



# GCOS

KEEPING WATCH OVER OUR CLIMATE



International  
Science Council



WORLD METEOROLOGICAL  
ORGANIZATION

INTERGOVERNMENTAL  
OCEANOGRAPHIC  
COMMISSION

## **Implementation Coordination Meeting -ICM-16**

**Tenerife, Spain  
17-21 November 2025**

**GCOS-270**

UNITED NATIONS  
ENVIRONMENT PROGRAMME

INTERNATIONAL  
SCIENCE COUNCIL

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Chair, Publications Board

World Meteorological Organization (WMO)

7 bis, avenue de la Paix

P.O. Box 2300

CH-1211 Geneva 2, Switzerland

Tel.: +41 (0) 22 730 84 03

Fax: +41 (0) 22 730 80 40

E-mail: [Publications@wmo.int](mailto:Publications@wmo.int)

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## **1. OPENING OF THE MEETING**

The Implementation Coordination Meeting ICM-16 was held in Tenerife from the 17th to the 21st of November 2025, hosted by the Agencia Estatal de Meteorología (AEMET).

The chairs of Working Group GRUAN, Fabio Madonna and Masatomo Fujiwara welcomed the participants and explained that the goal of the meeting was to investigate progress with the Implementation of GRUAN and to understand what has been achieved and what still needs to be achieved for the full network implementation, until 2030 which is the end of the current GRUAN IP cycle. Other topics are the consistency of GRUAN Data Products (GDPs); the network expansion (30-40 sites by 2030); validation of GDPs; challenges to be on track with the science development and quality assurance. During this meeting, more time was dedicated to the discussion on GRUAN sites. The chairs concluded by thanking the local organizers.

David Suárez (Territorial Delegate of AEMET in the Canary Islands) opened the meeting and delivered a statement that can be found in Section 1.1 of this report.

An opening statement from the President of AEMET was delivered during the site visit and can be found in Section 1.2.

The agenda and the links to the presentations can be found here:

<https://www.gruan.org/community/meetings/icm-16#c9791>

The list of participants can be found in Annex 1.

Annex 2 contains the slides summarizing the Strengths, Weakness, opportunity and Threats (SWOT) analysis for GRUAN provided by the participants at the meeting. Annex 3 contains the list of activities for the next period agreed during the meeting.

### **1.1 Opening statement from the Territorial Delegate of AEMET in the Canary Islands**

The meeting started with an opening statement from David Suárez (Territorial Delegate of AEMET in the Canary Islands):

"Good morning everyone,

Welcome to Puerto de la Cruz, and welcome to this GRUAN meeting. First, I want to say thank you to the Mayor of Puerto de la Cruz (Leopoldo) for their great support and for giving us this beautiful place for our meeting. We feel very welcome here. I also want to thank the GRUAN leadership (Fabio and Masatomo) for choosing Tenerife as the place for this meeting. It is great pleasure for us to host you here. And I want to thank the World Meteorological Organization, WMO, (Caterina and Tim) for promoting and supporting Earth observation programmes like GRUAN. As head of Spanish Met Service in the Canary Islands, I am also very proud that the Güímar station is the only Spanish station in the GRUAN network. For us, this is a big honour and also a big responsibility. It is also very important for us that Tenerife is part of GRUAN. Our island is in a subtropical region, with special atmospheric conditions and strong contrasts between ocean and mountains. This makes Tenerife a very valuable place to observe the upper air and to provide high-quality data for the global network. I want to thank my team for their hard work every day. Without their effort, our station and our data would not be possible. As you know, upper-air observations are very important. Good data from these observations are essential for better weather forecasts, for climate studies, and for understanding extreme events. For AEMET, GRUAN is a priority. We are committed to maintaining and improving our

measurements, and to supporting the GRUAN community with reliable and long-term observations. Thank you very much, and I wish you a very good meeting here in Tenerife.”

## **1.2 Site visit**

On Wednesday, the participants of ICM-16 visited the observatory of Izana. The observatory was established in 1916 and is located at 2400m of altitude in a very pristine environment. It represents the ideal location to perform measurements of atmospheric composition and is a GAW station with several instruments to measure GHG, ozone and aerosols. The dynamic atmospheric patterns in the upper atmosphere make Tenerife a perfect location to take observations of atmospheric variables, and more specifically to establish a super-site where several variables are measured within a small area. The groups also visited the autolauncher for the newly certificated GRUAN site, which is located at Guimar (The visit to the ozone sounding sites and the future location for the GNSS antenna, in Puerto de la Cruz, took place the day after, shortly before the meeting started.). The President of AEMET, Maria Jose Rallo joined the group during the site visit and gave the following statement:

“ Good morning everyone, it is a pleasure to have the opportunity to greet you, as President of the Spanish National Meteorological Service, AEMET, and to welcome you to the Izaña Atmospheric Research Center—the first AEMET facility you will visit during this meeting, and a truly unique and emblematic centre for our institution, as you will hear shortly.

I am sure we all agree that the island of Tenerife is a wonderful venue for any international meeting, and I hope the environment contributes to a productive and enjoyable week.

And I was very pleased when I read that one of the objectives of this 16th Implementation and Coordination Meeting of the GRUAN Network is “to encourage collaboration among participants and strengthen the network spirit.”

I hope you are already advancing toward this goal, which is so important at a time when building alliances has become crucial.

From AEMET’s point of view, the island of Tenerife is also especially significant. It has a long history in the development of meteorology in Spain and stands out as a place of innovation and scientific progress.

In this context, AEMET is strongly committed to the work carried out by the GRUAN Network as part of the Global Climate Observing System of WMO. The organisation of this meeting—and our keen interest in obtaining certification for our Güímar station—are two clear examples of this commitment.

The Güímar radiosonde station became Spain’s first fully automatic station in 2001. It has been part of GRUAN for eight years, and the experience gained is extremely valuable for AEMET as a whole, both scientifically and technologically.

GRUAN provides a reference framework for many national and international observation networks in which National Meteorological Services participate.

Today, this role is essential: we need institutions and experts who define standards and quality criteria to guide us all—especially when it comes to identifying climate trends in complex areas such as the upper atmosphere of subtropical regions. Tenerife is one of these rare and unique environments. We thank WMO for its continued support and leadership in strengthening the network.

Within AEMET, and under our Strategic Plan 2025–2029, we are strengthening our observational capacities—both organisationally and through significant investments. Upper-air observation activities will be an important part of this effort. In fact, the GRUAN programme is being fully integrated into AEMET’s long-term Observation Strategy.

Before closing, let me express my gratitude to the AEMET team who have worked tirelessly to support GRUAN activities and to prepare this special occasion. Thank you very much for your attention. I wish you a fruitful and inspiring day.”



## 2. REVIEW OF PROGRESS SINCE ICM-15

Fabio Madonna outlined the main achievements of GRUAN and provided a concrete analysis of the progress made in the implementation of the network according to the metrics of assessment of both the GCOS IP and the GRUAN IP. He noted that:

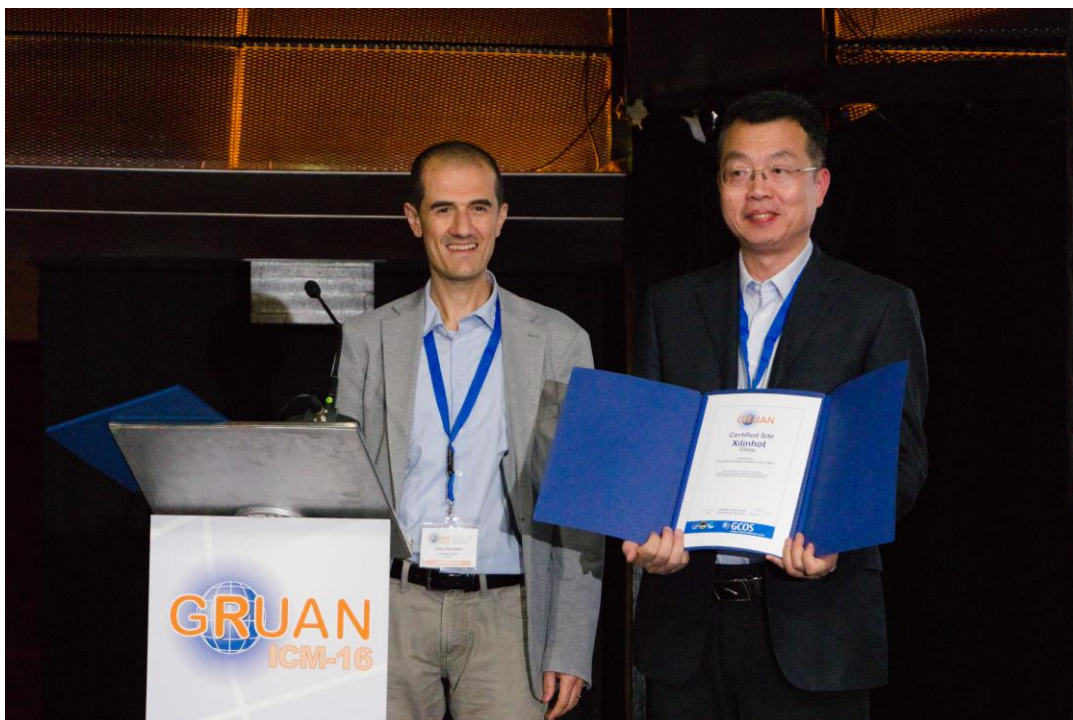
- GDP development: this is progressing slower than expected and a plan must be agreed to secure a sufficient number of GDPs to ensure that priority 1 and priority 2 variables are covered with redundant measurements. For example, the establishment of a GDP for stratospheric water vapour measurements, which is a clear scientific priority and has been a high priority action for three years. Yet currently there is no developed GDP, along with several difficulties highlighted in the site reports and in the available data collection measurements.
- Network expansion: 25 sites are currently providing data to the LC, and 22 have an available GDP. However, progress needs to accelerate in order to achieve the initial target of a 30–40 site network.
- Certifications: Certification activities have progressed too slowly in recent years and need to speed up. So far, only 14 sites have been certified, and although two more will be certified during this meeting, the certification process must be simplified and made faster.
- Publications: The number of publications per year peaked in 2016 but has since decreased, mirroring the declining visibility of the GRUAN network online (e.g., fewer people searching for “GRUAN”)

The table below summarizes the status of stations and GDPs:

**Table 1: History and status of the GDPs published or under implementation in GRUAN. Availability of the documentation requested to complete a GDP, i.e. TD and peer-reviewed paper, is also noted.**

GDP	Begin	Published	Paper+TD available
RS92 v2	2010	2012	2016
RS92 v3	2018	-	-
RS41 v1	2016	2022	2023
RS-11G	2015 (?)	2019	2019
iMS-100	2019 (?)	2022	TD under update
CFH/FPH GDP	> 5 years	-	-
O3 SONDES	> 5 years	-	-
GNSS GDP	> 5 years	-	-
Lidar GDP	> 5 years	-	-
MWR GDP	> 5 years	-	-
FTIR GDP	> 5 years	-	-

In 2025, Tenerife and Xilinhot were certified, the certificates were delivered to the representatives of the two stations during the meeting.





The list of certified sites is as follows:

GRUAN Sites (Website)	Certified	Uncertified	Candidate	Historical	WMO/OSCAR GRUAN Affiliation
35	16	9	8	2	24

2025: 2 new certified sites (Tenerife & Xilin hot); 2 re-certified (Beltsville & Ross Island)  
 2024: 0 new certified site; 1 re-certified  
 2023: 0 new certified site; 6 re-certified  
 2022: 1 new certified site; 2 re-certified  
 2021: 1 new certified site; 1 re-certified  
 1 site has been certified more than 5 years ago  
 1 site is going through the silent station process and if no remedial action will be removed in 2026.

Following this session, the following points were raised:

- Harmonization of practices should be a priority for GRUAN;
- GDP: Currently GRUAN is primarily a radiosonde-based community and to broaden the scope to other instruments will require a significant amount of work and, in some cases, is an expertise that the Lead Centre cannot provide alone. These GDPs need to be developed from other institutions with a proven specific background;
- Expansion of GRUAN: A workshop on the expansion of GRUAN was held in 2012 and addressed questions such as the focus to progress GRUAN. It was suggested

that the report from the workshop should be consulted to help understanding where to focus efforts.

### 3. KEY POINTS OF DISCUSSION DURING THE MEETING

This section summarizes the points of discussion and key activities identified during session 3 (GRUAN Sites), session 4 and session 5 (Multiple GDPs users), session 7 (Development of new GDPs) and session 8 (Science Forum, challenges), as well as during the three forums on sites, uncertainty, and SWOT on GRUAN.

- **UTLS Water-Vapour measurements:** The process of identifying suitable alternatives to using R23 has been completed. GDPs are being developed, and several new instruments with different cooling are under development and improving performances overtime. For the water vapour measurements in the stratosphere, good progress has been made towards the development of a SKYDEW GDP. However, there may be a change to the SKYDEW instrument in the future due to the discontinuity in the production of the optical sensor. In some sites, where the mid-troposphere is very dry (e.g. in the subtropics; dew point depression  $>50^{\circ}\text{C}$ ), SKYDEW may not be able to measure the frost point for a limited altitude range. A key question concerns how the change in stratospheric humidity instruments has been managed at the network level, particularly with respect to ensuring consistency in long-term trend analyses.
- **GDP development:** GDPs are in various stages of development for several radiosonde models. Progress is farthest for the M10-GDP, with its technical document currently under review. Furthermore, GDPs are under way for GTH3, DFM-09 & DFM-17 and RS92, with the laboratory characterisation of the RS92 finished and that for the DFM-17 nearing completion. The GDP development for GNSS-PW is now completed after the definition and implementation of the NetCDF file format.
- **GDP intercomparison:** Regular comparison soundings of GDP radiosondes are performed within GRUAN. A preliminary statistical analysis was performed comparing existing radiosonde GDPs with regard to temperature and relative humidity. In some cases, existing temperature biases are present which are comparable in magnitude to the measurement uncertainties for daytime measurements in the critical stratospheric region of the profiles. Humidity biases were observed in the tropopause region, presumably due to calibration differences and slow sensor response at low temperatures. However, these differences remain within the range of measurement uncertainties.
- **QA/QC:** There is a clear need for GRUAN to implement a QA/QC approach for both data processing and the post-processing phase, which includes homogenization, consistency, and plausibility checks of time series.
- **Eco-friendly radiosondes:** A comparison program for the RS41-SGPE has been initiated in Lindenberg (1-year long day & night launches) and results will be provided in due time. An initial short study with a small number of flights did not show any significant differences, but a longer evaluation period is needed to make solid statements. GRUAN sites are waiting for the LC results to decide whether to opt for the eco-friendly radiosondes.
- **Recycling of radiosondes:** LC recommends not to use 'recycled' radiosondes, as the measurement quality cannot be guaranteed. Radiosondes are manufactured for one-time use, and after the sounding, the calibration may no longer be valid, and the sensors may have invisible defects that can affect the data in flight. The cost of individual checks of the functionality of used radiosondes, in particular the calibration of temperature, humidity and pressure

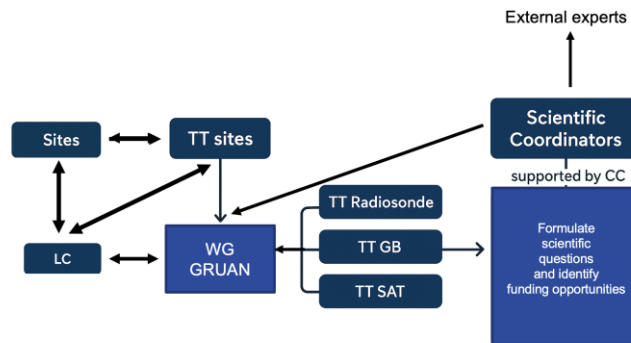
sensors, to an extent that corresponds to the GRUAN reference criteria, is most likely disproportionate to the savings from reuse.

- **GRUAN data management tools:** There have been significant efforts in the development of new online GRUAN tools for data and site reports, and satellite collocations. Sites, Task Teams (TT) and Working Group (WG) members are now requested to test the beta version of these online tools and provide feedback to the LC. Access information is in the presentation (<https://www.gruan.org/community/meetings/icm-16#c9791>) but should also be emailed to the GRUAN internal mail list. One Suggestion was to hold regular online forums showcasing different components of the tools, both for training purposes and to demonstrate their benefits and added value. It was also suggested during the forum to use these tools to identify milestones for the stations and to help develop stories/narratives that can motivate interest in GRUAN, support communication efforts, and engage researchers, especially younger scientists.
- **Certification:** At the forum, the long time to certify a station was discussed. The large amount of required information, some of which is duplicated, and a lack of clarity on what is mandatory for certification were cited as reasons for the delay. The proposal is to partially replace the lengthy documentation requirements with an initial interview, thereby reducing the paperwork. The LC also needs to review the overall certification process.
- **WG/TTs structure** remains valid with no suggestions to change. However, the communication (within and between teams) and motivation of these groups was considered sometimes poor with a low benefit for the network implementation. New methods need to be implemented to improve communications and member contribution. Alternatively, a structure could be envisaged in which only the TT sites is maintained, supported by a pool of experts contributing through time-bounded focus groups dedicated to specific selected topics relevant for the progress of GRUAN (see below).
- **GNSS:** Several presentations addressed the consistency between GNSS PWV and radiosonde measurements, showing progress in understanding, but highlighting that gaps in understanding and estimation still remain. Studies show that a similar bias is observed in both GNSS ground based and GNSS RO measurements, and the community is struggling to understand the reason for that. Further work is needed.
- **Standard Humidity Chamber:** Guidance is needed on how this tool should be employed. There is some heterogeneity among the sites, some employ an additional temperature sensor, others don't. The calibration of the temperature sensor in the SHC is the responsibility of the sites. There is the request for clear documentation and guidance on these operational issues. The new SHC under development by CMA may become an alternative option to the one model currently available.
- **GRUAN uncertainty approaches IASI noise.** There is a shortage of IASI - radiosondes collocations, which calls for soundings targeted to satellite overpasses.
- **Forum on uncertainty:** Within the discussion of the solution implemented by Tom Gardiner at NPL, in collaboration with TT-SAT, for estimating the error covariance matrix of GRUAN radiosonde measurements, it was further suggested to incorporate the concept of correlation length. This is important because atmospheric variability is not uniform with altitude: different layers of the atmosphere exhibit different degrees of variability and correlation. By including the correlation length, the error covariance matrix can better represent the structure of measurement uncertainties across various atmospheric levels,

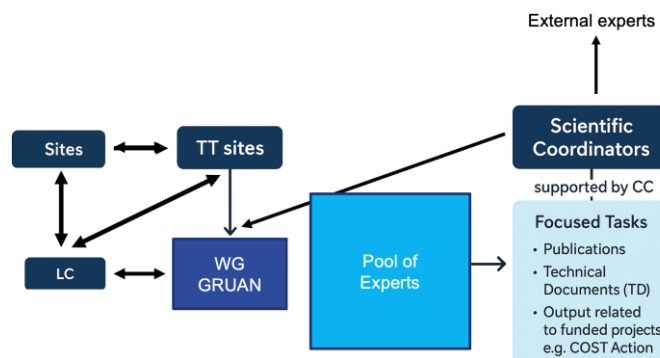
leading to more accurate and physically consistent characterization of radiosonde measurement uncertainties. However, this should be framed within a funded effort. Uncertainty must continue to be instrument-based, and the current level of details may be considered sufficient for the users' needs. Suggestion is to arrange a discussion to define what are the priorities to continue and complete this work in view of data usage. This needs to include a clear definition of terminology, a strategy to ensure the correct use of uncertainties depending on the specific application (across different temporal and spatial scales), and an effort to reconcile terminology with that used in other relevant fields.

- **Autolaunchers:** A recommendation was presented to define a threshold for the residence time of the radiosonde in the autolauncher after the additional manufacturer-independent ground check in the SHC.
- **Report of Water Vapour:** A discussion on which quantities should be used to report water vapor (e.g., WVMR, specific humidity, etc.) in the GRUAN files is needed. This aims to meet users' needs, including those of weather and climate modelers.
- **SWOT analysis:** The discussion during Forum 3 highlighted the need to make some changes. GRUAN must enhance external engagement and innovation to remain relevant. This includes connecting with experts, embracing new technologies, and clarifying how its high-quality reference data supports climate research and operational applications. Stronger collaboration with climate services and emerging fields like AI-based NWP is essential, while clearly demonstrating the value of GRUAN data for the study of climate. Key threats include complexity, documentation overload, funding challenges, and stagnation in the publication of peer-reviewed papers and outreach activities. Simplification is needed without compromising standards. Motivation can be strengthened through short-term objectives, focus groups, and sharing success stories beyond ICMs. Showcasing impact and aligning with user needs will help secure funding and maintain momentum. The LC and the WG-GRUAN will discuss how to achieve those changes.
- **Challenge:** To support the implementation of new sites, it is also key to finally solve the long-standing issue with data transfer from BoM (Australia).
- **Collateral initiatives** could provide support to GRUAN and help mitigate the lack of dedicated funding, including some Copernicus C3S contracts and the CRIM Cost Action (sign-up page: <https://e-services.cost.eu/action/CA24155/working-groups/apply>). WG1 of CRIM is dedicated to upper-air and lidar reference measurements.
- A new structure for GRUAN was proposed by the WG chairs, which replaces the current task teams with a pool of experts, thereby facilitating more collaborations and contributions and leading to more 'efficient' progress for various actions. This will be further discussed in the WG telecons:

## GRUAN structure: current



## GRUAN structure: proposed



### 4. CLOSURE OF THE MEETING

The chairs presented a list of suggestions for activities and possible publications as well as a new GRUAN structure. The list of actions that are still relevant can be found in the presentation at:

[https://www.gruan.org/gruan/editor/documents/meetings/icm-16/pres/pres\\_1102\\_Fujiwara\\_ICM-16-actions.pdf](https://www.gruan.org/gruan/editor/documents/meetings/icm-16/pres/pres_1102_Fujiwara_ICM-16-actions.pdf) , or in Annex 3.

The meeting closed on Friday 21st November. The Chairs and the GCOS Secretariat expressed their gratitude to the local host for the impeccable organization of the meeting. Before the closure, sincere thanks and gratitude were expressed to Tim Oakley, who will retire in four months. His contribution to the GRUAN implementation was key in opening minds to new challenges and ensuring discussions were always oriented toward the concrete actions needed for the growth of GRUAN.

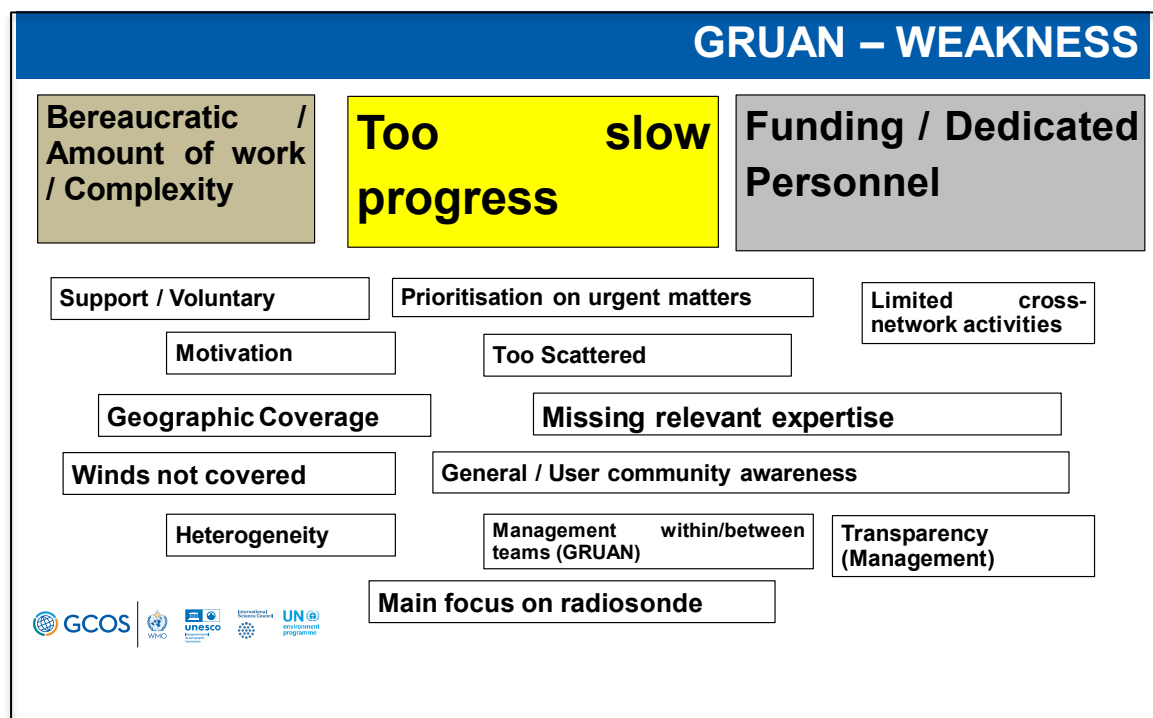
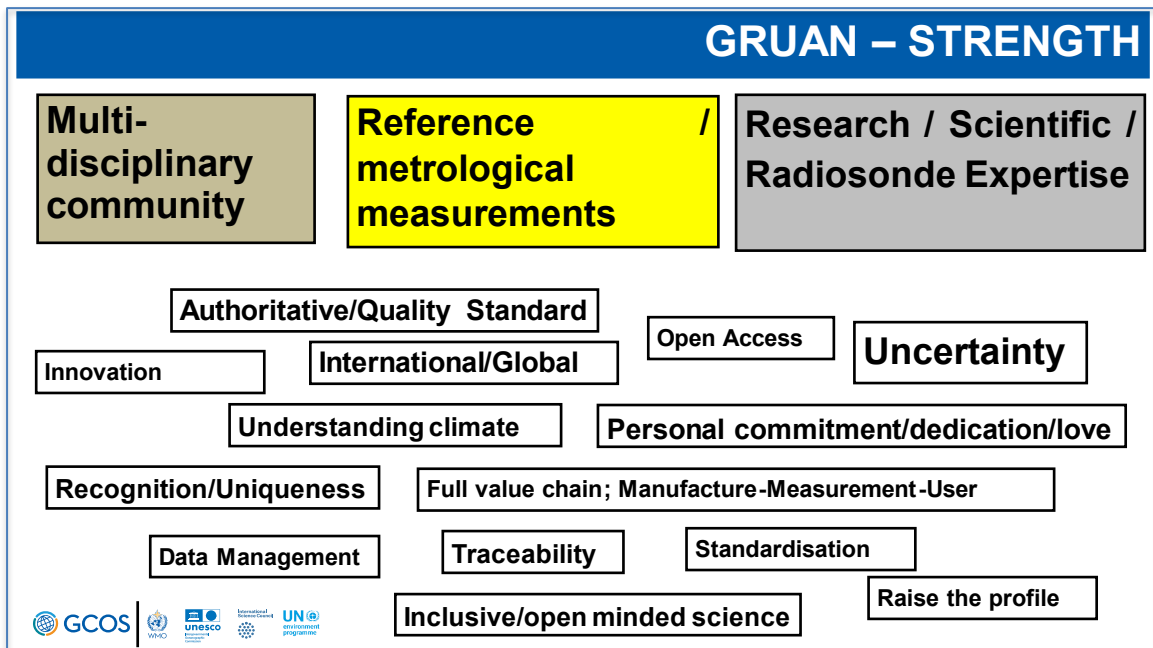
Dr. Zeng Peng, Director-general of the meteorological observation center at CMA, announced that the next ICM will be held in June 2027 and will be hosted by CMA at their GRUAN site in Xilinhot.

## ANNEX 1 - PARTICIPANTS

Akgul	Ferit	Meteosis
Apituley	Arnoud	KNMI, Utrechtseweg 297, 3731 GA, De Bilt, The Netherlands
Bock	Olivier	IPGP, 1 rue Jussieu, 75005 Paris, France
Brossi	Thomas	mylab elektronik GmbH, Rosswiesstrasse 29, CH-8608 Bubikon, Schweiz
Calbet	Xavier	AEMET, C/ Leonardo Prieto Castro, 8 Ciudad Universitaria 28071, Madrid, Spain
Castro Almanzan	Julio	Instituto de Astrofísica de Canarias
Cimini	Domenico	CNR-IMAA, C.da S. Loja, 85050, Tito Scalo (PZ), Italy
Dick	Galina	GFZ Helmholtz Centre for Geosciences, Telegrafenberg A17, D-14473 Potsdam, Germany
Dirksen	Ruud	Meteorologisches Observatorium Lindenberg, Am Observatorium 12, 15848 Tauche/Lindenberg, Germany
Farah	Antoine	Meteomodem, 35 Rue de Bessonville, 77760 Ury, France
Fassò	Alessandro	University of Bergamo, Via dei Caniana 2, Bergamo, Italy
Frielingsdorf	Johannes	Graw Radiosondes, Muggenhofer Str. 95, 90429 Nuremberg, Germany
Fujiwara	Masatomo	Hokkaido University, N10 W5, Sapporo, Japan
Gagliardi	Simone	CNR-IMAA, C.da S.Loja, Tito Scalo, Potenza, Italy
Gardiner	Tom	National Physical Laboratory, Teddington, UK
Guo	Qiyun	Fl. 27th, North Buldg., China Meteorological Administration, No.46, South Ave., Zhongguancun, Beijing 10081, P.R.China
Hernandez	MIGUEL	AEMET, TENERIFE, SPAIN
Holland	Kylie	Windborne
Hutchinson	Todd	Windborne
Jann	Patrick	METEO FRANCE DSO/DOA/GCA 42 Avenue Coriolis 31057 Toulouse Cedex FRANCE
Jauhiainen	Hannu	Vaisala Oyj, Vanha Nurmijärventie 21, 01670 Vantaa, Finland
Jones	Jonathan	Met Office
Kim	Seonwoong	Korea Research Institute of Standards and Science (201-111, 267, Gajeong-ro, Yuseong-gu, Daejeon, Republic of Korea, 34413)
Kivi	Rigel	Finnish Meteorological Institute, Tähteläntie 62, 99600 Sodankylä, Finland
Lam	Ming Chun	Hong Kong Observatory, 134A Nathan Road, Kowloon, Hong Kong
Le Roux	Christo	InterMet, 33 Estmil Road, Diep River, 7945, Western Cape, Cape Town, South Africa
Lehmuskero	Matti	Vaisala Oyj, Vanha Nurmijärventie 21, 01670 Vantaa, Finland
Locatelli	Tommaso	IUSS Pavia, Italy
Luo	Haowen	Fl. 27th, North Buldg., China Meteorological Administration, No.46, South Ave., Zhongguancun, Beijing 10081, P.R.China

Madonna	Fabio	Department of Physics, University of Salerno
Marra	Fabrizio	CNR-IMAA, C.da S. Loja, 85050, Tito Scalo (PZ), Italy
Martucci	Gianni	MeteoSwiss, Ch. de l'Aéologie 1, CH-1530 Payerne, switzerland
Maturilli	Marion	Alfred Wegener Institute Helmholtze Centre for Polar and Marine Research; Telegrafenberg A45; D-14473 Potsdam; Germany
Meral	Murat	Meteosis
Nielsen	Johannes	Danish Meteorological Institute
Oakley	Tim	GCOS, c/o WMO, Geneva
Piters	Ankie	KNMI, Utrechtseweg 297, 3731GA De Bilt
Poltera	Yann	University of Bern, Institute of Applied Physics - Microwave Physics, Atmospheric Dynamics and Meteor Physics, Sidlerstrasse 5, 3012 Bern, Switzerland
Prats Porta	Natalia	AEMET, Tenerife, Spain
Rodríguez González	José María	AEMET, Tenerife, Spain
Romanens	Gonzague	MeteoSwiss, Ch. de l'Aéologie 1, CH-1530 Payerne, switzerland
Rosoldi	Marco	CNR-IMAA, C.da S. Loja, 85050, Tito Scalo (PZ), Italy
Skodda	Ben	Meteorologisches Observatorium Lindenberg, Am Observatorium 12, 15848 Tauche/Lindenberg, Germany
Sommer	Michael	GRUAN Lead Centre, Lindenberg Meteorological Observatory, Deutscher Wetterdienst, Am Observatorium 12, 15848 Tauche/Lindenberg, Germany
Sugidachi	Takuji	Meisei electric co., ltd. , Isesaki--shi, Gunma, Japan
Tassone	Caterina	GCOS/WMO
Trasobares	E. Idoya	Aemet
von Engeln	Axel	EUMETSAT, EUMETSAT Alle, 64295 Darmstadt, Germany
von Rohden	Christoph	DWD, Lindenberg Meterological Observatory, Am Observatorium 12, 15848 Tauche/Lindenberg
Wienhold	Frank	ETH Zurich, Universitätstrasse 16 (CHN O16.3), CH 8092 Zurich, Switzerland
Yamamoto	Kenta	Meisei Electric Co., Ltd. , TOYOSU IHI BUILDING., 1-1, Toyosu 3-chome, Koto-ku, Tokyo 135-8115, Japan
Yeap	Gavin	Upper-Air Observatory of Singapore, Meteorological Service Singapore
Zhang	Peng	Fl. 27th, North Buldg., China Meteorological Administration, No.46, South Ave., Zhongguancun, Beijing 10081, P.R.China
ZHONGQIANG	Han	Fl. 27th, North Buldg., China Meteorological Administration, No.46, South Ave., Zhongguancun, Beijing 10081, P.R.China

## ANNEX 2 – SWOT ANALYSIS



## GRUAN – OPPORTUNITY

User community / impact studies

Joining scientific communities / other networks / projects

New obs systems & GDPs

Validation

NWP

Coverage

Science

Climate awareness

Open source code

Importance/benefit of reference networks

Publications

Aircraft data

Capacity Development / Expert / Consultancy

SOFF (WMO)

Harmonisations

SMART objectives



'GRUAN grant' for student/early career scientists

## GRUAN – THREATS

Complexity / Documentation overload

Funding

Aging / Stagnation / Momentum / Compacency

Commitment / Time Invested

Next generation (experts)

Lack of engagement

Lack of LC support

Competing priorities

Political / Commercialisation

Supply chain

Lack of GDP use (i.e. climate modelling)

Resilience

Isolation



Dilution of quality focus / direction

## ANNEX 3 - LIST OF ACTIVITIES/ACTIONS

This section shows some of the slides that the chairs presented on the final day, showing a list of suggestions for activities and possible publications toward the next ICM.

### Summary of the progress of all Actions

		Completed	Progress (Reasonable/On-going)	Progress (Little/None)
General Actions (GA)	4 (1 HP)	0	4 (1 HP)	0
Lead Center Actions (LC)	7 (3 HP)	1 (1 HP)	5 (2 HP)	1
Co-Chair Actions (CC)	4 (1 HP)	1	3 (1 HP)	0
TT-led Actions (TT)	13 (1 HP)	1 (1 HP)	12	0
Time unbound Actions (OA)	6	2	3	1

Note – Actions were not assessed against the time-lines agreed at ICM-15, just whether there has been any progress between ICM-15 & ICM-16

### Summary of the progress of all Actions

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General Actions (GA)	4 (1 HP)	0	4 (1 HP)	0
Lead Center Actions (LC)	7 (3 HP)	1 (1 HP)	5 (2 HP)	1
Co-Chair Actions (CC)	4 (1 HP)	1	3 (1 HP)	0
TT-led Actions (TT)	13 (1 HP)	1 (1 HP)	12	0
Time unbound Actions (OA)	6	2	3	1

- Only a few actions completed in the past 1.5 years. Many are still in progress.
- In particular, 4 High Priority Actions have not been completed. . . “High Priority” means High Priority!
- We need to change our strategy somehow, so that we are more “efficient” to complete High Priority and other important and influential Actions.

# Proposed new grouping of the Actions

- . . . not grouped by the owners, but by different themes:
  1. GRUAN Operations – Sites
  2. GRUAN Operations
  3. Progression of new GDPs, including new versions
  4. Publications : Technical documents/notes and peer -reviewed papers
  
- This is to facilitate
  - easier monitoring of the Actions status
  - more community-wide collaborations
  - more opportunities for contributions

## 1. GRUAN Operations - Sites

### ICM15-OA4: GRUAN sites

- Description: a) Certification of new sites and re -certification of existing sites during the period to the next ICM
- b) Application of the silent sites policy

### Status @ ICM-16 (Nov 2025)

GRUAN Sites (Website)	Certified	Uncertified	Candidate	Historical	WMO/OSCAR GRUAN Affiliation
35	16	9	8	2	24

2025: 2 new certified sites (Tenerife & Xilin hot); 2 recertified (Beltsville, Ross Island)

2024: 0 new certified sites; 1 recertified

2023: 0 new certified sites; 6 recertified

2022: 1 new certified sites; 2 recertified

2021: 1 new certified sites; 2 recertified

1 site has a certification which is more than 5 years ago.

1 site is going through the silent station process and if no remedial action will be 'removed' in 2026.

## 2. GRUAN Operations

ICM15-LC6: Resolve data reporting for sites unable to use Rslaunchclient

- Description: Work with GRUAN sites making observations but not currently able to submit data for technical/policy reasons, to find solutions; Agree an acceptable technical solution.

ICM15-CC3: GRUAN data dissemination

- Description: Resolve outstanding issues around how to serve data publicly, via one or more hosts, including addressing issues of DOIs and attribution. Include the consideration of exposure of data to a broad range of users, ensuring up -to-date data provision, and minimizing management.

ICM15-TT3: Quality monitoring – Site performance and GCs

- Description: LC, in consultation with sites, to provide automatic diagnostics to sites, in addition to the annual reports, and to come up with a means to alert sites when performance are outside expectations; TT sites to investigate issues identified in present annual reports, and then on a sustained basis resolve issues arising from the new diagnostic tools. Beta version of the tools available for testing by Sites; WG & TT.

ICM15-TT7: GNSS-PW data product serving ( netcdf files)

- Description: Finalise production of netCDF format files including reprocessing of GDP for GRUAN sites. Agree on the netCDF format with LC and then provide the netCDF GDP to the LC

## 2. GRUAN Operations

ICM15-TT10: Satellite co-locations with in-situ and ground-based

- Description: Work with LC to provide searchable database for satellite instrument collocation, based on queries or files including radiosonde metadata to download co -located profiles only. Propose how to apply this for triple co-location (satellite, radiosounding and lidar) in clear-sky conditions for tropospheric humidity. Beta version of this tool is available for testing by WG, TT and experts.

ICM15-TT12: Collocation metadata

- Description: To investigate the capability to set up collocation tools (e.g. VICIRS) and enable queries for the GRUAN station via APIs (Application Programming Interfaces). the VICIRS tool provision, Met Office internal admin part completed, waiting for NWP SAF (Sat. App. Facility) partner confirmations. License issues still under discussion, approved at Met Office and now with NWP SAF partners (June '25).

ICM15-OA5: Sites photographs

- Description: Verification that sites are submitting photos.
- b) Use of aerial/satellite images to corroborate the metadata.

## 3. Progression of new GDPs, including new versions

ICM15-GA1 (HP): M10 GDP Progression

- Description: Resolve reproducibility issue; complete TD ; start certification

ICM15-LC3 (HP): RS92 v3 GDP Progression

- Description: Complete the processing of the RS92 v3 GDP, that includes: Laboratory experiments; Production of the GDP (beta version).

ICM15-CC1 (HP): Frostpoint Hygrometer GDP progression

- Description: Provision of a TD for at least one instrument measuring water vapour in the UTLS; Report on regular meetings with co-chairs; viable plan for progression of all frostpoint technique GDPs to be presented

### 3. Progression of new GDPs, including new versions

#### ICM15-GA2 : Graw GDP Progression

- Description: Continue the progression of the Graw DFM -17 and DFM-09 GDP

#### ICM15-GA3 : GTH3 GDP Progression

- Description: Laboratory characterization, TD, Data flow

#### ICM15-GA4 : Ozonesonde GDP progression

- Description: Continue the progression of the ozonesonde GDP

### 3. Progression of new GDPs, including new versions

#### ICM15-TT6: Uncertainty of the GNSS GDP

- Description: TT GNSS to review the TD for the GNSS GDP and to reassess the uncertainties on the IPW GDP. Based upon this review, to decide if it is necessary to reprocess with updated knowledge to have a version 2 of the GDP.

#### ICM15-TT8: LIDAR GDP progression

- Description: Provide a TD on the Lidar GDP; Complete the setup of the data flow for all the GRUAN sites equipped with a water vapour lidar

#### ICM15-TT9: Microwave Radiometer GDP progression

- Description: Continue with the progression and report on the development of the Microwave Radiometer GDP through ACTRIS. The procedure is to establish a MoU with ACTRIS. Currently ACTRIS is establishing a MoU with E -Profile. This will be the base for a MoU with GRUAN

### 4. Publications : Technical documents/notes and peer -reviewed papers

#### ICM15-LC2 (HP): Standard Humidity Chamber (SHC)

- Description: Paper to justify the use of a SHC in terms of the data quality and the benefits; TN outlining guidance on operating procedures + Information on the hardware to enable open design manufacturing, noting that different SHCs are being used within GRUAN.

#### ICM15-LC4 : Site Metadata

- Description: TN to describe the extension and homogenization of metadata that is required to be collected from the sites based upon insights gained in GDP processing.

#### ICM15-LC5 : Data policy for development versions of GDPs

- Description: Produce a TN describing / formalizing a data policy for consideration and review by sites, and approval by WG -GRUAN. Data policy shall cover specialized data and different development versions of GDPs.

#### ICM15-LC7 : RS92-RS41 comparison paper

- Description: Complete the preparation and submission of RS92 -RS41 comparison paper. Submission to journal.

#### 4. Publications : Technical documents/notes and peer -reviewed papers

##### ICM15-TT2: GDPs profile uncertainty correlations

- Description: Publish a technical note on error covariance matrix for the GRUAN GDPs in support of use in RTM calculations for satellite validation, thereby enhancing the comparison between GDPs and satellite data. This implies elaboration of a smart approach to provide the matrix on a per-profiles to ensure its variability in time and space being properly captured.

##### ICM15-TT4: Ground Check for the autolauncher

- Description: A TN/publication is required to describe the approach for the usage of an independent GC for the autolaunchers or an agreed procedure for improving measurements traceability and uncertainty quantification.

##### ICM15-TT5: Comparison of GNSS and radiosonde GDPs

- Description: TT GNSS to provide a paper on the comparison between radiosonde and GNSS GDPs; To include additional results as discussed at ICM-15 around co-location uncertainty estimation and possible insights around causes of systematic offsets.

##### ICM15-TT11: RS92-RS41 Parallel soundings database augmentation with ancillary data

- Description: Technical Note for sites with guidance.

#### 4. Publications : Technical documents/notes and peer -reviewed papers

##### ICM15-TT13: Establishment of the Scientific Coordination Group

- Description: Provide a white paper describing the mission of the Scientific Coordination Group (SCG) and initial proposal for science topics to address as priorities for the GRUAN data users.

##### ICM15-OA1: Radiosonde fundamental documentation

- Description: Completion of radiosonde fundamental TD

##### ICM15-CC4: QA/QC framework for GDPs

- Description: draft a TN describing a framework for the standardization of QA/QC procedures and nomenclature. Assess on whether current GDPs meet the agreed approach or provide an alternative plan

## Summary

- Proposed new grouping of the Actions
  1. GRUAN Operations – Sites
  2. GRUAN Operations
  3. Progression of new GDPs, including new versions
  4. Publications : Technical documents/notes and peer -reviewed papers
- This is to facilitate more efficient progress of the Actions
- In the following talk, Fabio will discuss (1) possible re -structuring of the GRUAN and (2) possible new research themes
- After the meeting, WG co -chairs will approach those who are in charge for each action
- We finalize the Actions list at the WG telecon in January

**GCOS Secretariat**  
**Global Climate Observing System**  
**c/o World Meteorological Organization**  
**7 bis, Avenue de la Paix**  
**P.O. Box No. 2300**  
**CH-1211 Geneva 2, Switzerland**  
**Tel: +41 22 730 8067**  
**Fax: +41 22 730 8181**  
**Email: [gcos@wmo.int](mailto:gcos@wmo.int)**