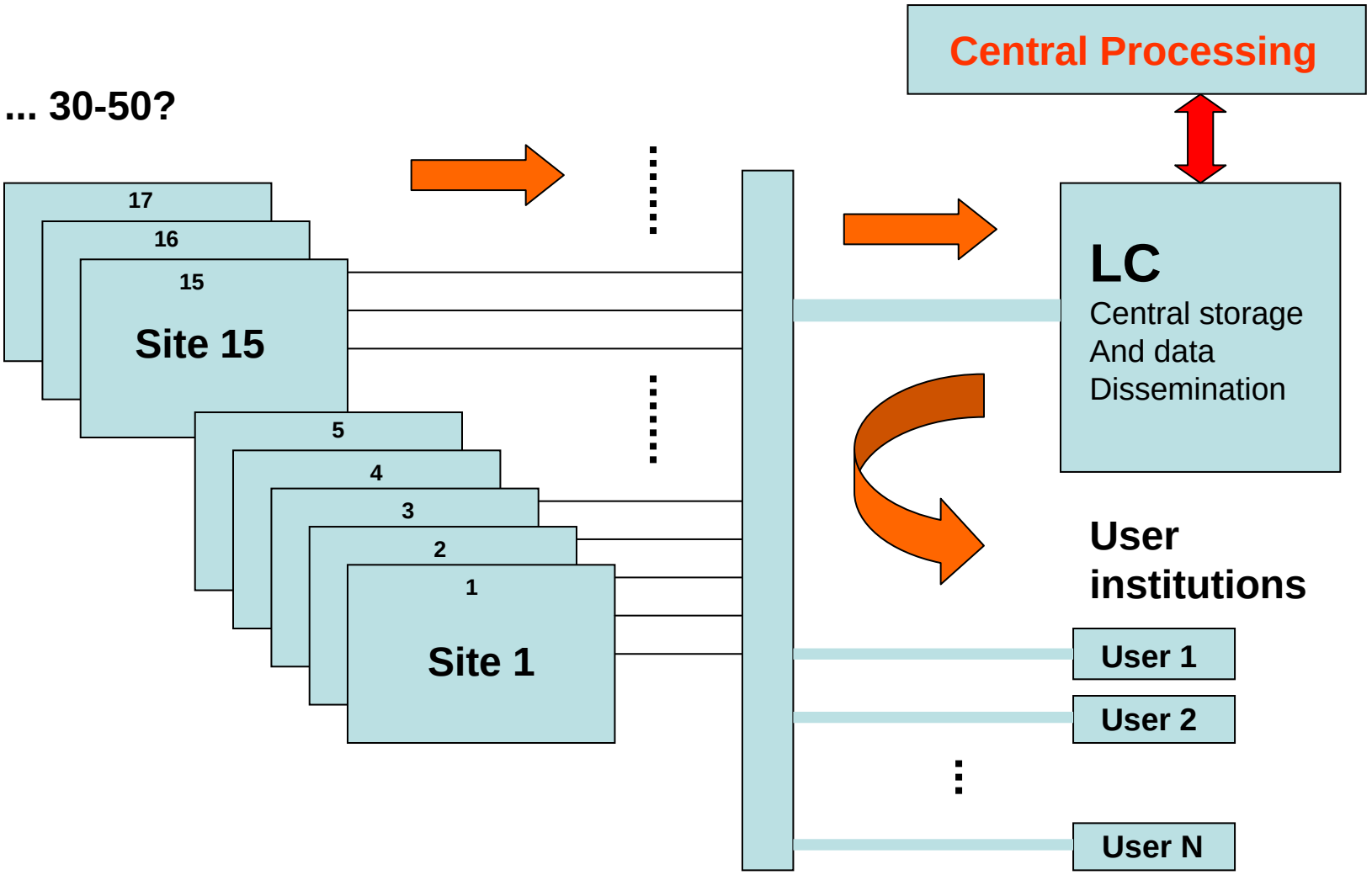
GNSS-PW Data Stream in GRUAN

Kalev Rannat

ICM-5, 2013

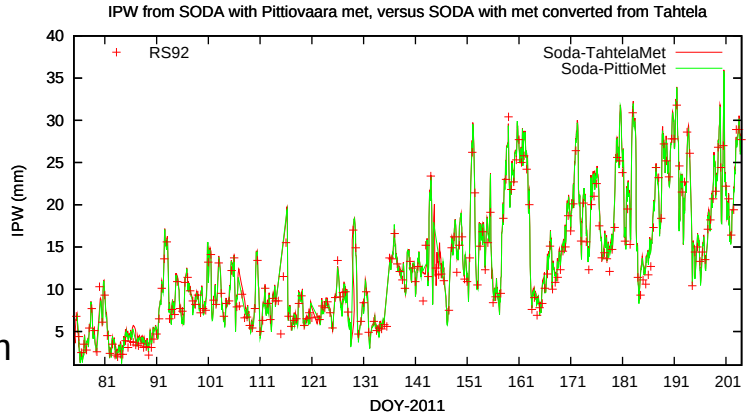
09:15 – 09:45 Overview of task team GNSS-PW – June Wang / Kalev Rannat
09:45 – 10:00 GNSS-PW data stream development – June Wang / Kalev Rannat

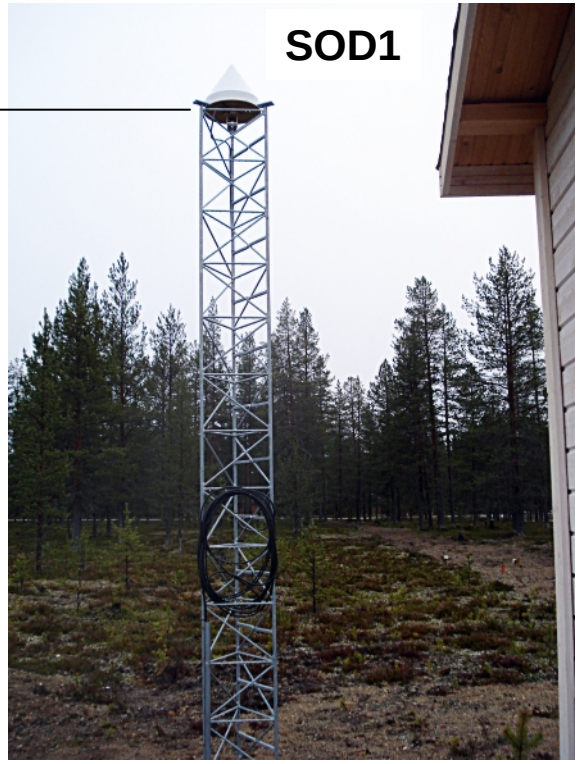
GRUAN – network of sites

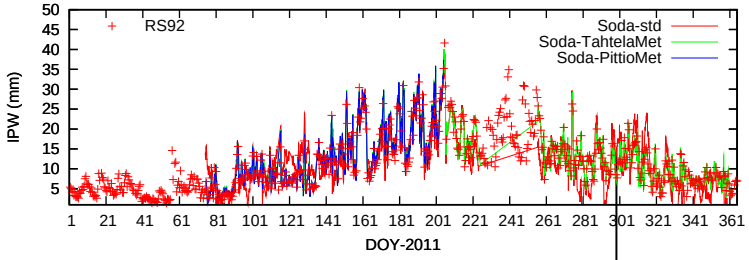



SODA

97 m


IPW from SODA with Pittiovaara met, versus SODA with met converted from Tahtela
RS92
Soda-TahtelaMet
Soda-PittioMet
IPW (mm)
DOY-2011


SOD1


Multiplot test GPS-PW
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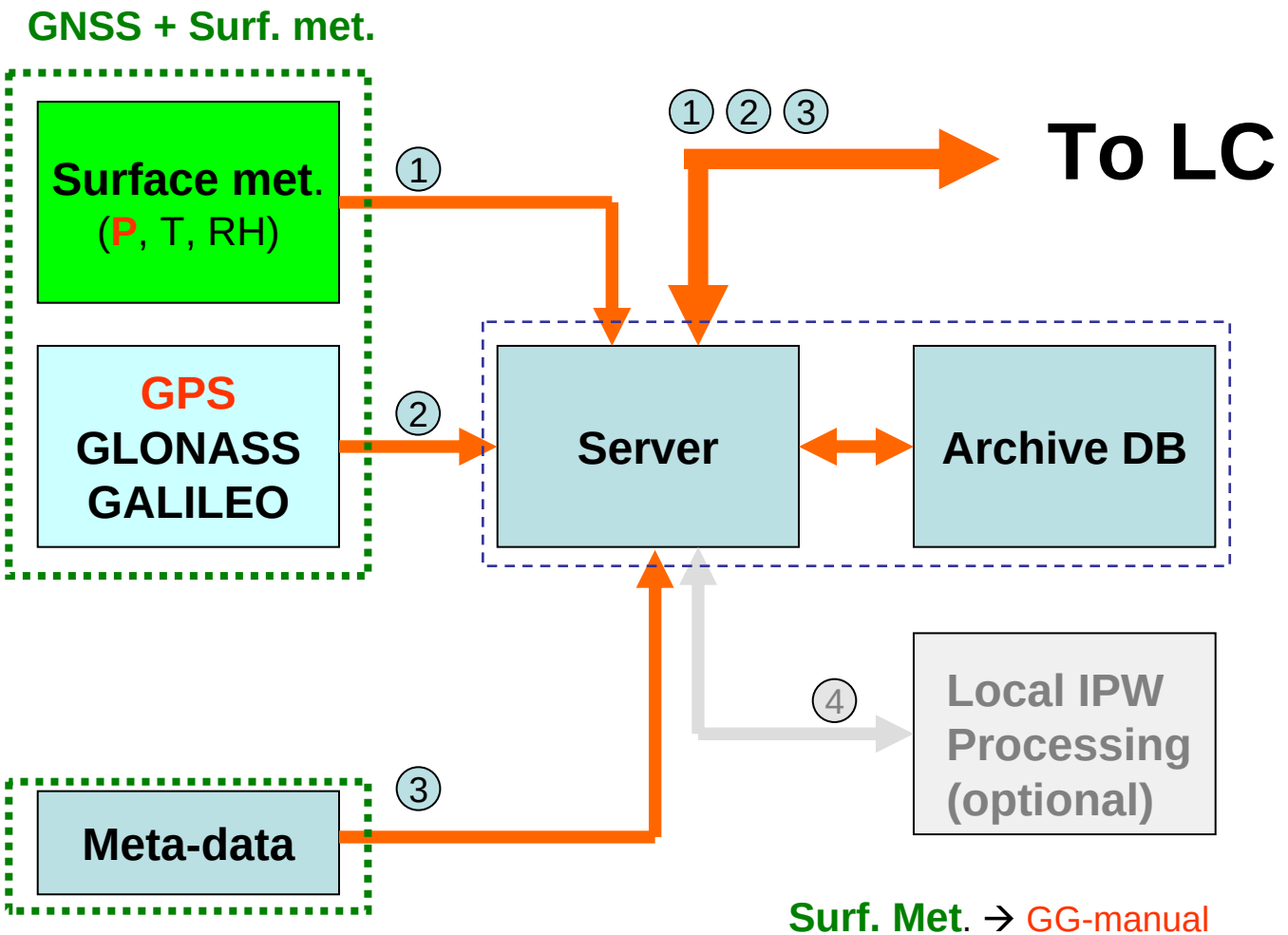
20 km

Data stream at the site



Surf. Met. → GG-manual

Site Meta-data → site log- and history files (GG-manual)

GNSS-rules → inherited from IGS-regulations, adapted to GRUAN needs (ref. GG-manual)

Data examples

Data specification at ① ② ③ :

① Depends, where is the AWS (connected to the GNSS-receiver or the data comes from external collocated source), binary data stream or Meteo RINEX (ftp://ftp.unibe.ch/aiub/rinex/rinex211.txt). Conversion utilities are ususlly offered by GNSS-receiver manufacturers.
If the meteo-data comes from collocated AWS, the data is usually not at the same server – it must be downloaded and converted to meteo-RINEX. These converters are usually self-developed.

② GNSS-observations: the initial data format is manufacturer-specific binary – compact, not human-readable. Each manufacturer offers utilities for conversion to RINEX (ftp://ftp.unibe.ch/aiub/rinex/rinex211.txt). Additionally TEQC tools (http://facility.unavco.org/software/teqc/teqc.html). Must be resolved what is more convienient for LC. The binaries are optimal, but from practical considerations it should be RINEX.

③ Site metadata (site log-files, site history): there is no clear consensus regarding formats yet.

C:\GRUAN\ICM5\
sod10010.12m

①

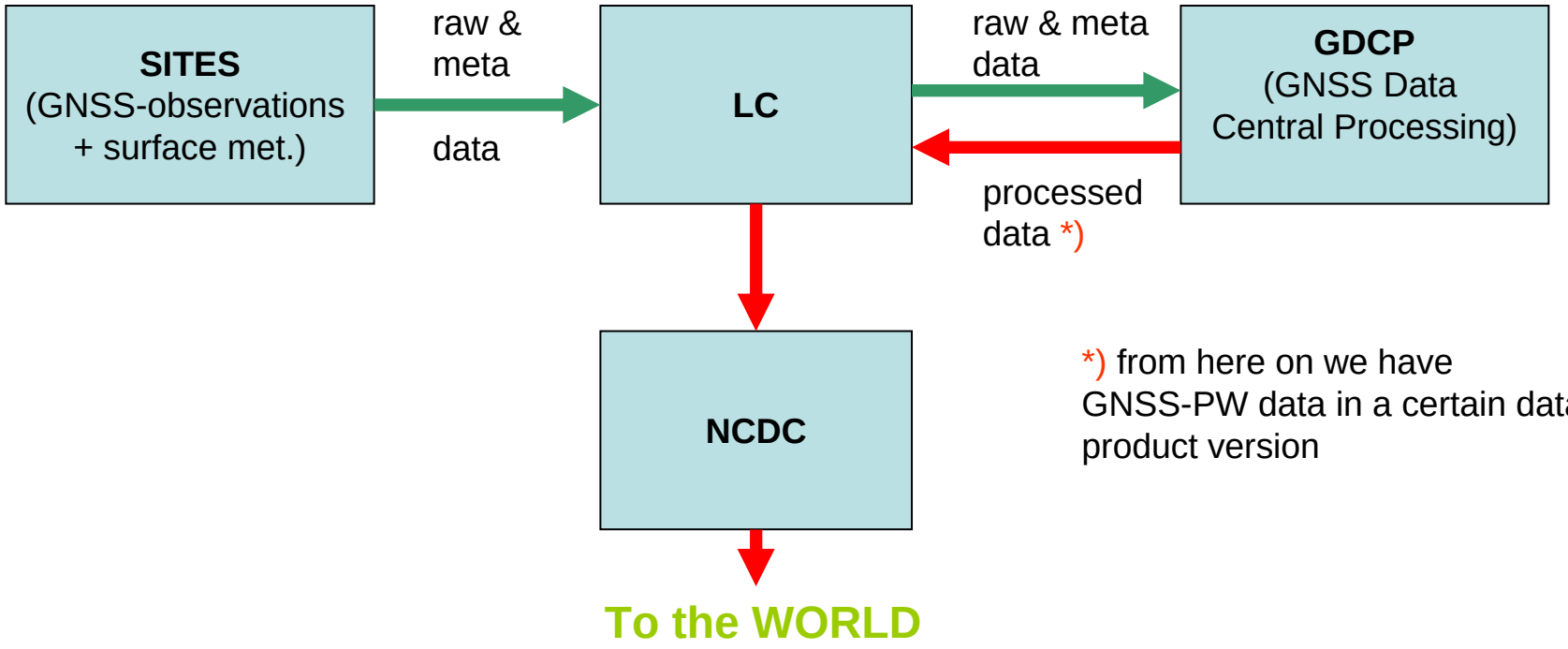
C:\GRUAN\ICM5\
sod13550.12o.txt

②

C:\GRUAN\ICM5\
soda.logfile.txt

③

FROM GNSS-PW PERSPECTIVE



*) from here on we have GNSS-PW data in a certain data product version

It is suggested that GRUAN GNSS-PW DATA PRODUCT follows E-GVAP (E-GVAP ASCII) format
(also known as „cost format“)

- well defined
- well documented
- easily convertable to BUFR and NetCDF.

C:\GRUAN\ICM5\
716_format_exampl

GNSS Data Central Processing – what would it be?

Concept(s) of central data processing and uncertainty analysis:

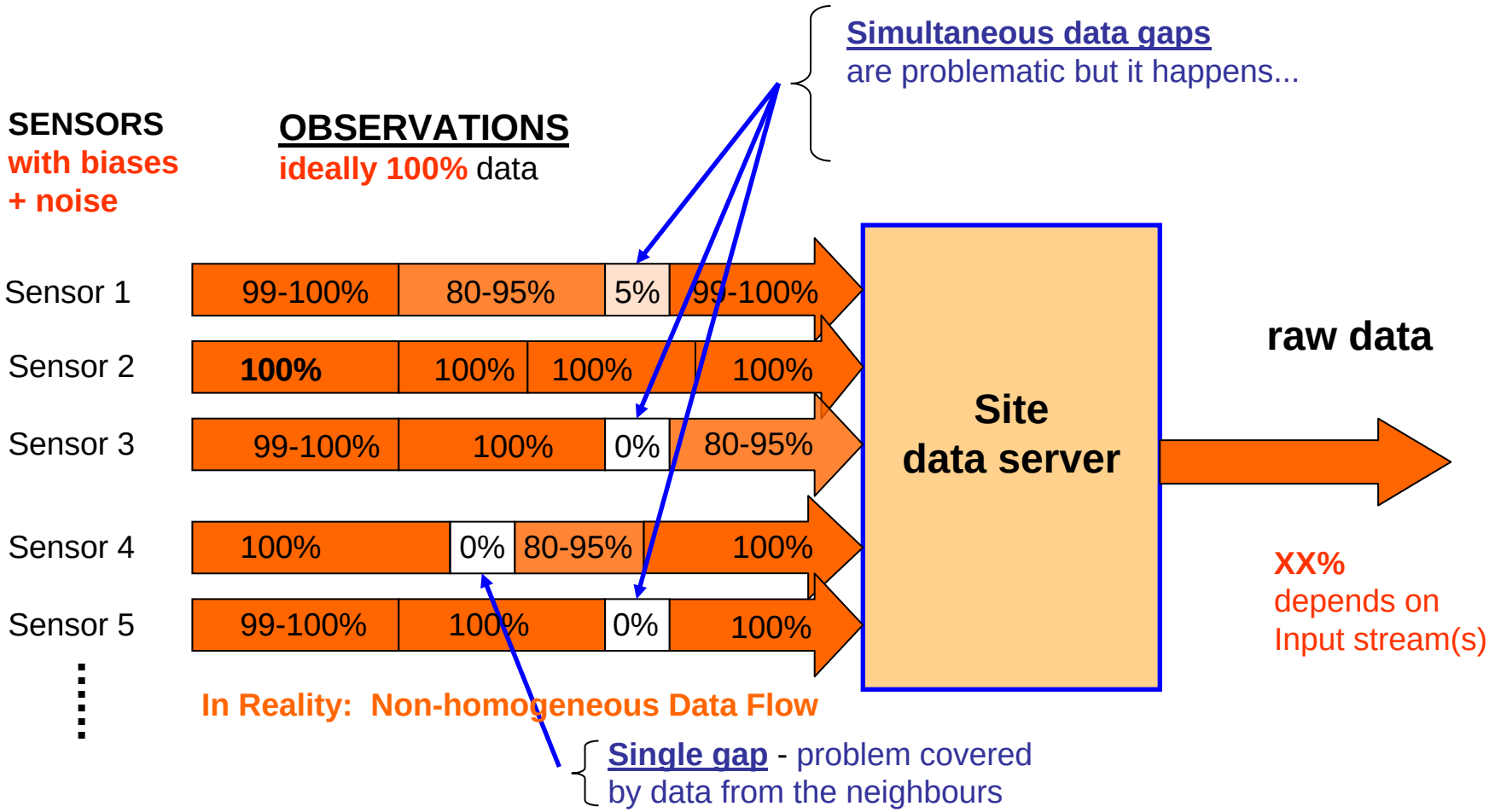
a) 1 Central Processing Centre (the last idea we had after ICM4)

Some ideas (from the last GNSS-PW TT telco):

b) Some Analysis Centre(s) and one GRUAN Combination Centre (instead of one „Supercentre“)

something to be discussed at the side meeting...

The realities in data stream



*) Usually fully automated data stream from 1 sensor only may have gaps and jumps. Secure by some additional ref. points (data sources)?

We must be aware about potential problems in data stream

... and we must have ready-to-use strategies how to overcome them.

Raw data quality from the site is critical for data analysis. To keep the quality of GNSS-PW, the GNSS-PW TT has delivered (**Ref. GRUAN TD6, best practices, management of changes and other recomendations made by TT**).

The sites should be responsible on initial Quality Control of the data.

TEQC software can be employed to derive and output Quality control metrics of the daily data. Automated quality check for raw data streams (tried at Lauder, maybe in Sodankyla?).

Automated „smart“ quality control of sensors, maybe using „supporting sensors“ for most critical parameters, like surface pressure for IPW derivation. For example, using technical means for detecting sudden (but small) biases from instrumental malfunctions?

User-Friendliness

The majority of potential users will loose their motivation to use any data if the access and overview is complicated

The users of GRUAN GNSS-PW (and other products) should be aware about missing or uncomplete data and what has happened at the time of observations. The users should access easily both observational data and related metadata.

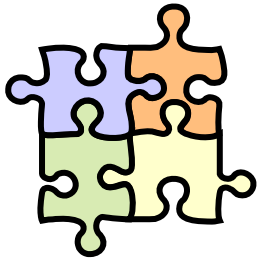
Checking must be simple, fast and easily understandable.

- LC point of view - operative observation if the data is present, what has happened if not, ..., Visualization of data management...

- End User‘s point of view – in a certain time window it must be easily detectable if the measurements were continuous, what has been the situation with changes, when the changes have been made, etc.

Maybe some GUI in form of interactive dynamic map?

THANK YOU FOR YOUR ATTENTION!

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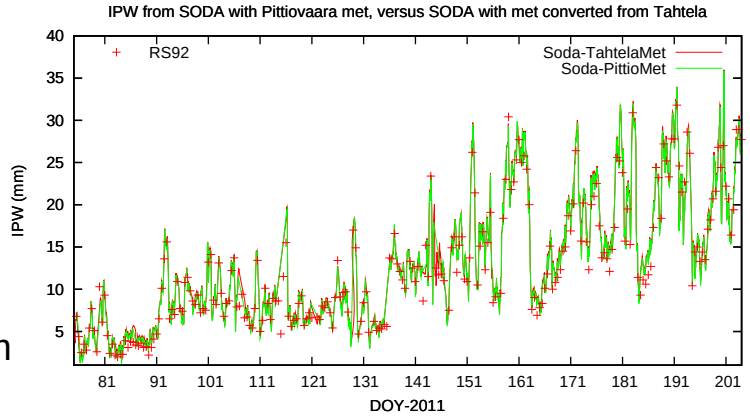
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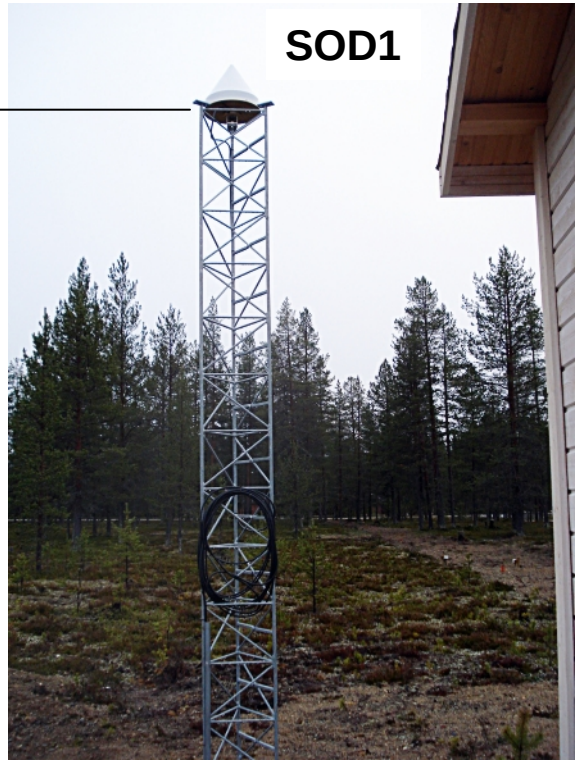
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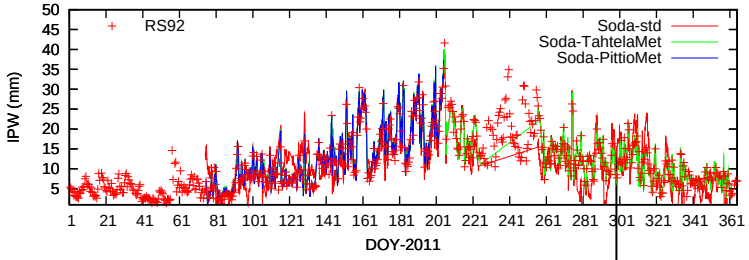
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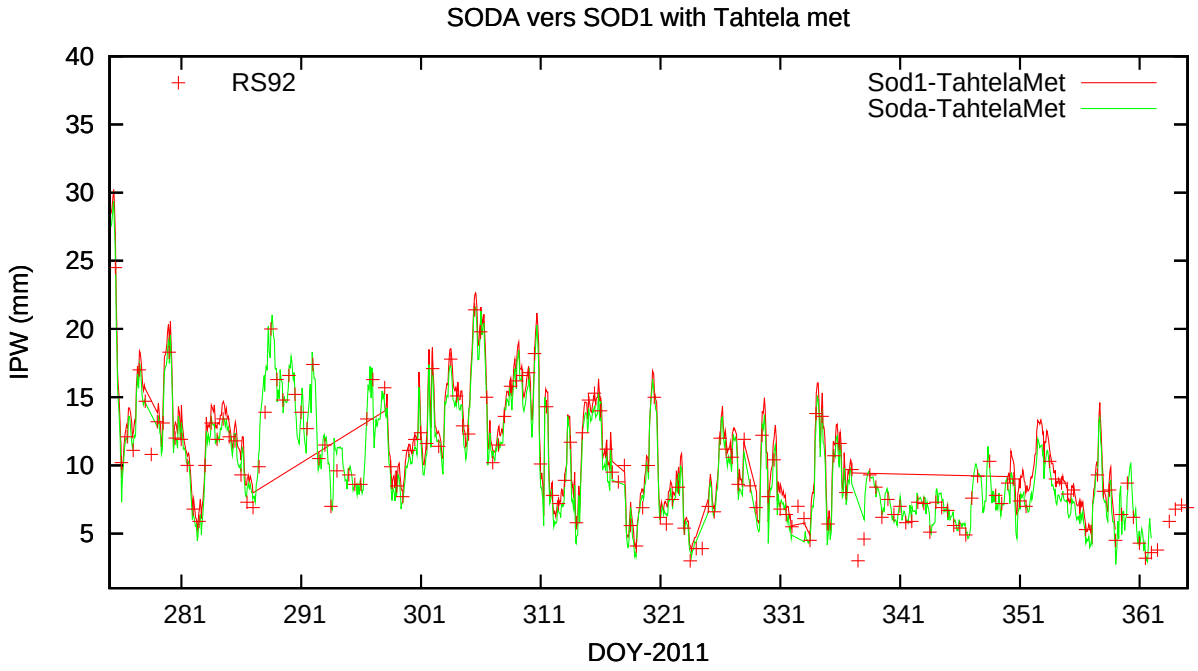
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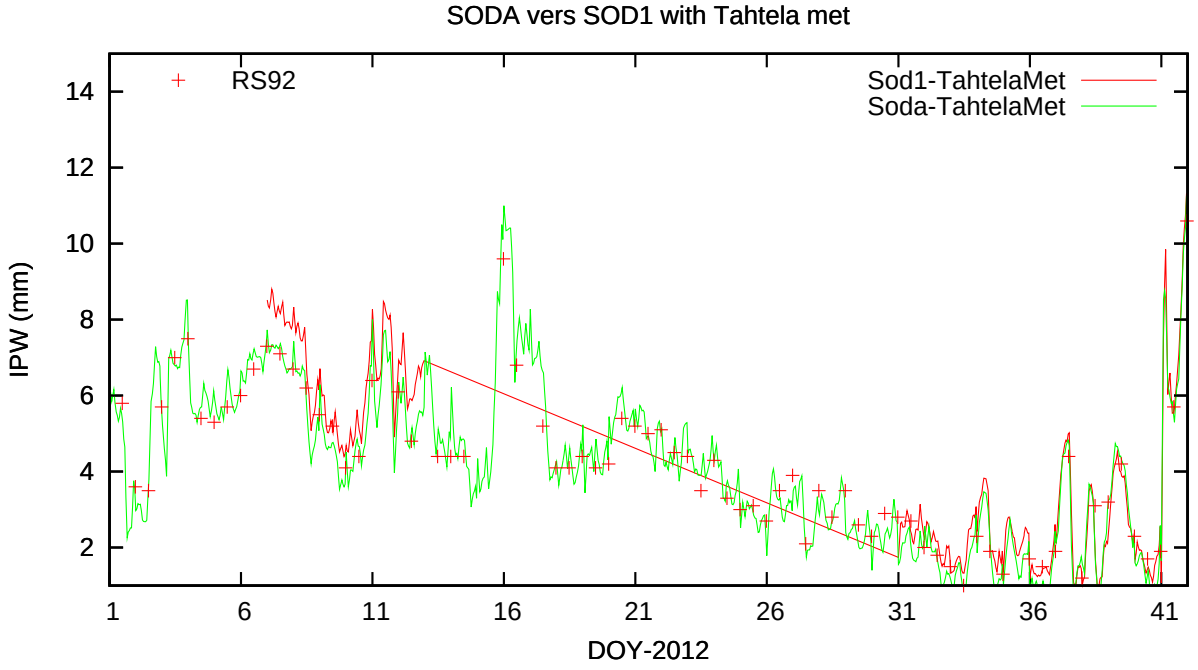
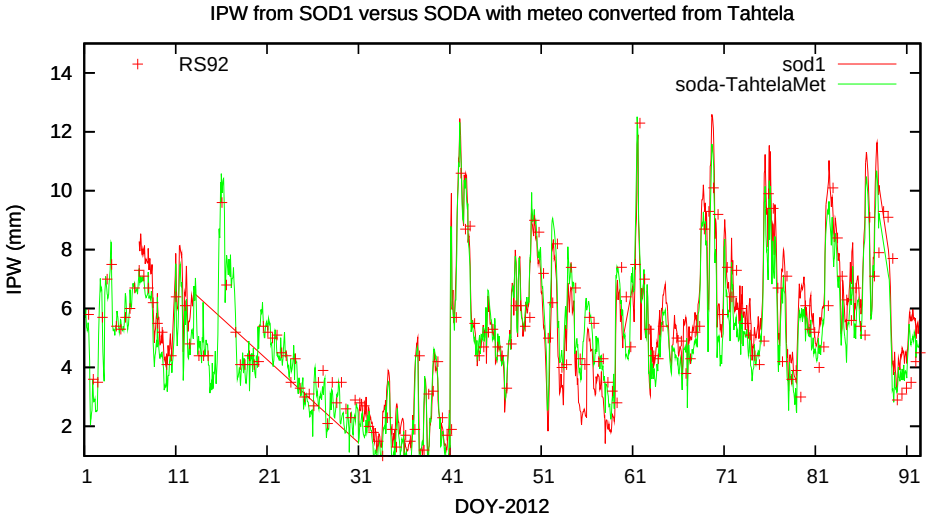
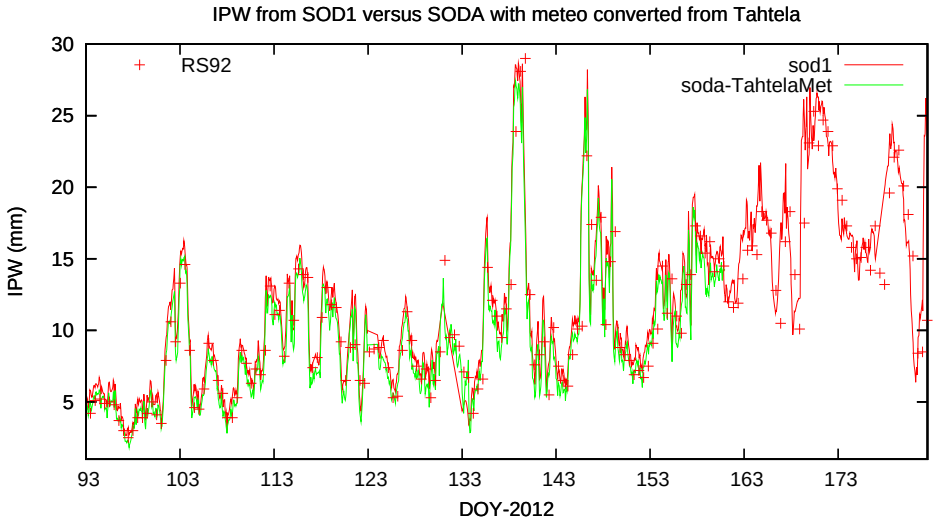
RS92
Sod1-TahtelaMet
Soda-TahtelaMet
IPW (mm)
DOY-2011
40
35
30
25
20
15
10
5
281
291
301
311
321
331
341
351
361


SODA vers SOD1 with Tahtela met
RS92
Sod1-TahtelaMet
Soda-TahtelaMet
IPW (mm)
DOY-2012
14
12
10
8
6
4
2
1
6
11
16
21
26
31
36
41





soda001_160:
mean_g = -3.3125
std_g = 13.3476
n_g = 307

sod1007_182:
mean_g = 4.5162
std_g = 15.1799
n_g = 300