# Consistency between GRUAN/IASI and the 3G Collocation Uncertainty Determination project

## Xavier Calbet - EUMETSAT

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1. Consistency of GRUAN vs IASI

2. 3G (GRUAN, GSICS, GNSSRO) Collocation Uncertainty Determination project

3. Questions

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# Why consistency of GRUAN vs IASI?

1. **Climate** purposes:

   a) GRUAN is the GCOS **Reference** Upper-Air Network

   b) IASI is the **Reference** for GSICS (Global Space-based Inter-calibration System)

2. **Validation** of IASI: pre-requisite for adequate validation (Calbet, ITSC18, 2012)
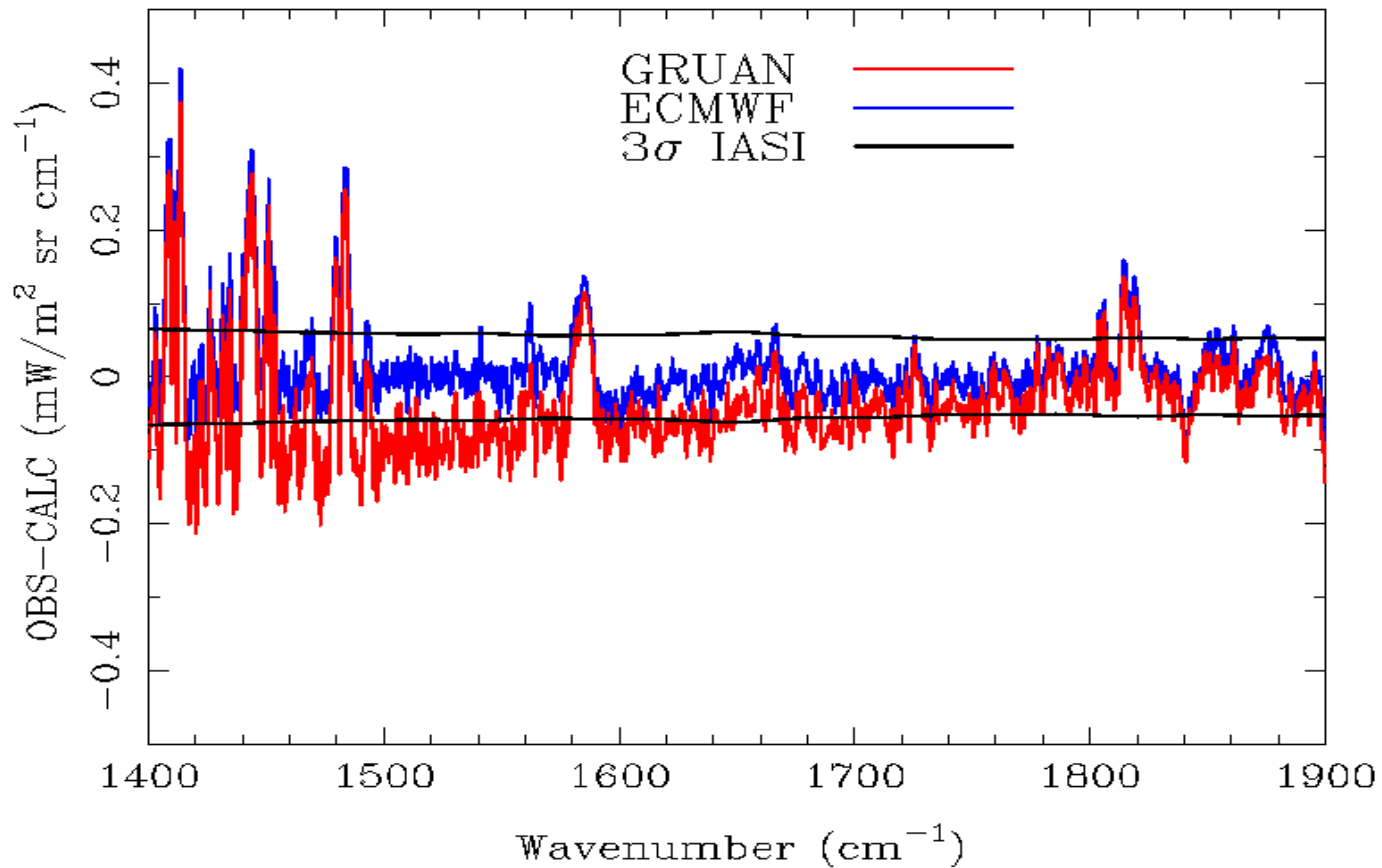
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# Consistency check: outline

1. Observed IASI radiances (OBS) are compared to

2. Calculated radiances (CALC) using GRUAN Sonde profile + Radiative Transfer Model (LBLRTM 12.2)

3. OBS-CALC should fall within $\pm 3\sigma$ IASI instrument noise

# Consistency check: results

26
Cases



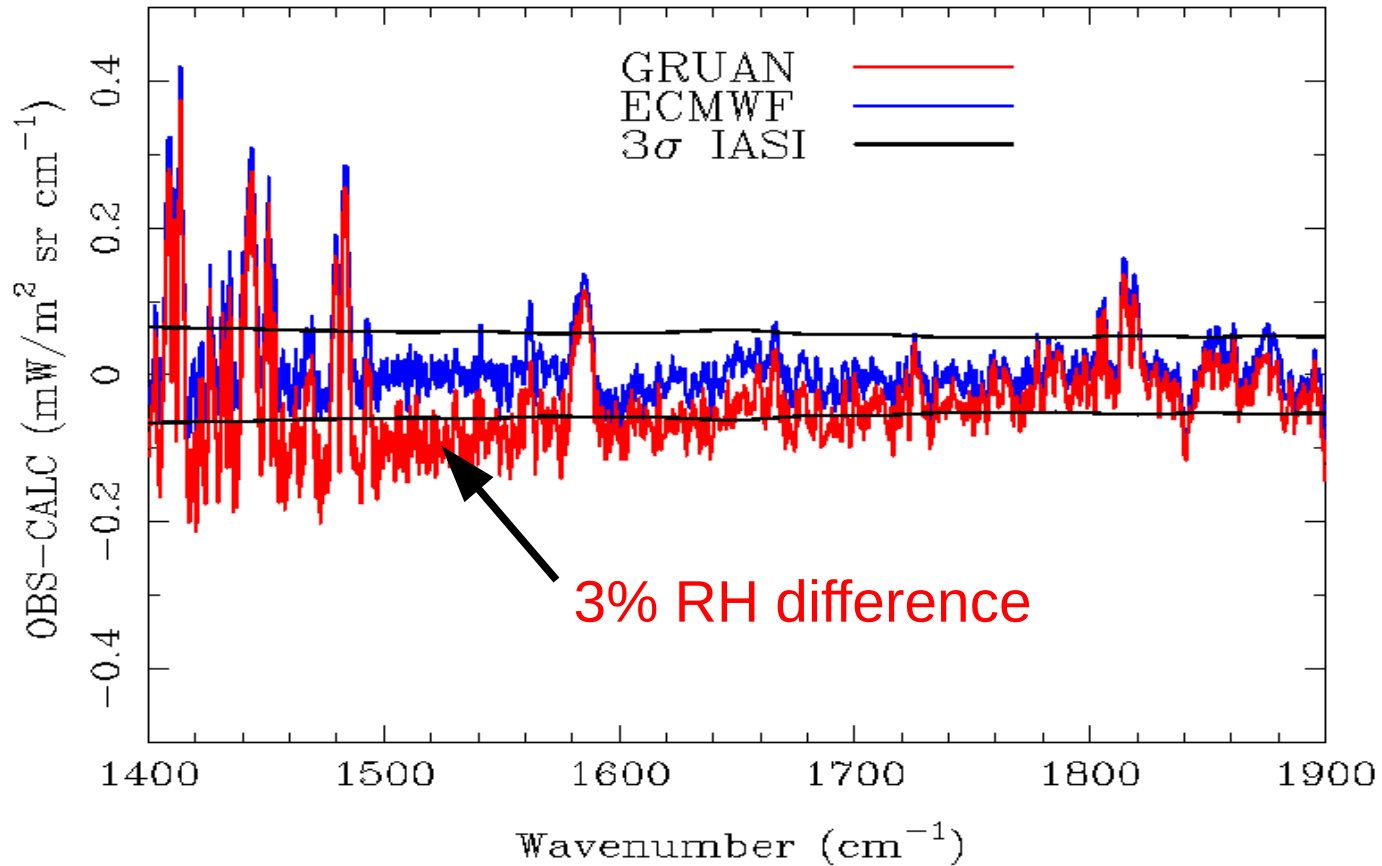OBS−CALC Bias. GRUAN + Sonntag Sat. Vap. Press.

# Consistency check: results

26 Cases



OBS−CALC Bias. GRUAN + Sonntag Sat. Vap. Press.

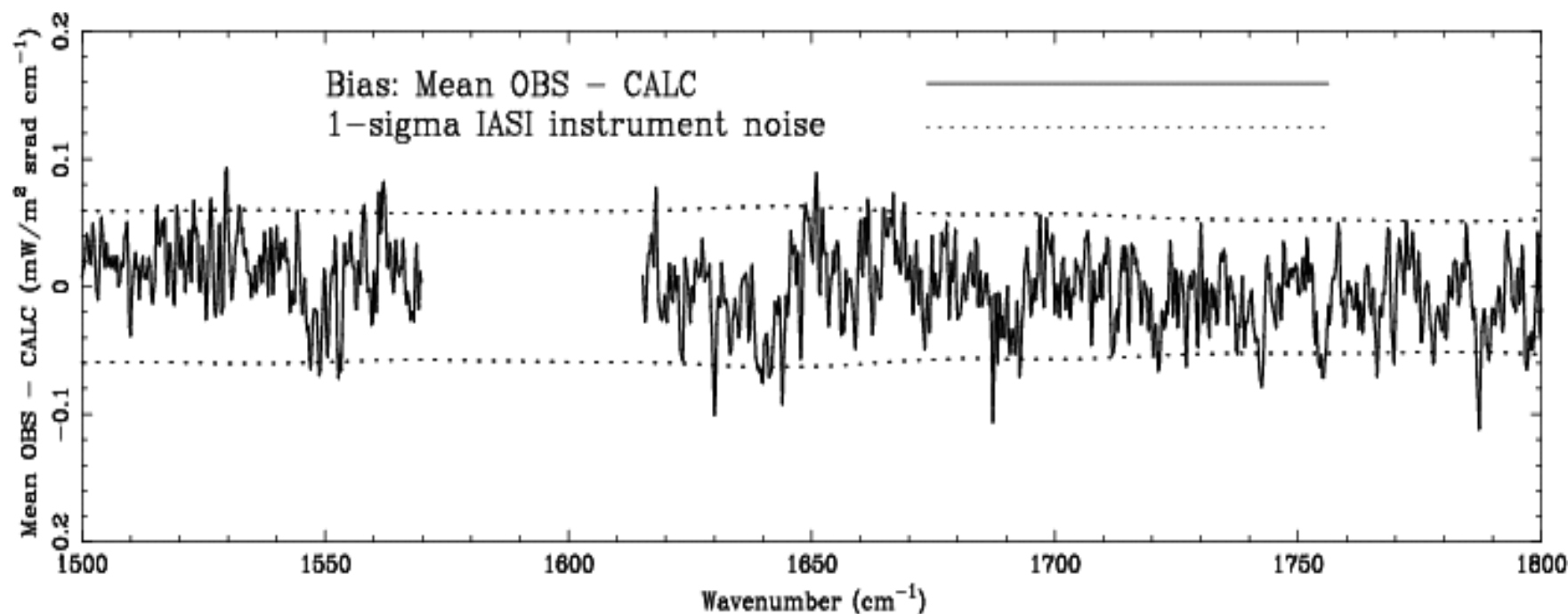Legend: GRUAN (red), ECMWF (blue), $3\sigma$ IASI (black)

3% RH difference

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# Consistency check: can it be done differently?

Apparently yes! With CFH and collocated Sonde pairs

Calbet et al. AMT 2011



Only 4 Cases! Will be extended in the near future

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# 3G Collocation Uncertainty Determination

1. 3G = GRUAN-GSICS-GNSSRO WIGOS Workshop, May 2014

2. Action: Determine Collocation Uncertainty methodology for GRUAN vs IR Hyperspectral vs GNSSRO on an individual basis

# Collocation Uncertainty Determination project: Phases

- Collocation of a limited sample to estimate the time and space window for collocation of all 3G to obtain 2-3 examples per site

- Exact determination of time/space collocation window

- <span style="color:red">Collection of datasets (GRUAN, IASI, CriS, AIRS, COSMIC, GRAS, ECMWF)</span>

- Collocation uncertainty determination using available data

- First results should be available mid 2015: description of algorithms

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# Collocation Uncertainty Determination: small dataset

- 3 cases of triple collocation <span style="color:red">GRUAN, IASI and GRAS</span>

- 2 cases of triple collocation <span style="color:red">GRUAN, IASI and COSMIC</span>

- A few more cases to be added soon

- Need to add ECMWF data

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# Collocation Uncertainty Determination: dataset format

- **Collocation event files**: short ASCII files describing the collocation information (time, space, original data files, etc.) but without instrument data

- **Collocation data files**: Original instrument format (as much as possible) and information. In HDF5 or NetCDF

# Collocation Uncertainty Determination: data location

- Data location →
  ftp://ftp.eumetsat.int/pub/EUM/out/RSP/calbet/CollocationUncertaintyDetermination20150220.tgz

- Comments welcome!!!

- Nikita Pougatchev: Paper in preparation on "**Optimization of RAOB Launch Timing for Satellite Sounders Validation**". Practical technique for estimation of the optimal RAOB launch timing for satellite sounders validation

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# Questions

1. It is interesting to store the collocation data somewhere. Is the GRUAN website the most appropriate?

   a) 3G Collocation Uncertainty Determination database is about 1Gb

   b) GRUAN Manus/IASI collocation database is about 700Gb

2. Plans to "GRUAN process" other datasets? Shadoz?

   ftp://ftp.eumetsat.int/pub/EUM/out/RSP/calbet/CollocationUncertaintyDetermination20150220.tgz

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