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Coordination Meeting (ICM-7)**
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Session 2

**GRUAN Scientific Coordination – Summary of Progress,
Feb 2015**

(Submitted by Tom Gardiner and Richard Querel)

Summary and Purpose of Document

Progress report from the GRUAN Scientific Coordination.

GRUAN Scientific Coordination – Summary of Progress, Feb 2015

Prepared by Tom Gardiner and Richard Querel.

Background

It was decided at ICM-6 to instigate the role of Scientific Coordinator (SC) to provide a focal point for cross-network scientific research following the end of the GATNDOR activity. In July 2014 Tom Gardiner (NPL, UK) and Richard Querel (NIWA, NZ) were jointly appointed to the role. This report summarises the initial work carried out in this new activity. The main focus has been a series of one-to-one discussions with network members to gather individual views on GRUAN and the priorities for scientific coordination. These discussions will continue, but on the basis of the initial feedback (summarised below) we have reviewed the scope for the SC activities, and identified a number of scientific areas where cross-network collaboration would be widely beneficial.

The SC objectives for 2015 and beyond will reflect the conclusions from this initial work. These objectives will be put together following feedback from the GRUAN community at ICM-7.

Scope for GRUAN Science Coordinator Activities

The original scope focussed on identifying and coordinating ‘research projects and outcomes required to support GRUAN objectives. These projects should be short term (1-6 months) and highly focussed, with clearly stated objectives, methods, data use/requirements, tasks, and deliverables.’

Although this remains a high priority for the SCs, it has become clear during the initial phases of SC work that such short-term projects will not address or be relevant to a number of GRUAN science issues where a coordinated scientific activity across the network would be useful. We therefore propose to extend the scope for SC activities to include the following:

- Identify common areas of scientific activity across the network, and look to facilitate cooperation and knowledge exchange between the groups involved.
- Define research topics appropriate for longer term study that could form the basis of future research proposals and identify the potential stakeholders/collaborators for such research.
- Build up a database of relevant publications that may be of interest to the GRUAN network.

Summary of Individual Discussions

Participants (to date):

William Bell	UK Met Office
Belay Demoz	U. Beltsville
John Dykema	U. Harvard
Dale Hurst	NOAA/Boulder
Marion Maturilli	AWI
Anna Mikalsen	WMO
Kalev Rannat	Tallinn University of Technology
Dian Seidel	NOAA
Doug Sisterton	ARM
David Tan	ECMWF
June Wang	University at Albany-SUNY
Dave Whiteman	NASA

General comments:

- GRUAN is exciting and frustrating - it seems to lose momentum unless exciting things happen.
- Exchanges at meetings are science driven, so it's healthy to be involved in that.
- GRUAN should better market itself. If people don't know about it or its practical uses it is wasted, so communicating results outside of the community is important.
- External organisations are adding value to GRUAN; the relationship is not reciprocal yet.
- It's not clear yet what is going to happen with the data, what is the use of being in GRUAN? There need to be clear case studies that show the value of the data: Sensitivity study? How to use the data as a reference?
- It's a voluntary network, so it's hard to force things.
- Sites are worried about conforming to "GRUAN standards", and it can be difficult for GRUAN to dictate new protocols given existing site constraints.
- Need to bring up questions that combine data from different stations, and facilitating data sharing is key to this. U.S. and Europe are negotiating data sharing, etc. Could GRUAN be the intermediary?
- Measurement uncertainties is the cornerstone to all of this work. GRUAN can be the independent party that governs the uncertainties in shared data products

Funding

- Most sites currently have no specific resources dedicated to GRUAN
- GRUAN is missing advocators, it needs people to drum up support and funding
- How can we provide ideas or a template for how sites could ask for funding?
- How to work together to look at opportunity funding?
- How we can work with program managers and agencies to find funding for small projects?

Research projects

- Break larger tasks into readily achievable student projects.
- Identify small research projects.
- Have a large list of these student projects available.

Radiosondes

- What is the impact of discontinuing RS-92 use?
- Need a roadmap provided by the Lead Centre on how to proceed with the changeover.
- Need to understand GRUAN data qualification process to bring new sondes on stream.
- Need to push GRUAN to cover a range of regular sondes other than RS-92.

Data processing and Uncertainties

- We are selling GRUAN on uncertainty analysis, but that's still undemonstrated.
- What is the added value of GRUAN analysis of raw data?
- What are GRUAN QA steps before data release?
- What details are known about corrections and uncertainty calculations in GRUAN data?
- Need GRUAN sites demonstrating the value of data with/without GRUAN analysis.
- How do we standardize uncertainty reporting for various instruments?

NWP and Satellite validation

- Satellite validation is emphasized but is it used?
- Can GRUAN data give NWP SI traceability?
- How useful is GRUAN uncertainty data to NWP?
- Need to project GRUAN data into radiance space for NWP and satellite intercomparison.
- What are the uncertainties related to radiative transfer models?
- If GRUAN data provides QA for NWP runs then the raw data from GRUAN sites should not be included in NWP assimilation (may be resistance to this).

Links to wider community

- GRUAN should raise the quality of GUAN measurements.
- GRUAN has operational met sites and institutional sites.
- Need bidirectional communication between GRUAN sites and "regular" operational sites.
- Stimulate national met services.

Topics of Collaborative Effort

OSSE

- Observing System Simulation Experiment (OSSE) opportunity through NOAA.
- Needs experienced scientist and significant time, so not suitable for short term or PhD. Potential for international secondment.
- Main objective would be on GRUAN network design – where would new GRUAN stations add most value.
- We are not experts in this area, but discussions have shown that :
 - Setting up the OSSE is the main challenge.
 - To do this need to be very clear what goal of OSSE is and therefore which of the GRUAN objectives are being addressed.
 - OSSEs are not generally appropriate for looking at process studies, satellite validation or NWP QA activities. So that leaves climate trend detection which may be more viable, but again will need to be very clear what the specific objective is (which ECVs, which regions, which altitudes, etc.)?
 - Also have a slight issue that this is fundamentally a negative exercise (showing what GRUAN is missing) rather than a positive one on what the network can do.

SASBE

- The Site Atmospheric State Best Estimate (SASBE) activities seem like a good opportunity to demonstrate the benefits GRUAN can bring (see final point above).
- It provides an opportunity for each site to get involved (at the level they want) to develop the appropriate tools for their site. The Lauder PhD activity provides a good example of this.
- Linking the SASBE work to the co-location and measurement redundancy uncertainty work (e.g. by Alessandro and Fabio) would provide the tools to enable a rigorous assessment of the uncertainty of the atmospheric state as determined by GRUAN data, and how this can be compared to other measurements / models.
- Various aspects might be suitable for future research such as the vertical correlation of uncertainties from different measurement techniques (and how to combine and report them), and the uncertainty introduced by radiative transfer models when converting between parameter space and radiance space.

Sonde Qualification

- A number of groups have raised the issue of GRUAN qualification for non-RS92 sondes.
- This clearly links directly to the work of the radiosonde task team and various groups will be taking about this at the ICM.
- However, our perception (given the feedback during discussions) is there may still be a role for the SCs to help coordinate these efforts and we should review this following the ICM.

Data Timescales

- An issue that came up in discussion with both ECMWF and UKMO (as potential users of GRUAN data) was the timeline for data availability, and how this links to the timescales for operational inclusion into forecast models.

- One potential study would be to look at the timescales for the various data streams and the added value (in terms of data quality and traceability) as a function of time/analysis steps.
- In addition to assessing how current data streams could be used in NWP, this would provide useful guidance on the development of new data streams (and upgrades to existing ones).