Where do we stand on GSICS MW products?

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MW Subgroup Meeting

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Outline

- Introduction
- GSICS Goals
- GRWG Vision
- Larry's presentation to EP-16 , 'what could be GSICS Products'
- User Requirements
- EP-16 Clarification on FCDR
- Conclusions

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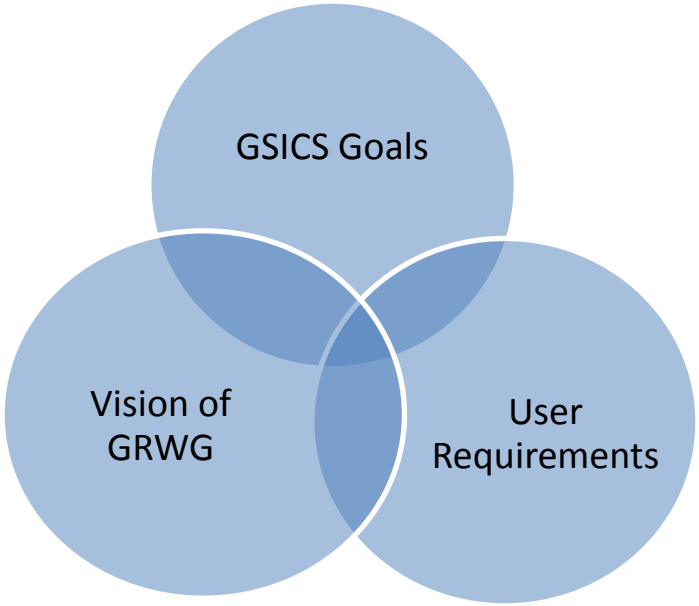
IntroductionTi

Do we currently have MW cross calibration products ? NO

- The MW subgroup is a group that was re-formed in 2013.
- The GPM-X and the CEOS-WGCV are closely linked with GSICS MW subgroup activities.
- Currently the subgroup has no products but discussions to identify products and deliverables are underway.



Factors help in identification of MW products

GSICS – Goals

- Level 1 adjustments and corrections (Resulted in Classical products)
  - Methods (e.g., SNO or double difference)
  - Transfer, stability,
  - Spectral region idiosyncrasies
- Satellite and Instrument Data Bases
  - OSCAR (SRF -> product, etc.)
  - Geolocation and FOVs
  - Anomalies and period of coverage
- FCDRs and ECVs
  - Users for reanalysis versus real time
  - Components, homogenization approach (algorithms?)
  - MW FCDR to GSICS Product example for discussion
- References
  - Solar
  - Lunar (ROLO and GIRO)
  - DCC (radiance levels, frequencies?)
  - Targets (Surfaces emissions and reflectivities?)
- Tools (SNO identifier, Display Graphics, Communication, Notification …)
- Documents (Journal articles, ATBDs, Users' manuals)
- RTMs (Error analysis and comparisons studies)
- Stability versus Traceability

Larry, EP -16

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GRWG Vision (Tim Hewison)

In terms of developing GSICS Products for Microwave instruments, the considerations should be :

1. What are the user's requirements for inter-calibration products?
2. What can we do to meet these?
3. Can we make products that fit within existing GSICS Conventions and systems?

GPM X-Cal Meeting

GSICS was again represented at a recent meeting of the GPM X-cal Working Group by Tim Hewison, who provided an update on the GSICS Procedure for Product Acceptance and access to products through the GSICS Data and Products Servers. This group has made excellent progress in establishing inter-calibration methods for the TRMM Microwave Imager, TMI, and WindSat and plan to extend these methodologies to include other conically scanning microwave imagers, as well as the window channels of cross-track sounders. They are also investigating other methods, such as NWP double-differencing, for the sounding channels. More details of the meeting can be found at http://www.gpm-x-cal.info/. Future interaction between GPM X-cal and GSICS were discussed, identifying a need for addition support to adapt this group's valuable work into GSICS-compliant products. It is intended that this will be performed as part of a GSICS subgroup of microwave experts.

Cheng-Zhi Zou leading the interaction with WGCV

MWSG Chair to have a communication with GSICS on how WGCV can offer support on best practices.

WGCV Secretariat to send out the list of potential GSICS-WGCV Cooperation items outlined by GSICS to each subgroup chair

WGCV (Completed) Subgroup Chairs to identify and prioritize specific activity areas for interaction with GSICS.

MW subgroup has close links with GPM-X and CEOS-WGCV

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What could be GSICS MW Products

- **MW products differ from those from VIS or IR because there are not potential SI standards to consider**
- **MW products can come in two classes:**
  - **Retrospective type products (FCDR "components" – geolocation, scan biases, intersatellite corrections, etc.)**
  - **Forward looking (quasi-real time)**
- **A possible path forward:**
  - **Determine from users what specific MW products they would like to see from GSICS**
  - **Define a MW primary reference**
    - WindSat or GMI for MW imagers?
    - ATMS for MW sounders?
    - A radiative transfer model like RTTOVS or CRTM?
  - **Work with GDWG to define:**
    - Data formats
    - Meta-data standards
    - Distribution mechanism
  - **Work with the GCC to see how the products could be reviewed through the GPPA**
- **Two potential products?**
  - **AMSU-MSU (C-Z. Zou)**
  - **SSM/I (K. Fennig)**

User Requirements: New Developments

Climate and Weather communities have placed a need to better calibrate in-orbit instruments and ensure high levels of precision and stability of the instrument.

New techniques of In-Orbit Calibration have given opportunity to better calibrate instrument

Cross calibration of range of instruments in IR, VIS, UV and MW wave lengths with concurrently flying instruments, In-situ targets (DCC, Deserts) , Solar and Lunar targets, ray matching has given more opportunity to quantify and correct in-orbit biases.

Need of better accuracy and stability

Thresholds of climate accurate L1 measurements have increased to accuracy better than .1 K and stability better than 0.05K/decade .

Requirements of the calibration community are growing

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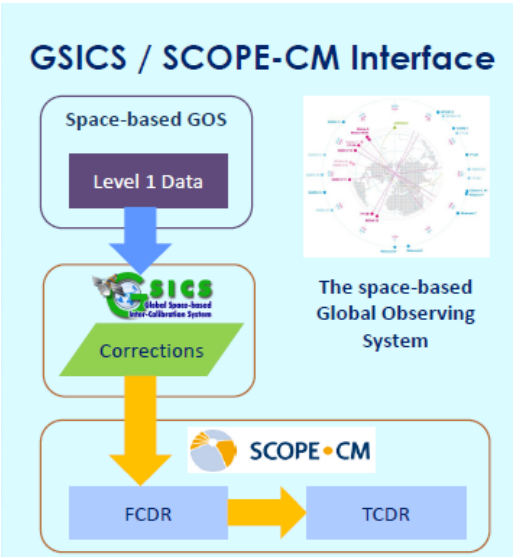
Users of In-Orbit Cross Calibration monitoring

- **The producers of cross calibration data are the first users of the cross calibration monitoring.**
- **The rest of the users are scattered in the community and mainly are the ones who need L1 radiances for applications that are sensitive to L1 radiance anomalies. Some examples are**
  - SST Retrieval
  - Cloud Height Retrieval
  - SRF Retrieval
  - Monsoon Studies (ITCZ Movement)
  - Climate Studies (FCDR, TCDR)…



User Requirements depends on the purpose for which the L1 corrections are applied

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User Requirements

Basic User Requirements

- A clear path towards benefiting from using the product.
- Mature ATBD
- Product Related Docs and Publications (Perhaps WMO, WIGOS accepted)
- User Manual (information on Uncertainties and basic i/o) Easy to understand with examples.
- Uncorrected/Corrected Radiances.
- Support from producer.

Producers of MW FCDR have indicated that just the calibration coeff stated in the FCDR are of no use to them.

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EP-16 report (Jerome Lafeuille Aug 2015)

The Panel underlined that it is good to take into account the expectations of different user groups but it would be very confusing if GSICS delivered different calibration information for the same instrument." (I had misplaced this sentence at the end !)

The Panel also noted that GRWG had taken an action to review the requirements and define the specifications of a GSICS inter-calibration product supporting the generation of FCDRs. **At the moment there is an internal understanding that GSICS could deliver or endorse algorithms used to generate FCDR series, but this should be formalized.**

The GCC recalled that the AMSU/MSU FCDR ATBD from Cheng-Zhi underwent stringent review and had been recommended by reviewers, as reported at EP-15. It uses inter-comparison algorithms (as documented in the ATBD) which are similar to GSICS baseline SNO algorithms; in addition, it includes corrected radiances. This discussion was continued under item 7.

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- **Action 16.06:** (From EP-16, stated in the report)

(a) GCC to finalize the high-level categorization of GSICS holdings and deliverables, ensuring that actual or planned products can be mapped to these categories, indicating a target audience, delivery or access mode;

(b) GCC to propose appropriate review/acceptance mechanisms for each category of GSICS products (with a distinction between acceptance of the algorithms, and acceptance of the production of calibration coefficients or calibrated radiances).

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- *The Panel agreed that the diversity of GSICS outputs was not limited to the "GSICS corrections" and that the review/acceptance mechanism should be adapted to the type of deliverable*." Table 1 in the draft report includes a row about "Calibration methodologies" which addresses "*ATBD for NRT correction or ....re-calibration*". **This is where an FCDR "product" could eventually fit in.** The ball is on your (i.e **GCC**) side since the action is on GCC (Action 16.06) to finalize this table and to propose the appropriate acceptance procedures.

Summary

- **Ability to monitor in-orbit instruments**
  - **Algorithms used to inter compare instruments (and perhaps produce FCDR).**
  - **MW subgroup need to identify stable references (or reference radiances) that can act as in-orbit references.**
- **Proposed cross calibration standards could be a deliverable.**
- **GCC to provide a mechanism by which GSICS stamps of approval could be given to algorithms and data.**
- **Closely interact with WGCV and GPM-X to understand their cross calibration requirements.**

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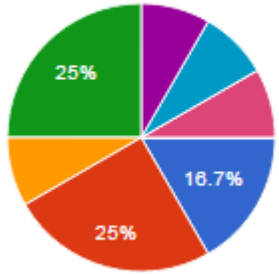
Would you like to give Feedback on use of



GSICS Intermediate data and GEO Ring requirements	**2**	16.7%
GSICS IR Products	**3**	25%
GSICS VIS Products	**1**	8.3%
GSICS MW Products	**3**	25%
GSICS UV Products	**1**	8.3%
Other Calibration Products	**1**	8.3%
Expectation from a Reference Instrument	**1**	8.3%
Other	**0**	0%

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