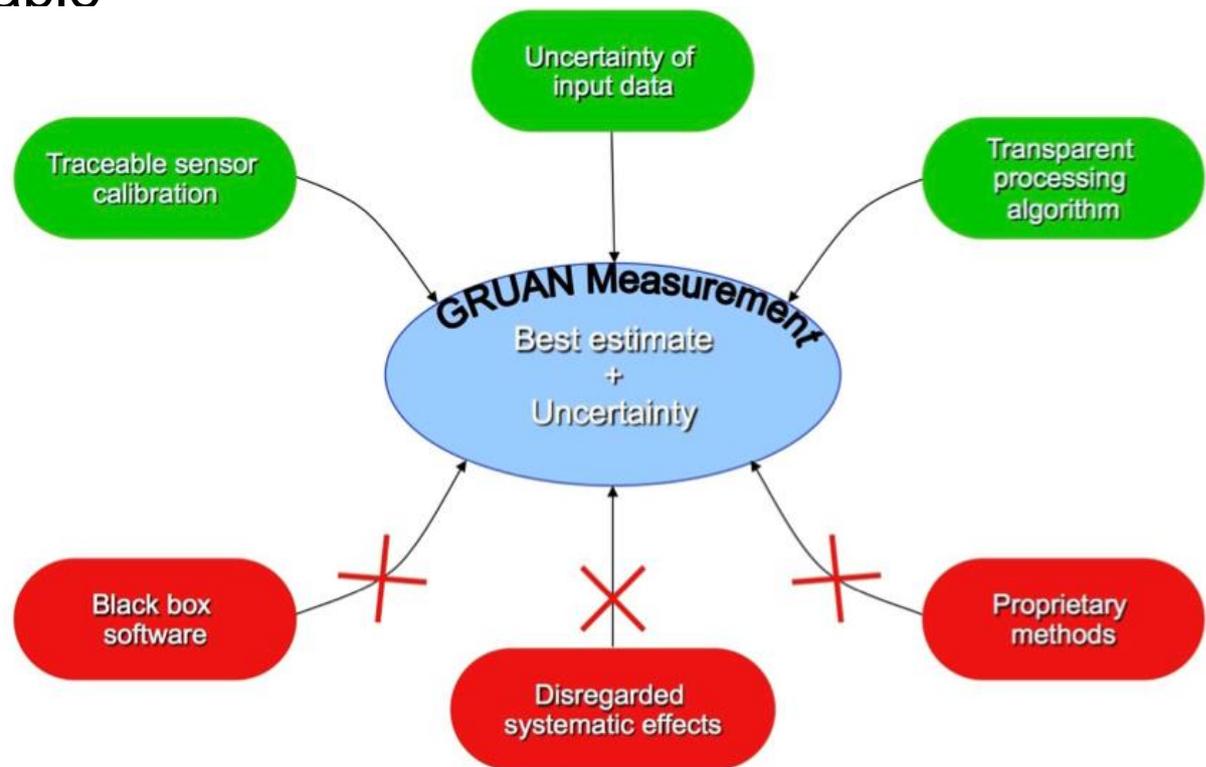# Site and instrument certification + practices

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Motivation for GRUAN data products

- ➢ From the GRUAN-for-beginners presentation:
  To answer the need [of WMO and the Global Climate Observing System] for highest accuracy data possible

- ➢ GRUAN's main deliverable

Requirements for certification of GRUAN data product

➢ Outlined in TN-1 & TN-4

    o Technical document with full description of the data processing

        ▪ Characterisation and correction of measurement errors

        ▪ Measurement uncertainty

    o Peer-reviewed paper on the data product

    o Measurement System employed within GRUAN

    o Central data-processing facility

    o Existing operational data stream

    o Review (validation) of the data stream

        ▪ LC

Certified

RS92 V2
RS-11G V1
GNSS-PW*
RS41
iMS-100**

*NetCDFdata format not
implemented yet
** provisional certification

Under development

RS-11G V2
M10
Graw DFM09/DFM17
RS92 V3
CFH/FPH
MWR
Lidar
O_3

Lindenberg Meteorological Observatory
Richard-Aßmann-Observatory

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- ➢ Development of GRUAN data product is a considerable task. For radiosonde products and GNSS-PW typically 4 years.
  - o Multiple persons involved
  - o Error + uncertainty characterisation
    - ▪ (lab) measurements, analysis, correction algorithm
    - ▪ Example: solar radiation error, RH sensor time lag
  - o Writing documentation (e.g. TD-5 [iMS-100] TD-6 [GNSS-PW] TD-8 [RS41])

- ➢ Radiosondes: some investments can be re-used
  - o Optimized measurement program + set ups + analysis software, modular data processor system

- ➢ Not re-usable
  - o Data analysis, develop & implement correction algorithms, review/validation (perform & evaluate twin soundings), documentation

Certification procedure

➢ Preparation of documentation package by LC

  o   Recommendation on completeness

➢ Review of documentation package by WG

  o   Review of TD by selected reviewers and/or LC

➢ Reply to review comments by GDP developers

  o   Re-editing of TD

➢ Certification by WG

Site certification

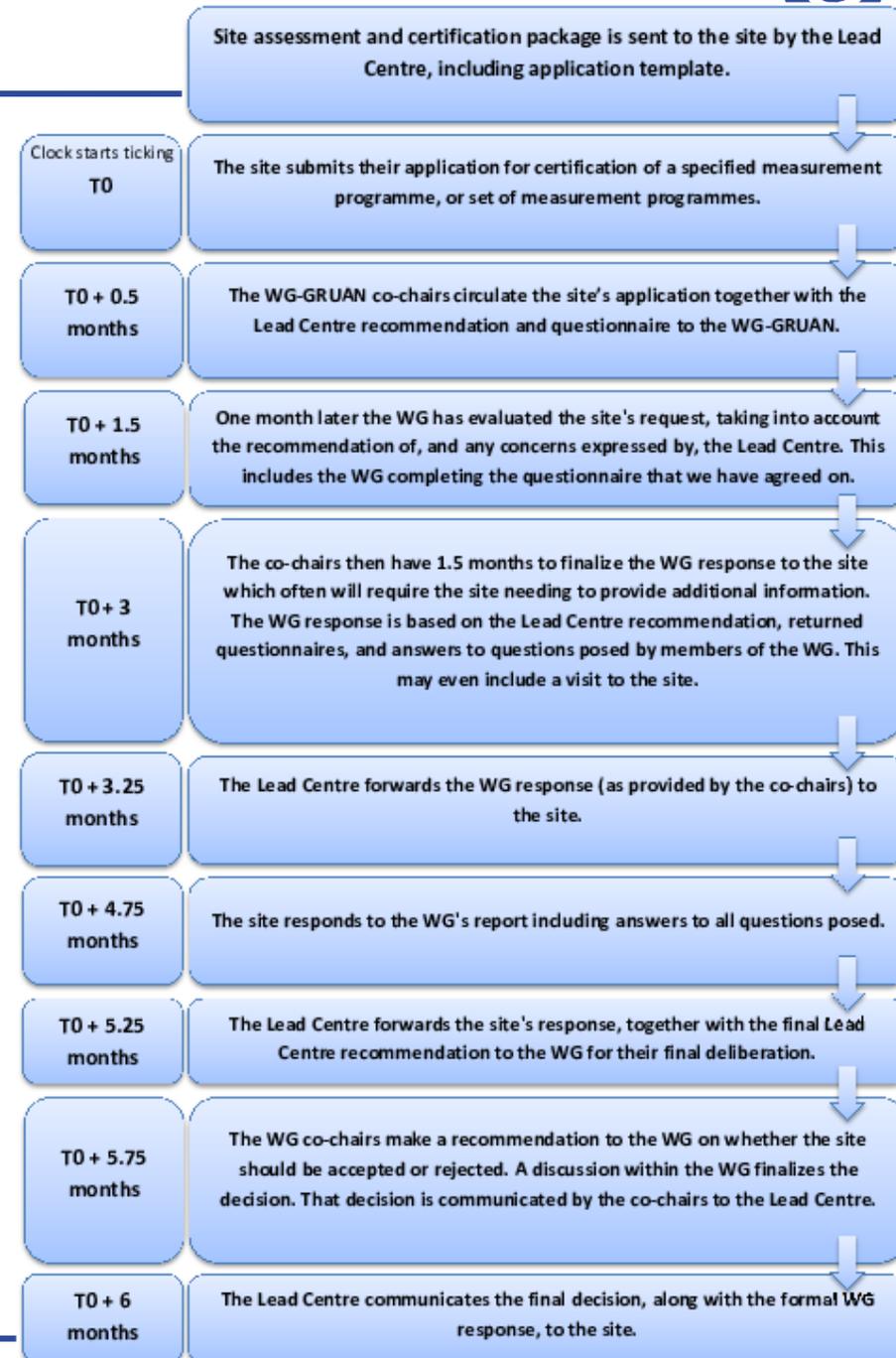Prerequisite: Operational data flow of certified G

➢ Site prepares certification application packag

- o Description of site + its value to GRUAN

- o Reference observations, change management

➢ Evaluation/review by LC + Working group

➢ WG response to site

- o Comments/questions/clarifications

➢ Response by site

- o editing + resubmission of application

➢ Approval by WG

Standard procedure for the GRUAN site certification process

- ➤ Processing time allocated for each step ~4 weeks

- ➤ Envisaged timespan between initial submission and certification 6 months

	Site assessment and certification package is sent to the site by the Lead Centre, including application template.
Clock starts ticking **T0**	The site submits their application for certification of a specified measurement programme, or set of measurement programmes.
T0 + 0.5 months	The WG-GRUAN co-chairs circulate the site's application together with the Lead Centre recommendation and questionnaire to the WG-GRUAN.
T0 + 1.5 months	One month later the WG has evaluated the site's request, taking into account the recommendation of, and any concerns expressed by, the Lead Centre. This includes the WG completing the questionnaire that we have agreed on.
T0 + 3 months	The co-chairs then have 1.5 months to finalize the WG response to the site which often will require the site needing to provide additional information. The WG response is based on the Lead Centre recommendation, returned questionnaires, and answers to questions posed by members of the WG. This may even include a visit to the site.
T0 + 3.25 months	The Lead Centre forwards the WG response (as provided by the co-chairs) to the site.
T0 + 4.75 months	The site responds to the WG's report including answers to all questions posed.
T0 + 5.25 months	The Lead Centre forwards the site's response, together with the final Lead Centre recommendation to the WG for their final deliberation.
T0 + 5.75 months	The WG co-chairs make a recommendation to the WG on whether the site should be accepted or rejected. A discussion within the WG finalizes the decision. That decision is communicated by the co-chairs to the Lead Centre.
T0 + 6 months	The Lead Centre communicates the final decision, along with the formal WG response, to the site.

1. Detailed site description

2. List of existing capabilities and place them into the GRUAN context.

3. Description of the data flow of the official GRUAN data products.

4. Confirm the adoption of GRUAN change management principles, or discuss where deviations are to be expected.

5. List of activities and other items listed in the GRUAN IP, relevant to the application.

6. List of active participation in any of the ongoing GRUAN activities.

➢ Every 4 years: recertification (audit-questionnaire)