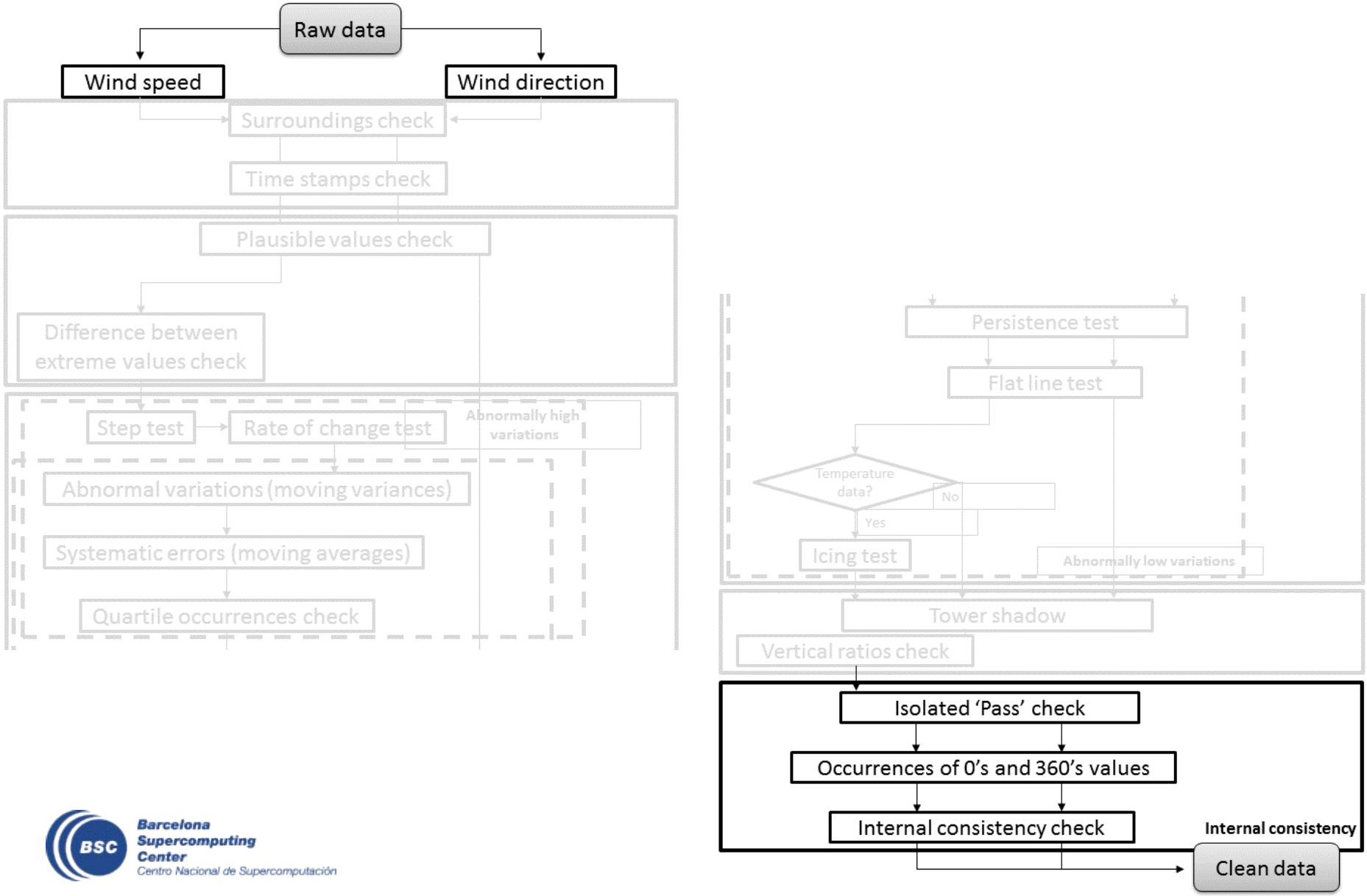
Quality Control routines





FINO3 met mast, Deutschland

Quality Control routines



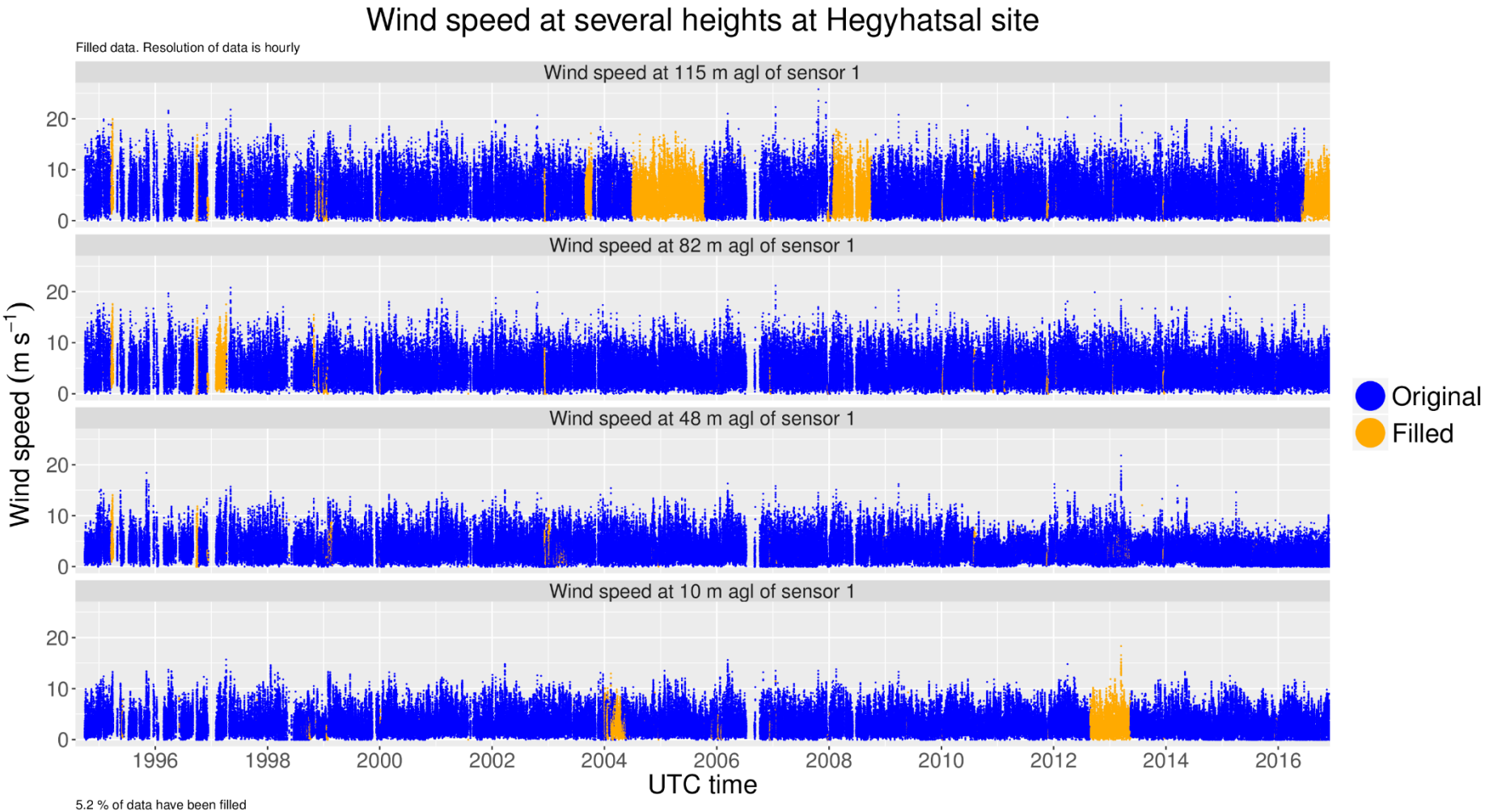
Homogenisation assessment of the quality controlled Tall Tower Database

- Poor spatial density of tall towers.
- Furthermore, no data periods usually appear simultaneously in all measurement levels.
- One approach could be:

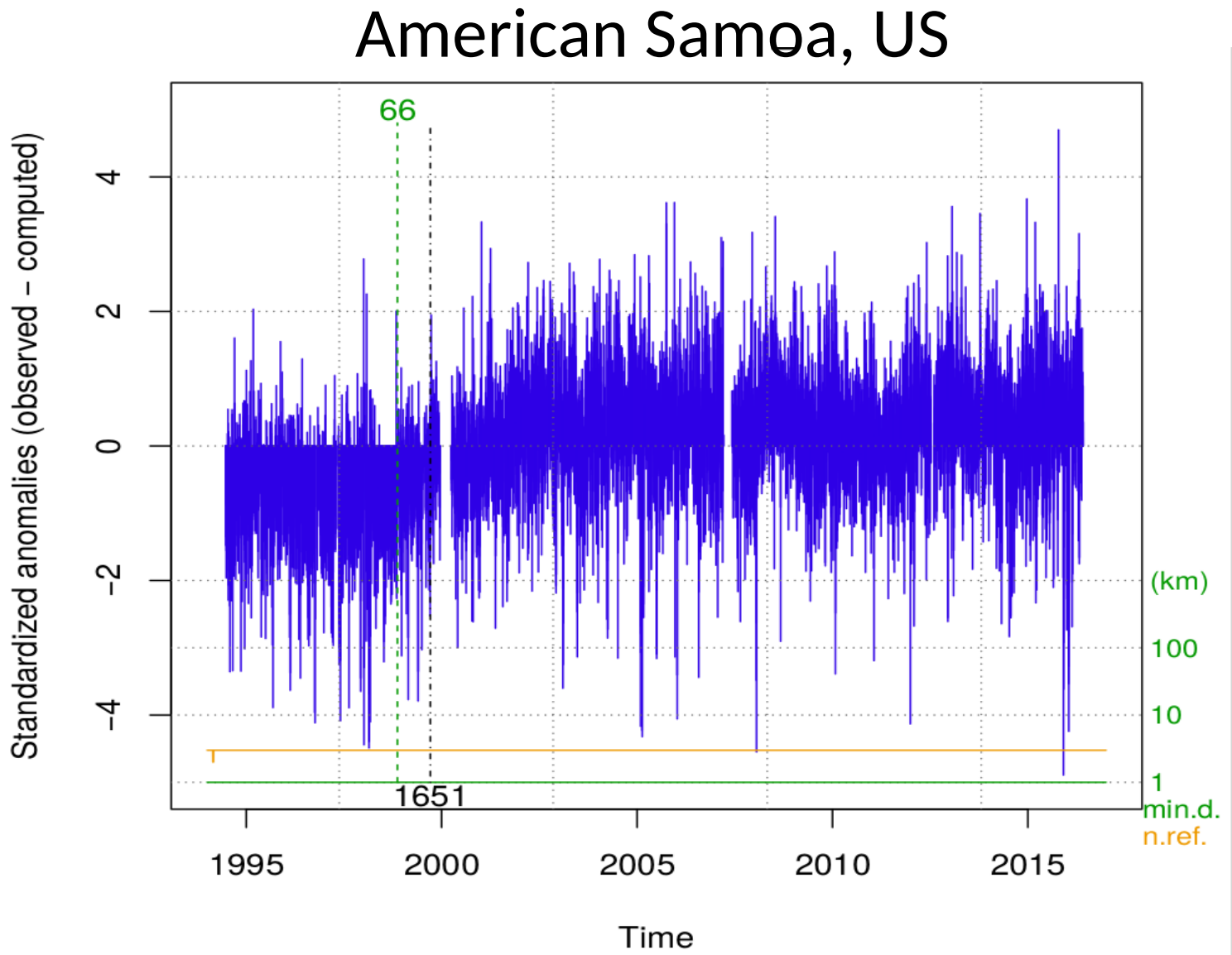
    1. Fill in gaps using data from the nearest level of measurement (when available).
    2. Run Climatol only to assess the quality of time series in terms of homogeneity (SNHT).

Gap filling

$$WS(h) = \left(\frac{h}{h_{ref}}\right)^{\alpha} * WS(h_{ref}) = A * WS(h_{ref})$$



Climatol


American Samoa, US
Standardized anomalies (observed – computed)
4
2
0
−2
−4
66
1651
1995
2000
2005
2010
2015
Time
(km)
100
10
1
min.d.
n.ref.

Conclusions

- A total of 18 quality control routines have been coded and run over the Tall Tower Raw Database
- Two special tests have been added to this suite: ‘tower shadow’ and ‘vertical ratios’
- Tall tower data appear to be difficult to homogenise
- Fill in gaps (when possible) using a simple linear model (power law) using data from other measurement levels
- Run Climatol to assess the quality of time series in terms of homogeneity.
- Test the robustness of the QC software suite using INDECIS benchmark (Tall Baboon)

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THANK YOU!

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Indecis
Sectorial Climate Services

JPI Climate

ERA4CS
European Research Area for Climate Services

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www.indecis.eu

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