

Task Team on Radiosondes

A Task Team of AOPC Working Group on GCOS Reference Upper Air Network (WG-GRUAN)

Terms of reference

12 June 2014

Background

The GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC) Working Group on GCOS Reference Upper Air Network (WG-GRUAN) was established in 2006 in recognition of the importance of initiating reference-quality observations of atmospheric column properties, in particular temperature and water vapour, from the surface into the stratosphere to enhance the monitoring and understanding of climate variability and change. At the second GRUAN Implementation and Coordination Meeting (ICM) held in Payerne, Switzerland in March 2010 the Working Group, Lead Centre and initial sites agreed to the instigation of a number of task teams.

The Task Team on Radiosondes exists to provide guidelines for GRUAN on how to obtain the best possible reference quality data from radiosoundings. According to the reference specifications (Immler et al., 2010) that have been approved during the ICM-2 meeting in Payerne, "reference quality" means that a data product:

- is traceable to an accepted standard (generally to the SI unit)
- provides a comprehensive uncertainty analysis.
- is properly documented (e.g. in peer-reviewed publications) and validated (e.g. through intercomparisons).

In this context the Task Team supports efforts from manufacturers, scientists (at sites) and the GRUAN Lead Centre to take the steps that are necessary to obtain reference quality in radiosoundings, i.e. to choose suitable sensors, to define correction algorithms and QA/QC procedures, to identify and quantify sources of uncertainty, to define data formats for submission, and to provide proper documentation of this entire chain including technical documents and peer-reviewed publications.

It should be noted that a "radiosonde" has several components such as a temperature sensor, a humidity/water vapor sensor, a pressure (or GPS altitude) sensor, a balloon-parachute-unwinder part, etc. The task team will need to discuss issues related to each of these components and, if necessary, will try to bring in additional expertise by appointing ad-hoc, "associate" members. We will also gather the information on existing sensors for the GRUAN priority 2, 3 and 4 variables (see GCOS, 2013) and recommend specific actions. An important issue to consider is the long-term stability of radiosonde observations in order to ensure that GRUAN data series are useful for monitoring climate change. While it is desirable that the best possible equipment is used at GRUAN sites at any time, it is also important to assess and limit the damage that instrumental change can cause to climate data series due to improperly corrected or undiscovered systematic offsets or biases.

The Task Team needs to make recommendations in terms of procedures, launch schedules and algorithms that meet the specifications required to achieve the goals of GRUAN in co-operation with other task teams and groups of researchers such as the GRUAN scientific coordinator and the GRUAN Analysis Team for Network Design and Operations Research (GATNDOR).

Reference:

GCOS (Global Climate Observing System), The GCOS Upper-Air Reference Network (GRUAN) GUIDE, GCOS-171, WIGOS Technical Report, No. 2013-03, 2013.

Immler, F.J., J. Dykema, T. Gardiner, D. N. Whiteman, P. W. Thorne, and H. Vömel, Reference Quality Upper-Air Measurements: guidance for developing GRUAN data products *Atmos. Meas. Tech.*, 3, 1217-1231, 2010.

Duties

Under the auspices of the Working Group on GRUAN the Task Team was established to:

- Evaluate radiosonde data products on the basis of the GRUAN reference specifications and the GRUAN measurement specifications
 - Survey radiosondes and sensors (in particular considering their performance in intercomparisons).
 - Review the uncertainty analyses and correction algorithms.
 - Recommend radiosonde launch procedures and metadata to be collected.
- Make recommendations on the suitability of radiosondes, specific sensors, procedures, and algorithms for the network.
- Promote scientific efforts for assessing and improving radiosonde performance.
- Recommend measures for ensuring long-term stability of radiosonde records.
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Reporting and governance

- The task team is managed by two co-chairs both of whom are members of WG-GRUAN. They should use as primary points of contact the co-chairs of WG-GRUAN and the Head of Lead Centre.
- The task team co-chairs shall report on a six-monthly basis in February and August to the WG-GRUAN via a brief written progress report which will also be posted as part of official documentation relating to GRUAN. These reports will be discussed on a telephone conference between WG-GRUAN the Lead Centre and all task teams with representation from at least one co-chair from this task team.
- At least one task team co-chair, and potentially additional task team members, shall attend as deemed appropriate and affordable the annual ICMs to report in person on progress.
- The task team is expected to respond to all reasonable formal requests for advice from the WG-GRUAN, Lead Centre, other task teams or sites made on an ad-hoc basis in a timely manner.
- Reports to the WG-GRUAN or any kind of recommendation or publication issued by the task team need to be approved by at least the co-chairs and all core members (see the column "status" in the member table below).

Operation

- Means of communication are e-mail, GRUAN blog and wiki, and telephone-conference. The telephone-conferences will be organized by the co-chairs at least twice a year. To undertake in person meetings, the task team should take advantage of other meetings where a sufficient number of members is in attendance.
- Task team chairs will seek funding for dedicated meetings if deemed appropriate.
- The task team will exist until such time as its duties are deemed to have been completed by the WG-GRUAN.
- Task team terms of reference and membership will be revised periodically, coincident with revisions to the WG-GRUAN ToR or if requested by either party, by the task team members in consultation with WG-GRUAN.

Annex

Membership roster valid 12.6.2014

| Members: | Affiliation | e-mail | Status |
|-------------------|--|--|------------------------------|
| Masatomo Fujiwara | Faculty of Environmental Earth Science, Hokkaido University, Japan | fuji@ees.hokudai.ac.jp | co-chair, member of WG-GRUAN |
| Rolf Phillipona | MeteoSuisse, Payerne Observatory, Switzerland | rolf.philipona@meteoswiss.ch | co-chair, member of WG-GRUAN |
| Frank Schmidlin | USA | francis.j.schmidlin@nasa.gov | Core |
| Alexander Kats | Central Aerological Observatory/KOMET, Russia | alexander.kats@cao-rhms.ru | Core |
| Ruud Dirksen | GRUAN Lead Centre, DWD, Germany | Ruud.Dirksen@dwd.de | Core |
| Rigel Kivi | Finnish Meteorological Institute, Finland | Rigel.kivi@fmi.fi | core |
| Nobuhiko Kizu | Japan Meteorological Agency, Japan | kizu@met.kishou.go.jp | core |
| LI Wei | China Meteorological Administration, China | LW1024@263.net | core |
| Yang RongKang | China Meteorological Administration, China | ryang0809@gmail.com | core |
| Martial Haeffelin | IPSL/LMD - Ecole Polytechnique Palaiseau, France | martial.haeffelin@lmd.polytechnique.fr | core |
| Hannu Jauhiainen | The Association of Hydro-Meteorological Equipment Industry (HMEI), also at Vaisala, Finland | Hannu.Jauhiainen@vaisala.com | associate |
| Michael Hicks | National Weather Service, USA | Micheal.M.Hicks@noaa.gov | core |
| Larry Miloshevich | MILO-Scientific, USA | larry@milo-scientific.com | associate |

Note:

The core members and the co-chairs are responsible for administering the task team and for approving reports to the WG-GRUAN and recommendations or publications issued by the task team. Alternate members are designated in some instances to represent a core member who is temporarily absent (note that currently there is no alternate member). Associate members provide additional expertise to the task team and participate in discussions, but their consent is not necessary for the issuing of reports and recommendations.