

GRUAN Interaction With Radiosonde Manufacturers

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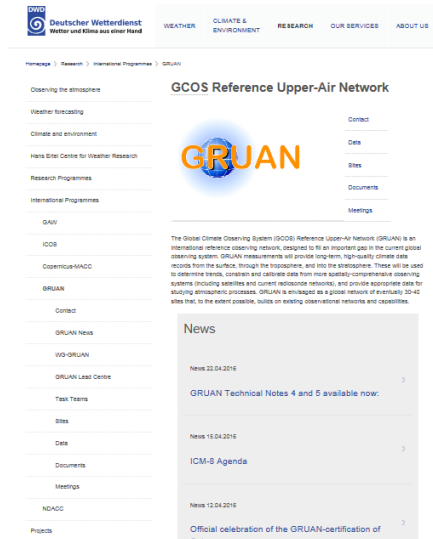
What GRUAN means to the manufacturers

- GRUAN as part of WMO/GUAN has become an established network requiring long term high quality upper air observations for climatological needs.
- For the radiosonde manufacturers GRUAN defines scientific based key measurement parameters and their target specifications for the measurement accuracy for climatological observations.
- In addition GRUAN defines a set of specific requirements related to radiosondes operation, data and documentation.
- When taking a new radiosonde data product to use there is an overlapping observation period needed.
- These requirements can be used as an input when manufacturers plan and develop their product offering

General information related to GRUAN and its objectives

Information sources

- GRUAN web sites, GCOS web sites
- ICM-meetings with reports
 - HMEI representation - newsletters, manufacturers participation



The Global Climate Observing System (GCOS) Reference Upper-Air Network (GRUAN) is an international reference observing network, designed to fill an important gap in the current global observing system. GRUAN measurements will provide long-term, high-quality climate data records from the surface, through the troposphere, and into the stratosphere. These will be used to determine trends, constrain and calibrate data from more spatially-comprehensive observing systems (including satellites and current radiosonde networks), and provide appropriate data for studying atmospheric processes. GRUAN is envisaged as a global network of eventually 20-40 sites that, to the extent possible, builds on existing observational networks and capacities.

- ### News
- News 22.04.2016
[GRUAN Technical Notes 4 and 5 available now:](#)
 - News 15.04.2016
[ICM-3 Agenda](#)
 - News 12.04.2016
[Official celebration of the GRUAN-certification of Cabauw](#)

Why do we need GRUAN?
Understanding our changing climate, and the underlying causes of these changes, requires an

This screenshot shows the 'GRUAN' section on the 'GLOBAL CLIMATE OBSERVING SYSTEM' (GCOS) website. The page is titled 'GCOS Reference Upper-Air Network (GRUAN)'. It features a large 'GRUAN' logo and a sidebar with navigation links such as 'HOME', 'News', 'Contact', 'Publications', and 'Site map'. The main content area includes a brief description of the GRUAN network, a 'News' section with recent updates, and a 'GRUAN-related documents' section with a list of reports and manuals. A diagram on the right side of the page illustrates the 'GCOS Cascade of upper-air networks', showing the relationship between the 'GRUAN Reference Upper-Air Network (GRUAN) 30-40 stations' and the 'GCOS Upper-Air Network (GUAN) 161 stations'.

GCOS Reference Upper-Air Network (GRUAN)

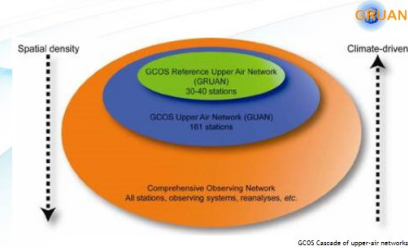
GCOS is establishing a reference network for upper-air climate observations (GRUAN). GRUAN is expected to provide long-term, highly accurate measurements of the atmospheric profile, complemented by ground-based state of the art instrumentation, to constrain and calibrate data from more spatially-comprehensive global observing systems (i.e. satellites and current radiosonde networks), in order to fully characterize the properties of the atmospheric column and their changes. GRUAN is envisaged as a network of 30-40 high-quality, long-term, upper-air observing stations, building on existing observational networks, such as NDACC, ARM, QJAN, GAW, ESRN and SSN. GRUAN builds on, but is not confined to, the larger GCOS Upper Air Network (GUAN). In 2007, the GRUAN Lead Centre has been assigned to the Richard-Asmann-Observatory at Lindenberg, Germany. The GRUAN Lead Centre is responsible for the coordination among stations, including training, education and research, and ensuring the archival and dissemination of GRUAN Data.

For further information, visit the official [GRUAN Website](#), maintained by the [GRUAN Lead Centre](#).

- [GRUAN outreach material](#)
- [GRUAN operating chart](#)
- [GRUAN measurement sites](#)
- [Working Group on GRUAN](#)

GRUAN-related documents

- The GCOS Upper-Air Reference Network (GRUAN) GUIDE ([A PDF](#))
- The GCOS Upper-Air Reference Network (GRUAN) MANUAL ([A PDF](#))
- Report of the 5th GRUAN Implementation and Coordination Meeting (ICM-5), DeBilt, Netherlands, February/March 2013 ([A PDF](#))
- Report of the 4th GRUAN Implementation and Coordination Meeting (ICM-4), Tokyo, Japan, March 2012 ([A PDF](#))
- Report from the WIGOS Pilot Project Meeting on GRUAN Observing Practices and Governance, Geneva, Switzerland, 26-27 February 2012 ([A PDF](#))
- Report of the 3rd GRUAN Implementation and Coordination Meeting (ICM-3), Queenstown, New Zealand, February/March 2011 ([A PDF](#))
- Report of the 2nd GRUAN Implementation and Coordination Meeting (ICM-2), Payenne, Switzerland, March 2010 ([A PDF](#))
- GRUAN Implementation Plan 2009-2013, July 2009 ([A PDF](#))
- GRUAN Data Policy, Feb 2009 ([A PDF](#))
- Report of the 1st GRUAN Implementation and Coordination Meeting (ICM-1), Norman, Oklahoma, USA, March 2009 ([A PDF](#))
- Report of the GCOS Reference Upper-Air Network Implementation Meeting, Lindenberg, Germany, Feb 2008 ([A PDF](#))
- GCOS Reference Upper-Air Network (GRUAN): Justification, requirements, siting and instrumentation options, Apr 2006 ([A PDF](#))
- Seidel, D., Reference Upper-Air Observations for Climate: Rationale, Progress, and Plans, *Bulletin of the American Meteorological Society*, March 2009 ([A PDF](#))
- Press Release "New Radiosonde to Shed Light on Climate Change", Feb 2009 ([A PDF](#))
- [GRUAN Manual Repository](#)

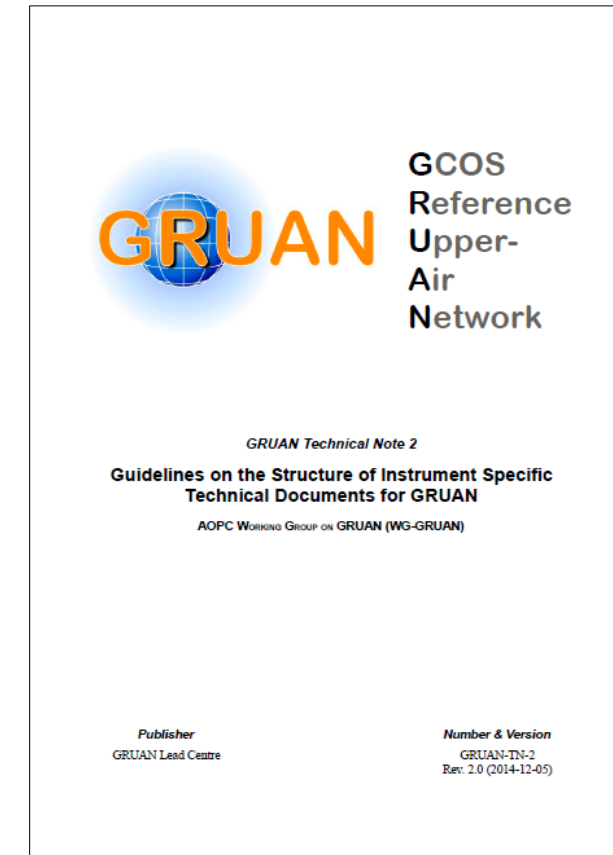
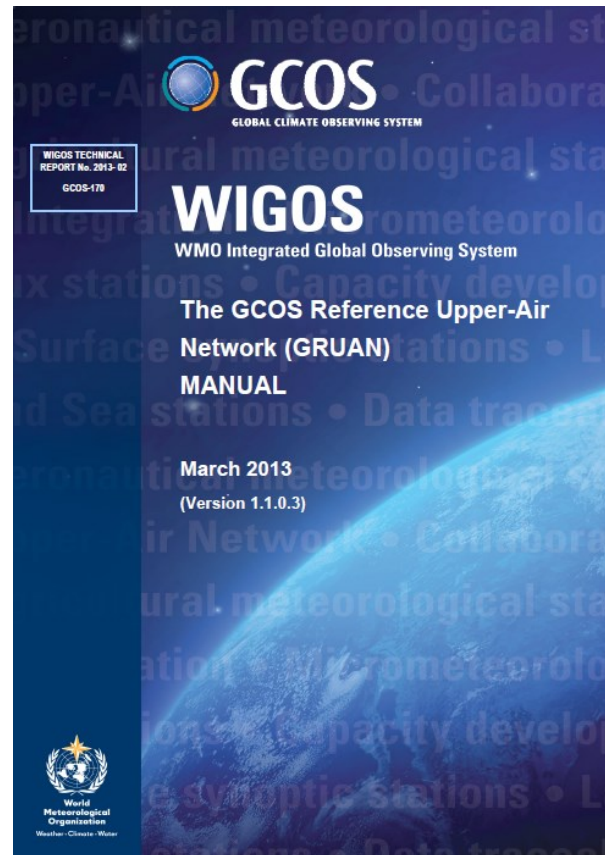
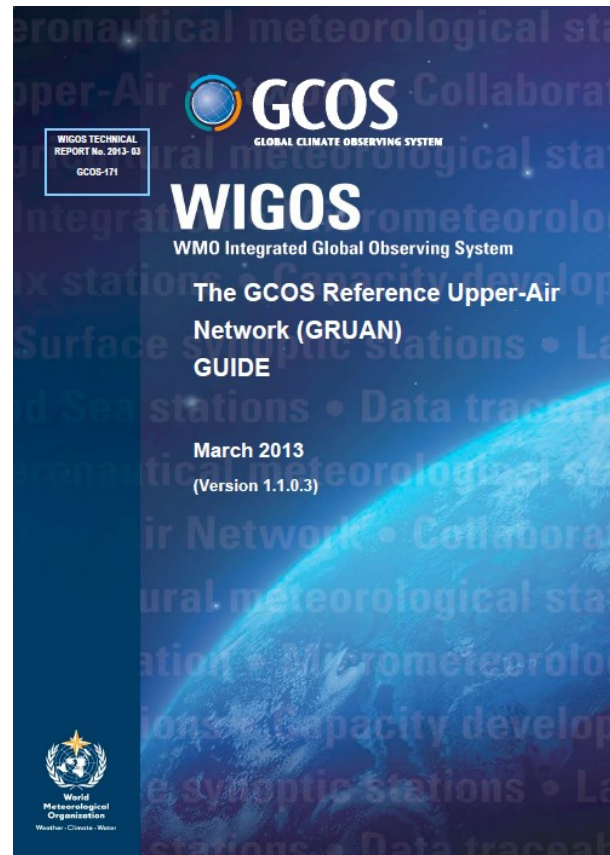


Specific information related to GRUAN radiosonde observations

GCOS-171, The GCOS Reference Upper-Air Network (GRUAN) Guide, version 1.1.0.3, WIGOS Technical Report No. 2013-03, 2013.

GCOS-170, The GCOS Reference Upper-Air Network (GRUAN) Manual, version 1.1.0.3, WIGOS Technical Report No. 2013-02, 2013.

GRUAN-TN-2, Guidelines on the Structure of Instrument Specific Technical Documents for GRUAN, Rev. 2.0 (2014-12-05), 2014.



Coming:
The overarching
Radiosonde
Technical
Document

and

Radiosonde
specific
Appendices

Interaction when planning and developing a GRUAN radiosonde data product

Communication

- Communication with GRUAN Lead Center
- Communication with partners, as national GRUAN representatives and Data Processing Centers (other than Lead Center)

Detailed requirements

- What are the parameters to be measured, and at what accuracy
 - The target observational requirements for GRUAN are defined in the report 'GCOS Reference Upper-Air Network (GRUAN): Justification, Requirements, Siting and Instrumentation Options' (GCOS-112)
- Data content and data format
- Required metadata
- Guidelines regarding the procedure for ground check records prior to launch.
- Channel to send the data from the observatories to the GRUAN data processing centers (GRUAN Lead Center or co-operating National Meteorological Institutes)
- etc.

Interaction when developing a GRUAN radiosonde data product

GRUAN radiosonde characterization

- Laboratory tests in Lead Center
 - Feedback from the laboratory tests
 - Technical support to LC as required
- Flight tests
 - Feedback from the flight tests, performed by LC and by partners
 - Technical support for performing soundings as required

Technical documentation phase

- Technical support to LC and partners as required

Other

- Experiences

- Based on small inquiry experiences on interaction with LC and other partners has been very positive.

- Something to further develop?

- Guidelines for product technical documentation are already under development in the Lead Center
 - “The overarching Radiosonde Technical Document and Radiosonde Specific Appendices.”
 - This will be useful information when developing new radiosonde data products to GRUAN use.

Thank you !