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Task Team Progress Report for November 2022 – Ground-Based

(Submitted by Domenico Cimini and Thierry Leblanc)

Summary and Purpose of this Document

Progress report from the task team on Ground-Based Remote Sensing Measurements.

Introduction

The GRUAN Task Team on Ground-Based Remote Sensing Measurements (TT-GB) oversees the integration and production of ground-based measurements from lidar, microwave, and infrared remote sensing techniques, in compliance with GRUAN best measurement practices.

The TT-GB was initiated in 2020 from the former Task Team on Ancillary Measurements (TT-AM), which was split into two separate Task Teams: TT-GB and the Task Team on Satellite-Based Remote Sensing Measurements (TT-SAT). The Term of Reference (ToR) for TT-GB were then reviewed as listed below (available online at: <https://www.gruan.org/network/task-teams/tt-ground-based>).

Summary of Activity Progress and Perspectives

As of Fall 2022, the standardized lidar data processor GLASS has been producing test water vapor retrievals for the prospective GRUAN lidars at the sites of Ny Aalesund, Payerne and Cabauw. Pending a fully-automated raw data transfer between the sites and the GRUAN Lead Center, a more systematic processing of the data is anticipated. A peer-reviewed manuscript describing GLASS is near completion, and a draft version of Best Measurement Practice Guide for GRUAN Lidars is already available.

Regarding microwave radiometer (MWR) instruments, TT-GB has continued to interface with other expert teams and networks. In particular, the development of the MWR GRUAN Data Product (GDP) will build on the activities towards the implementation of ACTRIS (EU long-term research infrastructure dedicated to atmospheric monitoring) and E-PROFILE (atmospheric profiling programme of EUMETNET). Both ACTRIS and E-PROFILE networks include MWR instruments, and all GRUAN sites in EU belong to either or both ACTRIS and E-PROFILE.

The MWR uncertainty characterization is being performed in the framework of the ACTRIS MWR quality assessment (2021-2023) at the ACTRIS Centre for Cloud Remote Sensing (Jülich, Germany, contact: Bernhard Pospichal, University of Cologne).

The MWR networking, including development of data format and metadata and the design of a system for the routine data collection and display from multiple platforms, is carried on in the E-PROFILE 2nd phase (2021-2023, contact: Rolf Rüfenacht, Meteoswiss).

During the WMO 2022 Upper-Air Instrument Intercomparison Campaign (UAI-2022) held at the GRUAN Lead Center from 8 August to 17 September 2022, two MWR of different types (HATPRO and MP3000) were operated. The data set will be analyzed at DWD to evaluate the MWR data products against the products from operational and dedicated radiosondes (4 per day).

The development of the MWR GDP will benefit from the outcome of the above activities in terms of expertise, best practices, and data life cycle. The update of the MWR GDP technical document (TD) is postponed to when the MWR GDP will be more established.

There is currently no activity to report for the infrared instruments (FTIR and AERI). Coordinated efforts will be undergone in 2021, following guidance provided by the TT-GB IR experts.

TT-GB Terms of Reference

- Interface with other expert teams and networks (e.g., NDACC, ARM, ACTRIS)
- Develop guidance on the type and number of data and associated metadata needed to be stored from the instruments, as needed
- Evaluate the data products (uncertainty budget etc.) and bring in missing knowledge
- Inventory instruments worldwide for potential inclusion in GRUAN
- Draw conclusions on the suitability of the deployed equipment and advise accordingly the GRUAN Task Team on Sites
- Establish campaign rationales for the validation of data from multiple platforms
- Establish a system for the routine collection and display of data from multiple platforms
- Report to WG-GRUAN on all above duties

Members

Member	Institution	Country	Expertise	Site
Co-chairs				
Thierry Leblanc	JPL-Caltech	USA	Lidar	–
Domenico Cimini	CNR-IMAA	Italy	MWR	Potenza
Regular members				
Arnoud Apituley	KNMI	Netherlands	Lidar	Cabauw
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Jonathan Gero	Univ. Wisconsin	USA	AERI	ARM SGP
Jim Hannigan	NCAR	USA	FTIR	Boulder
Christine Knist	DWD	Germany	MWR	Lindenberg
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Christoph Ritter	AWI	Germany	Lidar, MWR	Ny-Ålesund
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