



ICWG Matters: Report from the International Clouds Working Group

Presented to CGMS-46 Plenary, Agenda Item 5.8

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2nd International Clouds Workshop, High-level Summary

In ICWG-2, 4 semi-permanent sub-working groups were formed: Algorithms, Assessments, Weather Applications and Climate Applications. Within these sub-groups, more dynamic topical groups were formed (7 total) to address the relevant issues at the time of the meeting.

The Geostationary Imager Intercomparison Topical Group under the Assessments Sub-working Group continued in ICWG-2. This group assessed the differences in cloud parameter retrievals over the Asian region. CMA, EUMETSAT, JMA, KMA, NASA-GSFC, NASA-LaRC and NOAA participated in this intercomparison study, applying existing retrieval algorithms to Himawari-8 AHI observations on 19 August 2015 and 12 July 2016 (the IWWG golden day). In addition, the library of past golden days (SEVIRI) were reanalyzed and plans for a GOES-16/17 golden day in conjunction with the IWWG were made. ICWG seeks guidance in how to support this analysis and its reporting going forward.

ICWG came up with the following key recommendations to CGMS and other working groups:

- CGMS members to budget a baseline funding for the intercomparison study, given its importance and impacts on global cloud products.
- CGMS members to consider introducing multi-sensor (satellite and ground-based measurements) applications for convective nowcasting when developing/updating product requirements.
- CGMS agencies to continue operating conically-scanning passive MW sensors in an early afternoon orbit as well as in a dusk/dawn orbit in order to maintain this unique long-term time series.

Progress was made in the interaction of the ICWG with other CGMS groups. Karl-Göran Karlsson replaced Rob Roebeling as a co-chair of ICWG.

OUTLINE

- **Summary of the 2nd International Clouds Workshop (ICWG-2)**
- **Status of CGMS-46 Recommendations**
- **Other Items of Relevance to CGMS**

2nd International Clouds Workshop

- University of Wisconsin, Madison, Wisconsin (29 October – 2 November 2018)
 - Local Coordinator:* Ralf Bennartz (UW-AOS/Vanderbilt)
- **Sponsored by:** NOAA/NESDIS, EUMETSAT
- **Co-chaired by:** Andrew Heidinger (NOAA/NESDIS) and Karl-Goran Karlsson (Swedish Hydro and Met Inst. /SMHI)
- 80-85 participants



ICWG Organization: Sub-Working and Topical Groups

- **Algorithms**
 - Retrieval Methods (Phil Watts, Bryan Baum)
 - Cloud Masking (Karl-Goran Karlsson)
 - **New:** Microwave (Ralf Bennartz)
- **Assessments**
 - L2 Cloud Product Intercomparison (Andi Walther)
- **Climate Applications**
 - Cloud Climate Data Records (Mike Foster)
- **Weather Applications**
 - Severe Weather (Mike Pavolonis)
 - Cloud Height for Winds/AMV (Steve Wanzong, Dong Wu)
- **International Collaboration**
 - International Collaboration (Dong Wu, Andrew Heidinger)

Sub-Working Groups are permanent

Topical Groups can be modified based on ICWG feedback

2nd International Clouds Workshop, Summary (1/3)

- **Sub-Group Discussions:**
 - Product uncertainties (Algorithms, Climate, Weather):
 - L2 products: pixel-level uncertainties provided by many participating algorithm teams; inherent byproduct of some retrieval approaches, not others; AMV requests cloud-top retrieval uncertainties
 - Uncertainty approach for spatial/temporal aggregations remains an open issue
 - Challenges (Algorithms, Climate):
 - Forward modeling, ice crystal models, multilayer clouds (Algorithms)
 - Inter-sensor consistency/calibration (e.g., AVHRR->MODIS->VIIRS), impacts on multi-sensor cloud climate data records (Climate)
 - Inconsistent product definitions (e.g., cloud typing) across algorithm teams (Algorithms)
 - New approaches:
 - AI/machine learning (Algorithms) – benefits seen for classification and value-added products, but a reluctance to adopt for geophysical retrievals in the short-term

2nd International Clouds Workshop, Summary (2/3)

- **L2 Product Assessment:**
 - "Golden Day" analysis:
 - Intercomparison of L2 cloud products submitted by algorithm teams using common L1 input
 - Added Himawari-8/AHI (19 Aug 2015; IWWG "Golden Day" 21 Jul 2016) to existing SEVIRI golden day
- **Collaboration with Other CGMS Science WGs:**
 - Representation from IWWG, IPWG, GSICS attended and presented
 - New GOES16/17 "Golden Day" selected in coordination with IWWG (notionally 21 Sep 2018)
 - Cloud height/AMV topical group (Weather) with IWWG participation
 - Microwave cloud retrievals discussed for the first time; topical group formed (Algorithms) and identified areas of collaboration with IPWG (e.g., forward modeling)
 - Fostering collaboration with GSICS seen as a need regarding inter-sensor calibration
 - ICWG will send representatives to IPWG and ITWG

2nd International Clouds Workshop, Summary (3/3)

- **Other High-Level Outcomes:**

- ICWG expresses support for the continuation of A-Train-like observations (passive + active)
 - Active sensors are playing a larger role in algorithm/product development, training, and evaluation; access to such datasets long term is a concern
- ICWG also expresses support for continuing the conically-scanning passive MW sensor data record in early afternoon and dusk/dawn orbits
- While the "Golden Day" intercomparison was performed with an existing set of tools (hosted by University of Lille), a detailed analysis and report was precluded by lack of funding support
- ICWG will continue supporting the GEWEX Cloud Assessment, and will heavily participate in an ISCCP follow-on (ISCCP-NG)

Status of CGMS-45 Recommendations

A44.02- to CGMS space agencies : CGMS members to submit data to the ICWG intercomparison: full-disk data at 10 minute temporal resolution, 2 km spatial resolution in the native AHI projection is preferred. The data should be submitted by 1 September 2016.

- A44.02 is now closed.
- Future ICWG intercomparison studies should be funded in a similar manner to CREW (ICWG predecessor) and IWWG studies. ICWG seeks guidance on this.

Status of CGMS-45 Recommendations

R45.01- to ICWG : ICWG to liaise with IPWG to explore common interests in the area of cloud microphysics and scattering libraries of hydrometeors (liquid, ice).

- Ben Johnson (IPWG) attended ICWG-2 and gave a briefing on the IPWG and areas of collaboration.
- ICWG would like to establish a topical group to meet on this collaboration and include membership from IPWG. This group could meet at both meetings as warranted. The areas of collaboration would include cloud modeling and use of cloud microphysical products in precipitation retrievals.

Status of HLPP Relevant to ICWG

4.2.4: Develop best practices for retrieving cloud properties, using the converging capabilities of next-generation geostationary imagers

- ICWG continued to run an intercomparison of cloud properties for the existing golden days (SEVIRI/AHI) and a new golden day for AHI chosen in collaboration with IWWG (July 21, 2016).
- Agencies submitted data ahead of the meeting and a standard analysis was conducted and discussed in the intercomparison group. The ICWG continues to support publicly available tools and data library hosted by the University of Lille.
- The ICWG/IWWG collaboration is also developing analyses relevant to the use of heights for the AMV application.
- The IWWG has chosen 21 September 2018 as a Golden Day for GOES-16 and Aeolus comparisons (preliminary).
- The ICWG intercomparison group is planning on automating data submission and analysis in the future.
- ICWG will participate in the comparison of techniques for generating the International Satellite Cloud Climatology Project Next Generation (ISCCP-NG) under the direction of the GEWEX Data and Analysis Panel.

Other items of relevance to CGMS

R44.05: CGMS members to budget a baseline funding for the cloud intercomparison study, given its importance and impacts on global cloud products.

- Answer: ICWG thanks the agencies for providing data for ICWG-2 and we hope to have similar participation in ICWG-3. ICWG would like to seek support like other WGs for publishing the intercomparison report.

A44.06: To enhance coordination, ISWGs to discuss with ICWG co-chairs key items for collaboration.

- Answer: ICWG-2 had in-person participation from IWWG and IPWG and remote participation from GSICS. ICWG has a standing topical group focused on collaboration with the IWWG and this been successful and ICWG would like to try the same with IPWG. ICWG would also like to connect with ITWG on the use of cloud products in radiance assimilation applications.

Summary of recommendations from ICWG for the attention of CGMS 47

Recommendation 1: CGMS members to budget a baseline funding for the intercomparison study, given its importance and impacts on global cloud products.

Recommendation 2: CGMS members to consider introducing multi-sensor (satellite and ground-based measurements) applications for convective nowcasting when developing/updating product requirements.

Recommendation 3: CGMS agencies to continue operating conically-scanning passive MW sensors in an early afternoon orbit as well as in a dusk/dawn orbit in order to maintain this unique long-term time series.

Further Information

Please visit ICWG Page

<http://www.icare.univ-lille1.fr/crew/index.php/Welcome>

Please visit the ICWG-2 Web page:

<https://cimss.ssec.wisc.edu/icwg/program.html>

ICWG-3 planned 24-28 Aug 2020 at EUMETSAT HQ in Darmstadt, Germany.