

Report from WG II (Satellite data and products)

Ken Holmlund and JV Thomas
(Co-Chairs)
Paolo Ruti and Mitch Goldberg
(Rapporteurs)

Presented to CGMS-49 Plenary session, agenda item 4

WG II on “Satellite Data and Products”

WG II serves as important link between the annual CGMS meetings and the CGMS International Science Working Groups which provide regular reports and feedback to CGMS.

These are currently:

- International TOVS working group (ITWG)
- International Radio Occultation Working Group (IROWG)
- International Precipitation Working Group (IPWG)
- International Satellite Winds Working Group (IWWG)
- International Clouds Working Group (ICWG)

WG II is also the primary interface between CGMS and other international initiatives, such as CEOS-CGMS Joint WG Climate, GSICS and SCOPE-CM and user communities, such as those organized in the areas of oceanography and marine meteorology, and atmospheric composition.

Overview of Session

WGII/1: Welcome and opening

WGII/2: CGMS agency reports on highlights and issues in dataset and product generation **11 WPs**

WGII/3: CGMS International Science Working Groups

(IWWG, IPWG, ITWG, ICWG, IROWG, GSICS, SCOPE-CM, JWGCLIM, IG3IS, ISCCP and new proposed International Earth Surface Working Group) **5 WPs**

WGII/4: Arctic Observations **3 WP**

WGII/5: Working papers on climate **6 WP**

WGII/6: Agency response to the greenhouse gas initiative and applications **4 WPs**

WGII/7: Working papers on ocean monitoring **3 WPs**

WGII/8: Selected topics of high priority to members **5 WPs**

WGII/9: Working papers responding to or raising CGMS actions **0 WP**

WGII/10: AOB **2 WP**

WGII/11: Review and updating HLPP **2 WP**

WGII/12: Future CGMS plenary sessions **3 WP**

WGII/13: Review of actions/conclusions, preparation of WG report for plenary

In addition:

Joint Session with WGIII focused on second revision of the CGMS baseline & risk assessment with a specific focus on atmospheric composition and aerosol **10 WP**

$\Sigma = 54$ WPs (2020: 49; 2019: 44; 2018: 41; 2017: 36; 2016: 37; 2015: 64; 2014: 50)

Virtual meeting
112 registrations
April 26 - 28
11:00 – 15:30 UTC

WG II Terms of Reference, Co-chairs and rapporteurs

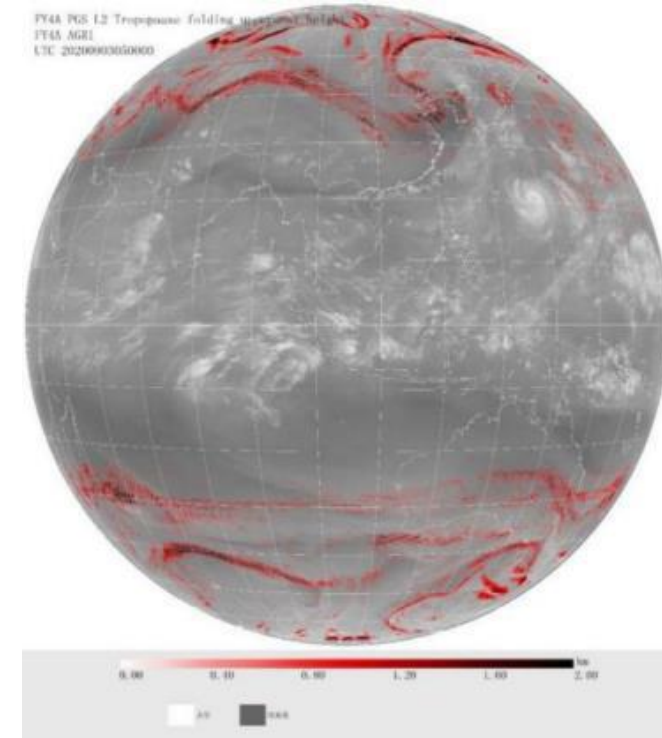
- WG II proposes an update to the ToRs of WG II
 - (First Co-chair from WMO, rapporteurs from NOAA and EUMETSAT)
 - Old ToR foresees
 - Second Co-chair from **KMA, CMA, JMA, Roshydromet and IMD**
 - New Tor:
 - Second Co-chair from the **Asia-Pacific region**
- Co-Chairs: Ken Holmlund (WMO), JV Thomas (ISRO)
- Rapporteurs: Mitch Goldberg (NOAA), Paolo Ruti (EUMETSAT)

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
Plenary		WGII49.	WG II recommends to Plenary the adoption of the new Terms of Reference as presented in CGMS-49-CGMS-WP-09
Plenary		WGII49.	WG II recommends to Plenary to confirm the nomination of JV Thomas as the second Chair of WG II.

CGMS agency reports on highlights and issues in dataset and product generation

CMA

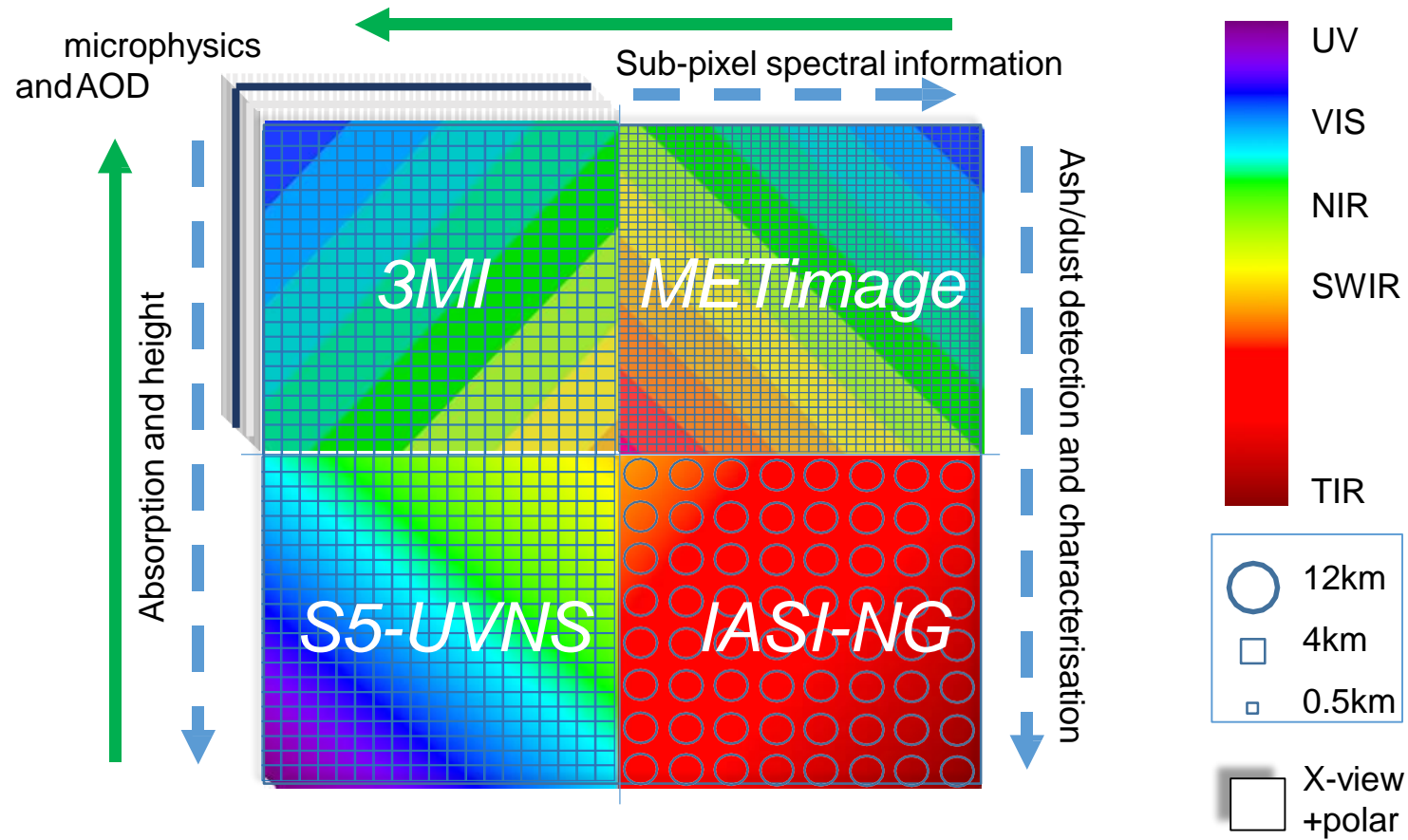
- Tropopause folding detection product from FY-4
 - AI Approach
 - validation and operational implementation ongoing
- Atmospheric temperature and humidity profiles from FY-3
 - NN-approach (HIRAS/MWTS/MWHS + MERSI)
- **FY-3E**
 - Early morning coverage continuation!!! (WIGOS Vision 2040 baseline)
 - Ocean vector winds (OVWs) from **FY-3E scatterometer**
 - Polar sea ice from **FY-3E scatterometer**



EUMETSAT

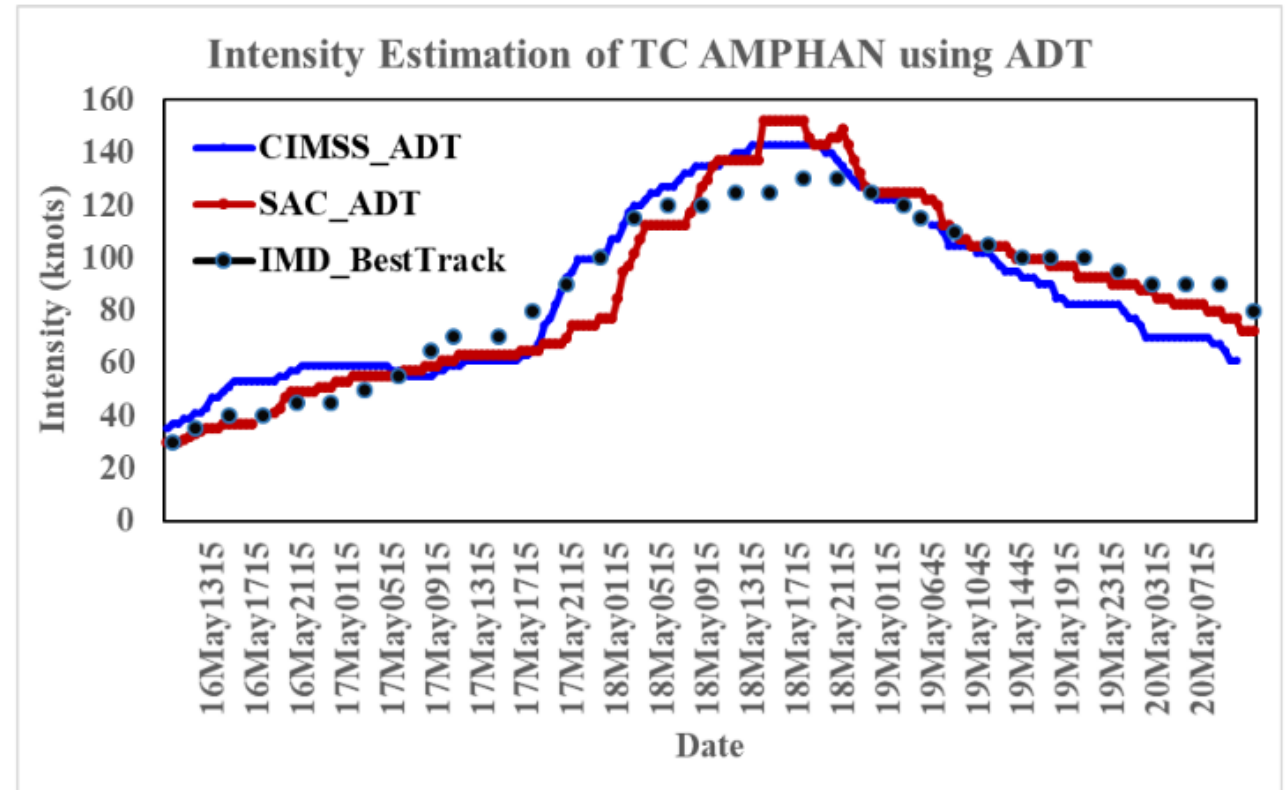
- Roadmap for SST and Sea-Ice Surface Temperature
- New Wave Optics for Radio Occultation
- Sentinel-3/SLSTR AMVs and HSIR 3D winds
 - NN-approach (HIRAS/MWTS/MWHS + MERSI)
- Aerosol developments –Metop PMAp, Sentinel-3 AOD and EPS-SG Aerosol Suite
- Copernicus Sentinel-3/OLCI TCWV over land

EUMETSAT: The Aerosol Observatory from EPS-SG sensors through the 2040s



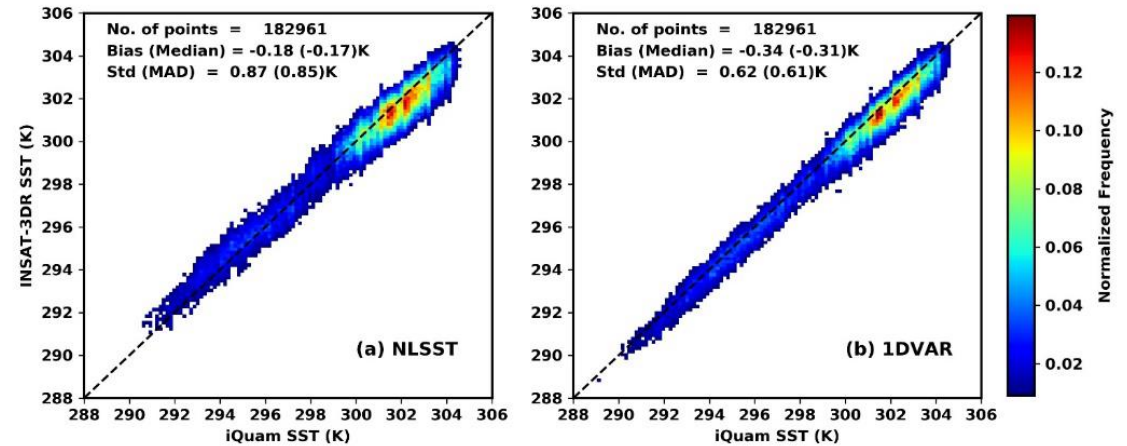
IMD

- New INSAT 3D/3DR product update
 - Net radiation, LSA; TPW, SBE, IMSRA
 - Agromet products PET and AET
- New sounder products
 - CTP, effective emissivity, CTT
- Additional products
 - 10 day Snow Map composite, LST, SST
- Implementation of ADT in MMDPRS using INSAT 3D & 3DR imager data and tested on an experimental basis of two cyclones- Amphan and Nisarga.



ISRO

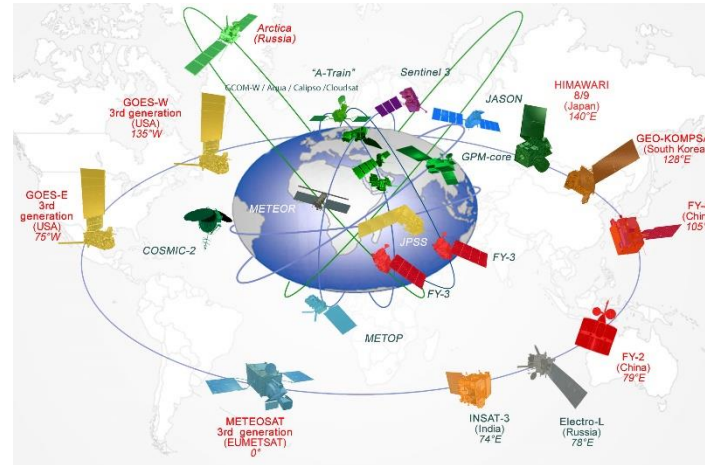
- Multi-Mission Meteorological Data Reception and Processing System (MMDRPS) The Aerosol Observatory from EPS-SG sensors through the 2040s
- Improved 1-dVar SST
- SCATSAT-1 anomalies may h



JAXA

- A particular highlight are the efforts to establish a GPM follow-on:
- The mission definition review of the next generation precipitation radar in JAXA is planned to be held in **August 2021** (TBD).
- **WG II recommends to Plenary that CGMS provides a letter of support to JAXA on the GPM follow-on mission/precipitation radar efforts (deadline June 2021)**
- JAXA appreciates IPWG for the effort organizing the report on the spaceborne precipitation radar. => **JAXA request a formal approval of the report by July 2021**, which can go a long way in showing requirements from the international meteorological community.
 - **WG II proposes a short review cycle of IPWG paper by CGMS WG II by mid-June and subsequent adoption by CGMS Plenary in by end-June 2021.**

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
Plenary		WGII49.	WG II recommends to Plenary that CGMS provides a letter of support to JAXA on the GPM follow-on mission/precipitation radar efforts
Plenary		WGII49.	WG II recommends to Plenary the adoption of the IPWG Precipitation Radar Position Paper after WG II review



A review of the different operational applications of spaceborne precipitation radars within the International Precipitation Working Group (IPWG) community

Presented to CGMS-49, Plenary

A review of the different operational applications of spaceborne precipitation radars within the International Precipitation Working Group (IPWG) community

May 4, 2021

Contributors by alphabetical order:

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Report coordinated by IPWG co-Chairs:
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Report “A review of the different operational applications of spaceborne precipitation radars within the International Precipitation Working Group (IPWG) community”

- ⇒ Initiated in 2020 in response of **action A48.13** of CGMS-48 WG II.
- ⇒ **22 authors** from 18 different institutes.
- ⇒ Focus on **operational applications** of precipitation radars
(note that precipitation radars are also a unique source of information for atmospheric science, see Battaglia et al. 2020 for a recent comprehensive review)

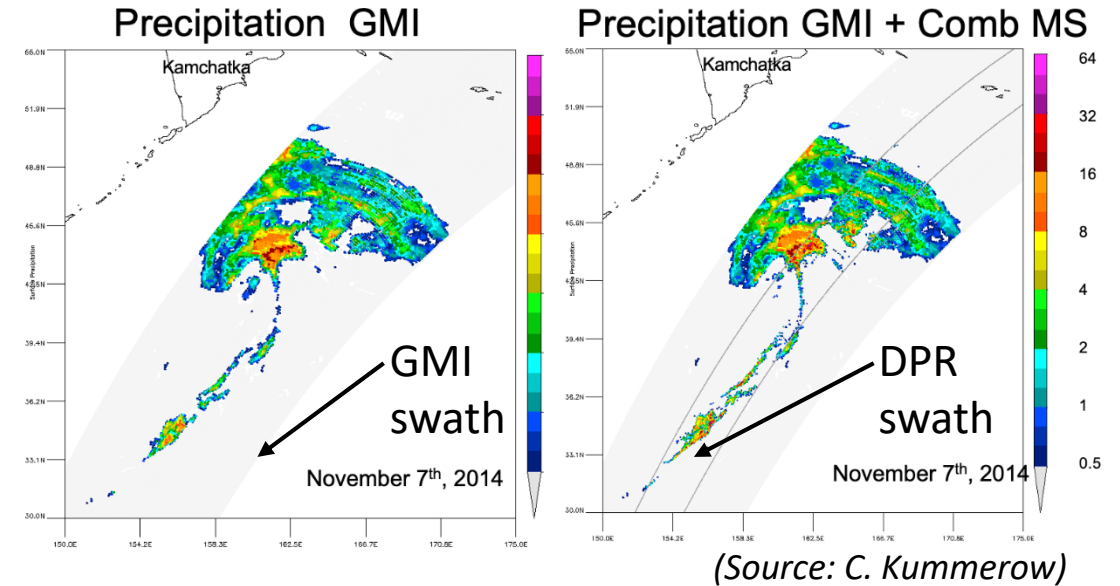
Highlight on 3 applications, at different stages of maturity, which all need a continuity of these data in the future:

- ⇒ Use of precipitation radars as **calibrator for precipitation retrievals** from the constellation of PMW instruments
- ⇒ Use of precipitation radars in **NWP (model validation and data assimilation)**
- ⇒ Use of precipitation radars as **calibrator for ground radar networks**

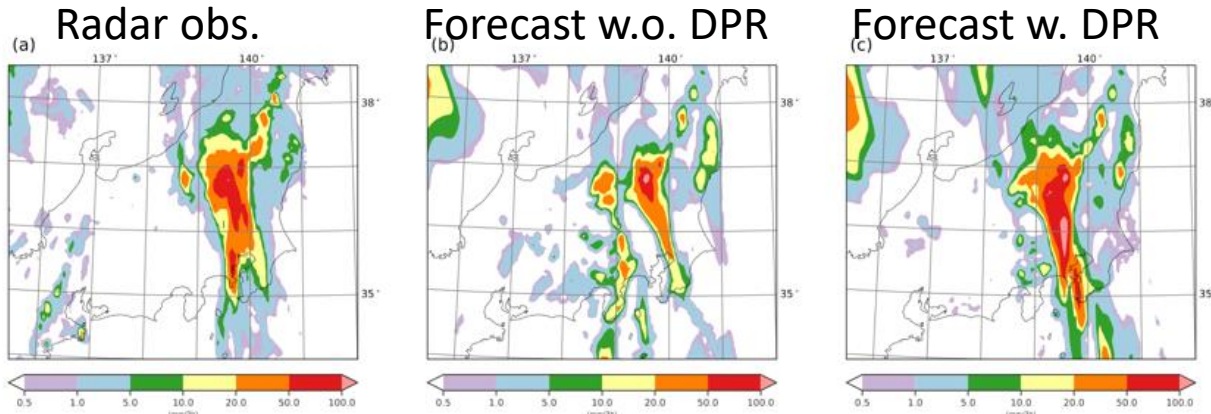
A recommendation section for future instruments

Use of precipitation radars as calibrator for precipitation retrievals from passive MW instruments

Precipitation retrievals from passive MW instruments require databases of co-located passive and active microwave observations. These databases will need to be repeatedly updated to account for an evolving climate. Multiplatform combined products also benefit from a continuous intercalibration of precipitation retrievals from the various radiometers before merging and therefore constantly require recent radar observations.



Use of precipitation radars in NWP (model validation and data assimilation)



Following the pioneering work of JMA, NWP centers are getting prepared to monitor and/or assimilate spaceborne precipitation radars. Major steps have recently been made by releasing to the international community observation operators with capabilities adapted to this endeavor.

(Source: Y. Ikuta)

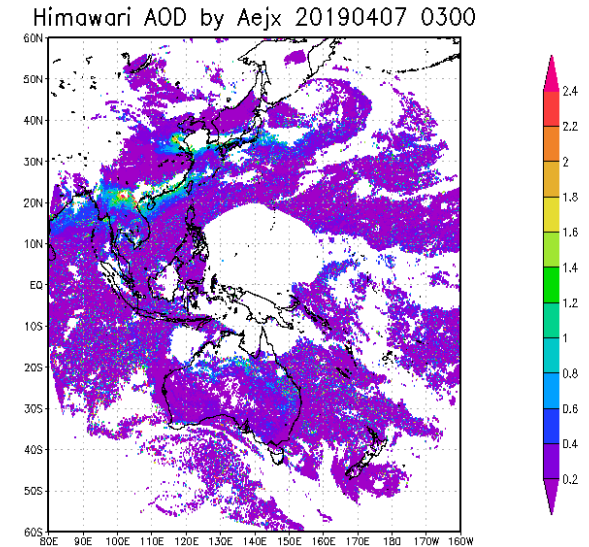
The highlighted applications require a **continuity of precipitation radar observations** in the future **to sustain development and/or operations**. A number of aspects of the current generation of radars which could be improved in future instruments have also been highlighted. In particular, several applications would benefit from:

- a **wider swath** compared to the TRMM, GPM, and CloudSat instruments (or a constellation of such radars with the current swath).
=> *Improving the sampling increases time/space coincidences with PMW and potential impacts in NWP.*
- an **improved sensitivity, resolution, and multi frequency capabilities**.
=> *Improving the sensitivity can help to capture drizzle or light snowfall.*
- capabilities of to **observe closer to the surface**.
=> *Mitigating the contamination by side-lobe clutter would help the sample of shallow precipitation*
- **Doppler capabilities**
=> *Constraining together physical (condensed water mass) and dynamical (winds) fields together to improve long range forecasts.*

(Note the authors are aware that all the potential improvements highlighted are very challenging to achieve, both technically and financially, for space agencies. Nevertheless, addressing these issues in a prioritized way across the agencies' programs would greatly benefit the development and use of current and future applications of spaceborne precipitation radars)

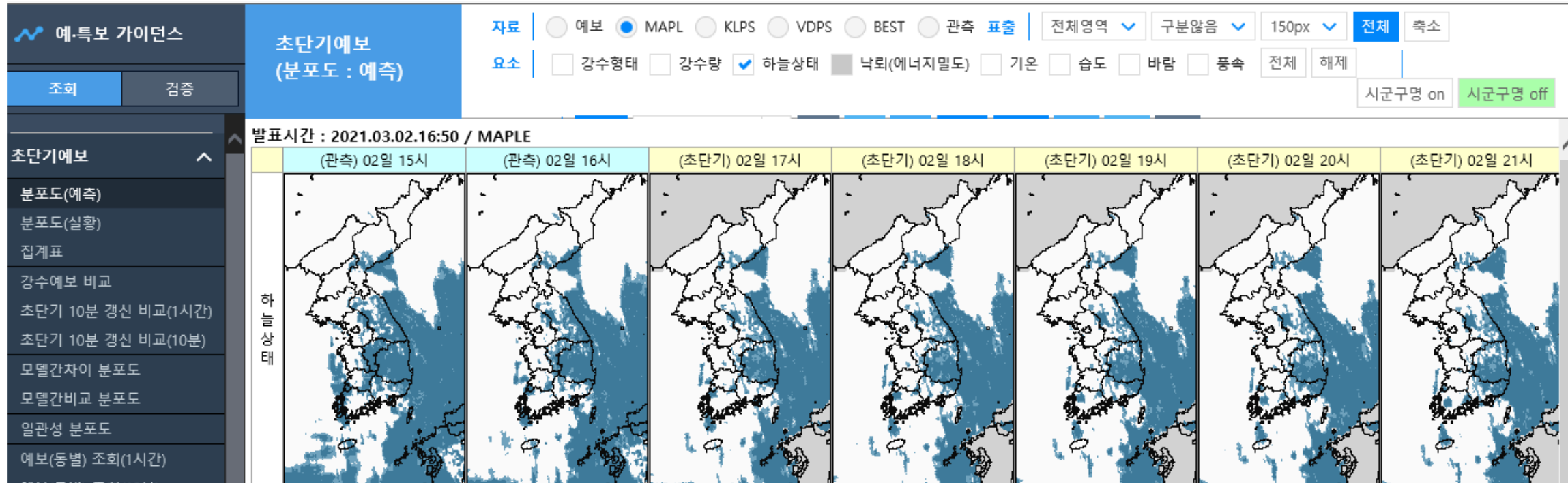
JMA

- Recently updated Himawari-8 products
 - Sea Surface Temperatures (SSTs)
 - Aerosol Products (algorithm developed by JAXA)
 - Rapidly Developing Cumulus Area Data
 - AMV Reprocessing
- Himawari-8 observation data quality
- Himawari RGB quick guides
- Potential influence of hyperspectral IR sounder usage on the Himawari-8/9 follow-on program
 - Several observation patterns were assumed for the investigation to optimize the observation pattern after CGMS-48
 - The importance of high-frequency observation on full disk was reconfirmed by the investigation



KMA

- GSICS, AMV assimilation, fog, dust, proxy vis at night
- Satellite image forecast:



NASA

- Calibration and Validation
- Research highlights
- Data products
- Highlighted the importance of campaigns:

Solar Spectral Flux Radiometer (SSFR)	Advanced Microwave Precipitation Radiometer (AMPR)	High Spectral Resolution Lidar 2 (HSRL2)
Spectrometer for Sky-Scanning, Sun-Tracking Atmospheric Research (4STAR)	Carbon Monoxide Measurement & Analysis (COMA)	Airborne Multi-angle Spectro-Polarimeter Imager (AirMSPI)
Airborne Third Generation Precipitation Radar (APR-3)	Research Scanning Polarimeter (RSP)	Enhanced MODIS Airborne Simulator (eMAS)



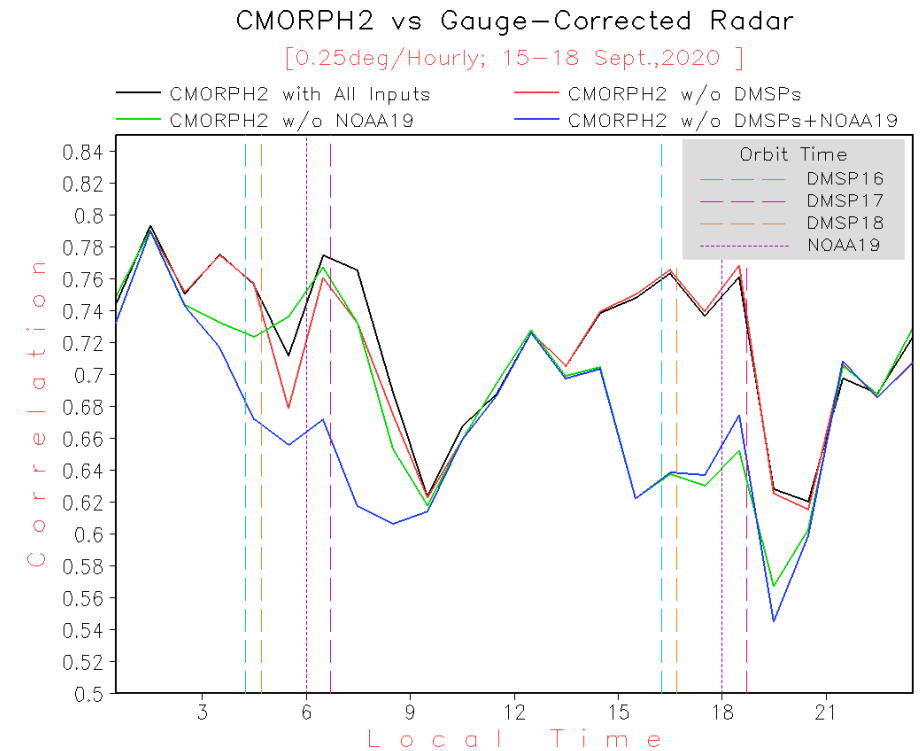
ER-2



CGMS

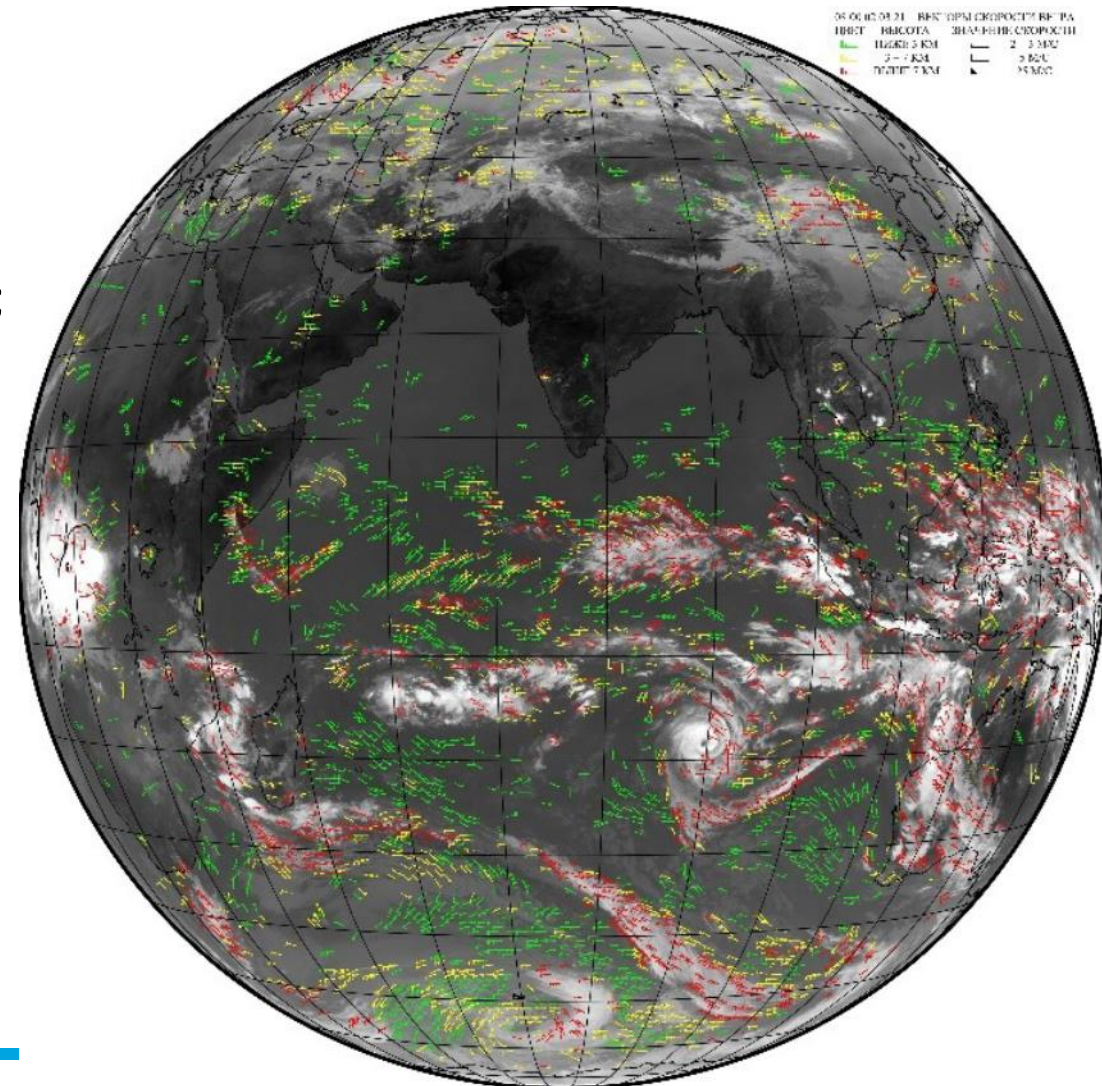
NOAA

- NOAA report on POES Data Denial Studies
- Demonstrated benefits of additional orbits for precipitation
- Agencies to provide case studies demonstrating the benefits of additional orbital planes, beyond use of data in NWP
- Define driving applications to determine the temporal coverage and spectral coverage needed as part of a LEO constellation



Roshydromet

- Cloud images and cloud analysis products generated from MSU-MR/ Meteor-M data;
- Cloud parameters derived from MSU-GS/ Electro-L N3 data;
- MSU-MR / Meteor-M based snow and ice cover mask;
- Atmospheric CO2 concentration retrievals from IKFS-2/ Meteor-M N2 data;
- Retrieval of total water vapour content and vertical temperature profiles in the atmosphere from MTVZA-GY/ Meteor-M N2-2 data.
- New optical flow method for AMVs:
- Roshydromet is encouraged to further collaborate with IWWG on the new method



WMO

Table 1: Proposed common minimum baseline for Level-2 products generated from geostationary imagery data

	Frequency	Format	Delivery	CMA /FY-4	EUMETSAT /SAF	IMD	ISRO (MOSDAC)	JMA /JAXA	KMA	NOAA	ROSH.MET
Full disk AMV	Hourly	BUFR	WIS/GTS		1-hr	15 min BUFR (Sector)	15 min HDF-5 (Sector)	1-hr	10 min	1-hr	30 min HDF Local distribution
			GEONETCast	3-hr NetCDF	1-hr			10 min	1-hr NetCDF		
CSR	Hourly	BUFR	WIS/GTS		1-hr			1-hr			
			GEONETCast	1-hr NetCDF	1-hr			10 min			
ASR	Hourly	BUFR	WIS/GTS		1-hr		15 min HDF-5	1-hr			
			GEONETCast		1-hr						
Cloud Mask	10-15 min	NetCDF	GEONETCast	1-hr	15 min	15 min HDF-5	15 min HDF-5	10 min		10-20 min	30 min HDF Local distribution
Cloud Analysis	10-15 min	NetCDF	GEONETCast	1-hr	15 min			10 min Format?	10 min Web download	10-20 min	30 min HDF Local distribution
Cloud Top Height	10-15 min	NetCDF	GEONETCast	1-hr	15 min	15 min HDF-5	15 min HDF-5			10-20 min	30 min HDF Local distribution
Volcanic Ash	10-15 min	CAP/Text	WIS/GTS								
			GEONETCast					10 min Web download			
Precipitation	10-15 min	NetCDF	GEONETCast	1-hr	Hourly SAF ??	15 min HDF-5	15 min HDF-5	1-hr	10 min Web download	10-20 min TPW	
Fire/Hotspot	10-15 min	CAP/Text	WIS/GTS		15 min						
			GEONETCast	1-hr NetCDF	15 min		15 min HDF-5	10 min Format?		10-20 min NetCDF	

WMO: Proposed GEO Level-2 baseline

- CGMS Members to consider the proposed baseline and to complete the information for the proposed baseline, including SSTs
- Precipitation and SST
 - Review specifications involving key users
- Review the baseline dissemination strategy for volcanic ash product
- The dissemination strategy for the baseline products presented in CGMS-49-WMO-WP-14, including SST, should be presented to and discussed with CGMS WG IV.
- WMO conduct a survey on baseline Level-2 product requirements for LEO satellites

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
Plenary		WGIIR49.	Working Group II recommends to CGMS Plenary the adoption of the proposed baseline products presented in CGMS-49-WMO-WP-14 with the addition of SSTs, to be considered for subsequent implementation by all Agencies.
WMO			WMO together with Working Group II to develop a baseline recommendation for channels from geostationary satellite imagers

IWWG Priority Discussion Topics

- IROWG-8 Virtual (7 – 13 April 2021 hosted by NOAA and UCAR)
- A detailed presentation from IWWG will be given to Plenary

WG II would like to highlight:

- WG II recommends to Plenary to address the gap of global 3D wind profile observations with high priority. Based on the Aeolus experience, a combination of lidar & IR missions can provide complimentary wind observations which look to be very promising.
- WG II supports the continued representation of Ocean Surface Winds (OSW) in the IWWG and supports the IWWG proposal to establish an OSW Task Group within the IWWG, that fills a gap currently not addressed by or within the mandate of other international initiatives
- WG II recommends to Plenary the adoption of the IWWG Terms of reference

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
Plenary		WGII49.	WG II recommends to Plenary the establishment of an Ocean Surface Wind Task Group (OSW TG) in the CGMS International Winds Working Group (IWWG) that coordinates its actions and recommendations with GSICS, CEOS and the IOVWST and other relevant entities.
Plenary		WGII49.	WG II recommends to Plenary to address the gap of global 3D wind profile observations with high priority. Based on the Aeolus experience, a combination of lidar & IR missions can provide complimentary wind observations which look to be very promising.”
Plenary		WGII49.	WG II recommends to Plenary the adoption of the IWWG Terms of reference.



IROWG Priority Discussion Topics

- IROWG-8 Virtual (7 – 13 April 2021 hosted by NOAA and UCAR)
- A detailed presentation from IROWG will be given to Plenary

WG II would like to highlight:

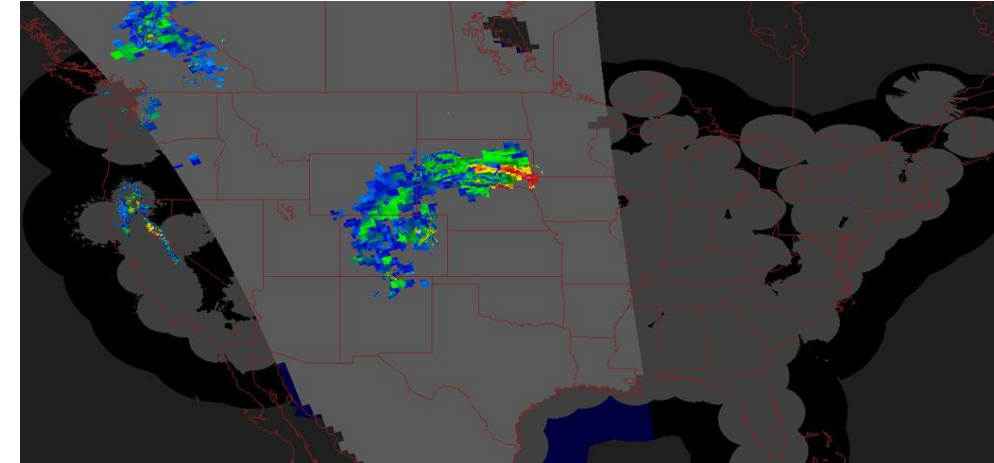
- IROWG continues to emphasize the value of and need to open and free access to RO data, including archived raw data.

Specifically:

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
Plenary		WGII49.	WG II recommends that Agencies when pursuing data buy clearly defines all aspects of the data, e.g. orbits and coverage, in order to optimise the benefits of the data.
Plenary			WG II recommends that Agencies consider data buy with an option for redistributing data to global NWP centres.

IPWG Priority Discussion Topics

- Several Online sessions
 - On the future of the Passive Microwave Constellation
 - On validation activities
- The Joint IPWG/GEWEX Precipitation Assessment
 - Publication stage at the WCRP/GEWEX international project office
- A review of the different operational applications of precipitation radars within the International Precipitation Working Group (IPWG) community has been prepared (Introduced earlier)
- Science highlights
 - NN GPROF, validation site in Korea, GPM-GSMaP V05 (algorithm version 8) released in 2021 will include algorithm evolutions such as a histogram matching method in the PMW-IR Combined algorithm, NOAA Operational Snowfall Rate Product
- Next meetings:
 - Ground-based Radar Products in June 2021
 - IPWG10 meeting: Joint meeting with the IWSSM community, June 2022



CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
Plenary		WGII49.	WG II recommends to Plenary the nomination of Joe Turk as the new IPWG rapporteur.
Plenary		WGII49R.	WG II recommends to Plenary the adoption of the updated Terms of Reference

Discussion on the establishment of a new International Science Working Group

- Proposal of Terms of Reference of the International Earth Surface Working Group (IESWG)
- Working Group II supports the establishment of the new working group providing:
 - Demonstrated relevance to CGMS
 - Broad CGMS engagement
 - Clear definition of tasks demonstrating complementarity with respect to other international land/cryosphere surface initiatives
- Working Group II received during the meeting updated proposed name and ToRs addressing some of the points raised above
 - **WGII in principle endorses the proposed Terms of Reference**
- Noting the approach used for the establishment of other ISWGs (e.g. ICWG) WG II proposes that
 - CGMS Members expresses their interest in the new ISWG and provides Points of Contacts
 - Broad participation should be secured for the next workshop (planned for May 2022)
 - **WG II to evaluate the outcome of the next workshop and subsequently provides a recommendation to CGMS-50 Plenary on the establishment of an International Earth Surface Working Group**
- A detailed presentation from IESWG will be given to CGMS-49 Plenary

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
WG II		WGII49.	WG II to assess the organisation and CGMS participation of the planned IESGW workshop in May 2022 and to confirm its support for the establishment of a new ISWG.
Plenary		WGII49.	WG II recommends to Plenary to consider the establishment of a new International Science Working Group: "International Earth Surface Working Group" based on a successful organisation of the next IESWG workshop including broad CGMS Member participation.

GSICS

The GSICS Annual meeting conveyed a positive outlook for the Space Component of the State of Observing System as Satellites supported by robust CAL/VAL systems (such as GSICS, CEOS) continue to provide high quality observations to the community.

GSICS coordinates with communities such as NWP, WGCV/CEOS, ISCCP and GPM-X to build CAL/VAL algorithms that can help generate and apply adjustments to satellite measurements thereby correcting them of any biases and provide traceability to in-space and on ground targets.

Advances in Lunar and Solar reference data have resulted in development of robust (lunar/solar) models and algorithms that provide crucial calibration capability to measurement spectrum spanning VIS/NIR to Microwave.

With the launch the first Geostationary UV measuring platform (GEMS), the CAL/VAL community has acquired new opportunities to perform GSICS (SNO) style intercalibration with other UV under flights thereby building a robust CAL/VAL system within the UV observing domain.

GSICS has now producing over 74 Inter-Calibration products , that are created by intercomparing monitored instruments with stable references such as IASI-A/B/C , CrIS, VIIRS and new references are being sought to span more monitored instruments.

GSICS will be reviewing the intercalibration paper provided by SWCG

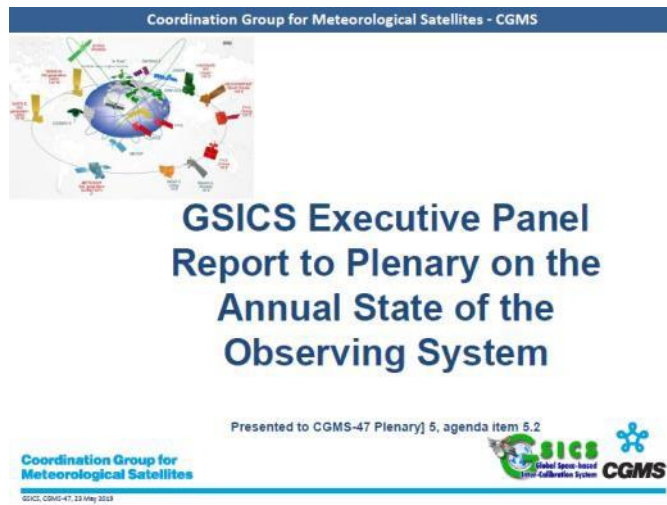
**Coordination Group for
Meteorological Satellites**



State of Observing System Report

The Coordination Group on Meteorological Satellites (CGMS) and the World Meteorological Organization (WMO) recently mandated GSICS (A45.05) to provide an overarching annual assessment of (Satellite) observing system performance with respect to GSICS reference instruments

In the Plenary Members joined to contribute to the upcoming State of Observing System report Special issue of GSICS Quarterly Newsletter on State of Observing System being published



Annual GSICS Calibration Report on the State of the Observing System

GSICS-EP-21, 18-19 May 2020



Quarterly

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Newsletter Winter 2021 Issue

CMA • CNES • ESA • EUMETSAT • IMD • ISRO • JAXA • JMA • KMA • NASA • NIST • NOAA • ROSCOSMOS • ROSHYDROMET • STP • URSI • WMO

Articles

Part I: State of Observing System Status of GSICS References
By Mitch Goldberg (NOAA) and Manik Bali (ESSIC/UMD)

GSICS recommends NOAA 20 VIIRS as the reflective solar band (RSB) calibration reference
By David Doelling (NASA), Changyong Gao (NOAA) and Jack Xiong (NASA)

Performance of the CrIS instruments as a GSICS IR reference
By Iuribide Sanchez et. al. (NOAA)

IASI radiometric noise assessment based on Earth views
By Carmine Serio, Guido Masiello, and Pietro Mastro (SI Unibas, Italy)

Status of the Atmospheric Infrared Sounder on the EOS Aqua Spacecraft
By Thomas Pagano, Hartmut Aumann, Steven Broberg, Evan Manning and William Matthews (JPL, CALTECH)

Reference Microwave Sounder Instruments for FCDR Development
By Cheng Zhi Zou (NOAA), Hui Xu (UMD), and Xianjun Hao (GMU)

News in This Quarter

Outcome of the Third Joint GSICS/IVOS Lunar Calibration Workshop
By S. Wagner (EUMETSAT), V. Maitelli (EUMETSAT), T. Stone (USGS), X. Hu (CMA) and X. Wu (NOAA)

Announcements

2021 EUMETSAT Meteorological Satellite conference to be held virtually
By Tim Hewison, EUMETSAT

GSICS Related Publications

Part-I: GSICS Annual State of Observing System Status of GSICS References

By Mitch Goldberg (NOAA) and Manik Bali (ESSIC/UMD)

The Coordination Group on Meteorological Satellites (CGMS) and the World Meteorological Organization (WMO) recently mandated GSICS (A45.05) to provide an overarching annual assessment of (Satellite) observing system performance with respect to GSICS reference instruments. This issue is Part-I of a two-part series of special issues of the GSICS Quarterly dedicated to providing the most up-to-date assessment of the State of the Observing System. In this part, the performance of only a select set of instruments that are also GSICS references is covered. The next issue will cover some of the instruments monitored by using the GSICS in-orbit references.

GSICS references are selected from the pool of satellites of the observing system, mainly by consensus among member agencies. Reference instruments satisfy a selection criterion (Bali et al. 2016) that is derived from principals of QA4EO (Quality Assurance for Earth Observation) and ensures that instruments that are many times more stable than most of the concurrently flying instruments and deliver high quality measurements over long periods of time are selected as reference instruments.

This gives all member agencies the ability to compare their satellites with single (or multiple agreed upon) references and make assessments that are intercomparable among agencies.

Using this selection criterion, GSICS member agencies identified VIIRS SNPP/T1 for assessing Visible and Near Infrared channels and IASI-A/B/C and CrIS SNPP/T1 for assessing Infrared channels. In addition, GSICS members are currently evaluating the use of Advanced Technology Microwave Sounder (ATMS) as an in-orbit reference for Microwave instruments.

In the second article Doelling et al. summarize the performance of the VIIRS on board the SNPP and T1.

Following this VIIRS article, the next three articles are on Infrared references and examine the in-orbit health and performance of the IASI-A/B/C (Carmine et al.), AIRS (Pagano et al.) and CrIS - SNPP/T1 (Iuribide et al.). GSICS has more than 30 instruments in the IR that are monitored by using these references.

The last article discusses the use of ATMS (Zou et al.) as a reference for calibrating Microwave instruments that contribute to construction of Climate Data Records.

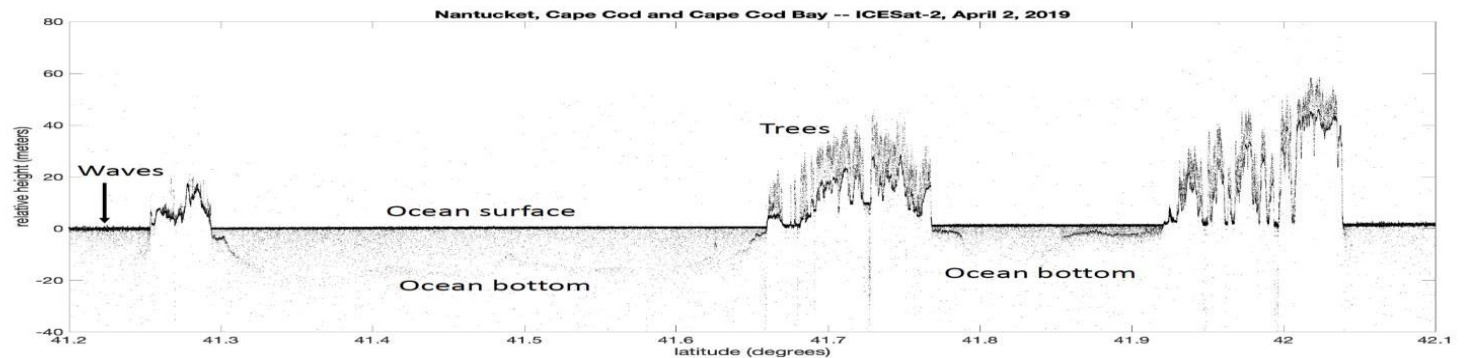
Conclusion

All the GSICS reference instruments covered here continue to satisfy reference criterion. They show a high stability over long periods of time and maintain performance within their design specifications.

The authors recommend that calibration community migrate to using IASI-B/C and SNPP/T1 CrIS as existing references, as IASI-A and AIRS are nearing end-of-life scenarios in the near future.

Arctic Observations

- EUMETSAT: Outcomes and recommendations of the EUMETSAT workshop on "the use of operational satellite microwave data for high-latitude and polar area models" (Feb 2021)
 - Coupled systems present major opportunities
 - CGMS Members to collaborate with users and L3 developers on spatial resampling chains “respectful of spatial scale
 - CGMS Members are encouraged to engage with the MOSAiC PIs for widespread use of the campaign data
- NASA: ICESat-2’s capabilities and products for the Arctic and near-coastal bathymetry applications
 - We can penetrate the sea!

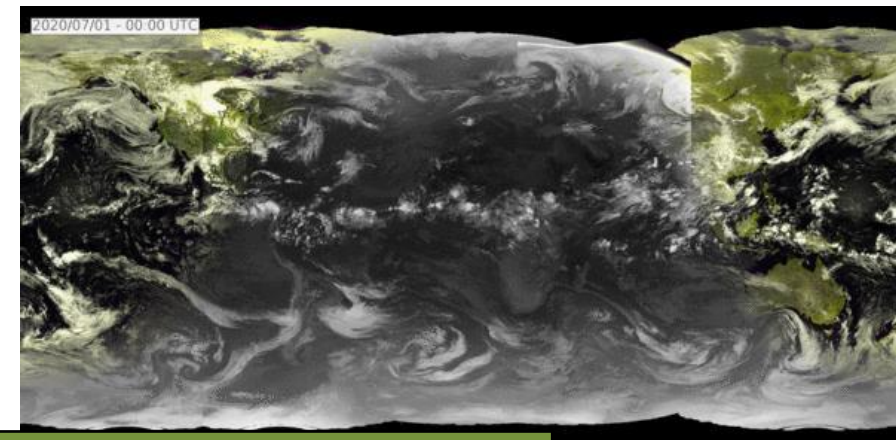
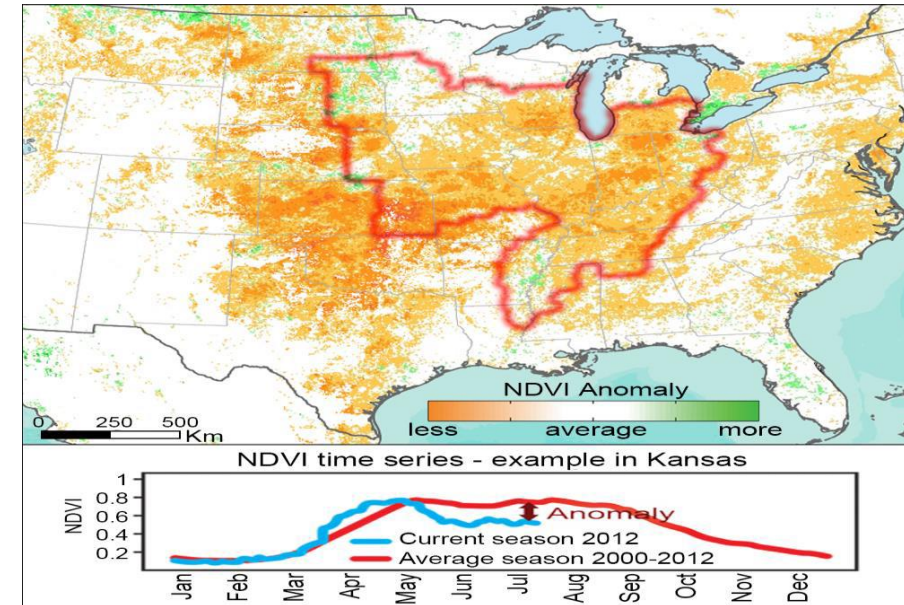


- ECCC: Status of plans for an Arctic Observing Mission (AOM) by Canada
 - If approved for implementation, AOM will target a launch in 2032 with a 10- year operational lifespan
 - Canada has engaged potential US and European international partners who are regularly discussing collaborative opportunities to achieve a cost effective and mutually beneficial approach to this mission

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
CGMS Members		WGII49.	CGMS Members to collaborate with users and L3 developers on spatial resampling chains “respectful of spatial scale”
CGMS Members		WGII49.	CGMS Members are encouraged to engage with the MOSAiC PIs for widespread use of the campaign data

Climate and GHG gas initiatives: Plenary Session

- Plenary:
 - GCOS and CEOS/CGMS JWGClimat
 - WG II summary report on GHG results
- Progress on FCDRs
 - CMA and EUMETSAT
- Use cases from NOAA CDRs
 - Assessing Drought over Agricultural Areas
- GEO Ring activities: ISCPP-NG
 - Generate one month of ISCCP-L1g Prototypes for ICWG Meeting in April
 - Develop L2 plan within ICWG in coordination with all participating space agencies and GSICS
 - Develop assessment plan with GEWEX-DAP
 - Generate one year of ISCCP-L1g by September 2021 supported by GSICS
 - **CGMS Member to consider derivation of Level-2 products using the new proposed Level-1g data.**



CGMS-49 recommendations - WGII

Actionee	AGN item	Rec	Description
CGMS Members		WGII49.	CGMS Member to consider derivation of Level-2 products using the new proposed Level-1g data.

Working papers on ocean monitoring

- IWWG sub group on CGMS Ocean Vector Winds Task Group
 - Part of IWWG presentation
- The value of NOAA CoastWatch/OceanWatch/PolarWatch to operational satellite oceanography
 - Importance of ground-based in-situ observations emphasized
 - WG II recommends to plenary the endorsement for future OSOS Symposia
 - WG II to consider the value and approach for the establishment of a new Ocean and Coast Working Group as a new International Science Working Group

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
Plenary		WGII49.	WG II recommends to plenary the endorsement for future OSOS Symposia
OSO		WGII49.	WG II recommends that OSO engages with the full International community
WG II		WGII49.	WG II to consider the value and approach for the establishment of a new Ocean and Coast Working Group as a new International Science Working Group

Selected topics of high priority to members

- ESA: Aeolus update
 - ESA intends to operate the mission as long as possible, even looking at different orbit strategies
- JMA: Sunshine duration product estimated from 2.5-minute Himawari-8 observation data
- NOAA: Status of GEO XO plans
 - **WG II recommends to Plenary that CGMS provides a letter of support to NOAA on the implementation of the GEO-XO ACX mission, which would also mitigate the gap for geo air quality measurements post NASA/Tempo**
- IPWG: Precipitation Monitoring and the constellation of microwave instruments
 - WMO to take into consideration the requirements for microwave imaging and sounding constellations, also in terms of equatorial crossing time in future reviews of the WIGOS Vision 2040.
 - CGMS Members to consider using all currently available microwave imager data for their precipitation products
- WMO: Results from the 7th WMO Impact Workshop in 2020
 - Presented to Plenary

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
Plenary		WGIIIR49.	WG II recommends to Plenary that CGMS provides a letter of support to NOAA on the GEO XO ACX efforts



WGII/11- HLPP

- Was reviewed and updates proposed

WGII/12 – Future CGMS Plenary Sessions

- Nominations for WG II, ISWGs and Vlab reviewed and endorsed
- Intersessional meetings defined
 - 27.09.2021, 24.02.2022, 28.03.2022

WGII/13 – Review of actions/conclusions

All open actions were reviewed offline

Plenary is requested to endorse

- Updated ToRs, Chairs and rapporteurs
- Way forward for new ISWG: IESWG
- Establishment of IWWG subgroup ‘Ocean Surface Wind Task’ Group

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
Plenary		WGIIR49.	WG II recommends to Plenary the adoption of the new Terms of Reference as presented in CGMS-49-CGMS-WP-09
Plenary		WGII49.	WG II recommends to Plenary to confirm the nomination of JV Thomas as the second Chair of WG II.
Plenary		WGIIR49.	WG II recommends to Plenary the adoption of the IWWG Terms of reference.
Plenary		WGIIR49.	WG II recommends to Plenary the nomination of Joe Turk as the new IPWG rapporteur.
Plenary		WGIIR49.	WG II recommends to Plenary the adoption of the updated IPWG Terms of Reference.
Plenary		WGIIR49.	WG II recommends to Plenary to consider the establishment of a new International Science Working Group: “International Earth Surface Working Group” based on a successful organisation of the next IESWG workshop including broad CGMS Member participation.
Plenary		WGIIR49.	WG II recommends to Plenary the establishment of an Ocean Surface Wind Task Group (OSW TG) in the CGMS International Winds Working Group (IWWG) that coordinates its actions and recommendations with GSICS, CEOS and the IOVWST and other relevant entities.

Plenary is requested to endorse

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
Plenary		WGII R49	WG II recommends to Plenary that CGMS provides a letter of support to JAXA on the GPM follow-on mission/precipitation radar efforts
Plenary		WGII R49	WG II recommends to Plenary the adoption of the IPWG Precipitation Radar Position Paper after WG II review
Plenary		WGII R49	Working Group II recommends to CGMS Plenary the adoption of the proposed baseline products presented in CGMS-49-WMO-WP-14 with the addition of SSTs, to be considered for subsequent implementation by all Agencies.
Plenary		WGII R49	WG II recommends to Plenary to address the gap of global 3D wind profile observations with high priority. Based on the Aeolus experience, a combination of lidar & IR missions can provide complimentary wind observations which look to be very promising."
Plenary		WGII R49	WG II recommends that Agencies when pursuing data buy clearly defines all aspects of the data, e.g. orbits and coverage, in order to optimise the benefits of the data.
Plenary		WGII R49	WG II recommends that Agencies consider data buy with an option for redistributing data to global NWP centres.
Plenary		WGII R49	WG II recommends to plenary the endorsement of future OSOS Symposia
Plenary		WGII R49	WG II recommends to Plenary that CGMS provides a letter of support to NOAA on the GEO XO ACX efforts

Plenary is requested to take note

CGMS-49 recommendations - WGII			
Actionee	AGN item	Rec	Description
WMO		WGIIR49	WMO together with Working Group II to develop a baseline recommendation for channels from geostationary satellite imagers
CGMS Members		WGIIR49	CGMS Members to collaborate with users and L3 developers on spatial resampling chains “respectful of spatial scale”
CGMS Members		WGIIR49	CGMS Members are encouraged to engage with the MOSAiC PIs for widespread use of the campaign data
CGMS Members		WGIIR49	CGMS Member to consider derivation of Level-2 products using the new proposed Level-1g data.
WMO		WGIIR49	WMO to take into consideration the requirements for microwave imaging and sounding constellations, also in terms of equatorial crossing time in future reviews of the WIGOS Vision 2040.
CGMS Members		WGIIR49	CGMS Members to consider using all currently available microwave imager data for their precipitation products.



Thank you

WG II/16 - Review of Actions of Past CGMS Sessions 1/2

- The WG reviewed the actions of past CGMS sessions related to its work
- 15 Actions have been closed since CMGS 48 and 4 are expected to be closed in coming weeks

A45.04 (TBC)	A48.03 (TBC)
A46.02	A48.05
A46.05	A48.06
A46.13	A48.07 (TBC)
A46.13	A48.08
A46.14	A48.09
A47.01	A48.11
A47.09	A48.18
A47.23	
A47.28 (TBC)	
A46.32	

- Further details are provided in the updated list of CGMS actions and the updated HLPP

WG II/16 - Review of Actions of Past CGMS Sessions 2/2

- **23 Actions remain open of which some are due to COVID-19 related postponements of workshop**

A46.01 ITSC June 2021

A46.03 Open

A46.04 Ongoing

A46.06 Ongoing

A46.07 Ongoing

A47.08

A47.16 ICWG 3

A47.21 COVID-19

A47.24 Ongoing

A47.27

A47.31 COVID-19

A48.01 Open

A48.02 Open

A48.04 Open

A48.10 Open

A48.12 Ongoing

A48.13 Ongoing

A48.14 Ongoing

A48.15 Ongoing

A48.16 Ongoing

A48.17 Open

A48.19 Ongoing

A48-20 Open

- **Further details are provided in the updated list of CGMS actions and the updated HLPP**

WG II/16 - Review of Recommendations of Past CGMS Sessions

- **21 Recommendations remain open of which 1 with new deadline due to COVID-19 related postponements of workshop**

R43.02 Open

R43.03 Open

R44R46.02 Open

R47.01 Open

R47.02 Open

R47.04 Open

R47.05 Open

R47.07 Open

R47.08 Open

R47.28 Open

R48.01 Open

R48.02 Open

R48.03 Open

R48.04 Open

R48.05 Open

R48.06 Closed

R48.08 Open

R48.09 Open

R48.10 Closed

R48.11 Closed

R48.12 Closed

- **Further details are provided in the updated list of CGMS actions and the updated HLPP**



WG II/18 New Actions and Recommendations

- **WG II raised 37 new Actions**
- **WG II raised 22 new Recommendations**
- **WG II will convert some of the Open (New and Old) Recommendations to Best Practices**
- **Further details are provided in the updated list of CGMS actions and the updated HLPP**