GRUAN manual draft: Lead center view

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Key ideas

- **GRUAN has to earn its staR**
- **Convince the science community that GRUAN is different**
- **Start small but start**
- **Focus on main priorities: long term climate records in upper troposphere and lower stratosphere**
- **Define right starting point, allow growth, set proper direction**

Site selection criteria

- **Capability in upper troposphere, lower stratosphere**
- **Capabilities for temperature, water vapor, and pressure**
- **Capabilities for traceable measurements**
- **Capabilities for change management**

In situ sounding

Observed parameters:

- **Temperature**
- **Water vapor troposphere**
- **Ozone**
- **Water vapor UTLS (in combination with ozone)**
- **Water vapor stratosphere (in combination with ozone)**
- **Redundant pressure and GPS in every sounding**

……. Input from group for others?

In situ sounding

Independent ground check:

- **Reference temperature**
- **100% humidity (polymer based sensor)**
- **Check for frostpoint (to be worked out)**
- **Reference pressure at launch**
- **Redundant pressure and GPS in every sounding**

……. Input from group for others?

In situ sounding

Uncertainty analysis:

- **Describe, quantify and make public**
  - **Sources of uncertainty**
  - **Corrections**
  - **Algorithms**
- **Provide raw data (pressure, temperature, water vapor, ….)**
- **Provide uncertainty profile**
- **Test uncertainty profile in regular comparisons**

Input from group for others?

In situ sounding

Humidity measurements:

Report data in mixing ratio, not RH(liquid)!

Reason: is conflicting vapor pressure equations for liquid water

Make sure you understand your manufacturers vapor pressure equation!

In situ sounding

Preference on ascent data

Descent data only as confirmation

In situ sounding

Meta data:

- **Sonde number, Manufacturer, model**
- **Launch date, time (UT), Location Lat,Lon**
- **Calibration information**
- **Vendors ground check**
- **Independent ground check**
- **Surface PTU, wind**

- **Balloon size**
- **Balloon nozzle lift**
- **Unwinder length**
- **Fillgas**

- **……. Input from group for others?**

Remote sensing

Follow other networks procedures

GPS column water vapor
(need to determine which processing is best to be used as reference)

Microwave column water
(need to determine which processing is best to be used as reference)

Lidar
(need to determine which calibration procedure is best to be used as reference)

etc.

But add uncertainties if not already done

Remote sensing

Use remote sensing for cross validation and test of uncertainty

GPS column water vapor
- **Use to cross check every sounding**

Microwave column water
- **Use to evaluate lower tropospheric profile (nighttime & daytime)**

Lidar
- **Use to evaluate tropospheric profile**

etc.

But add uncertainties if not already done

GRUAN working groups

Establish recommendations

Evaluate procedures

Recommend additions / deletions to / from GRUAN

Manual

Please provide suggestions:

Manual will contain requirements and recommendations