

# CGMS Report to ITSC-19

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# CGMS

- CGMS provides an international forum for the exchange of technical information and coordination on geostationary and polar orbiting meteorological satellite systems.
- Science working groups (ITWG, IWWG, IROWG, and IPWG) provide a source of guidance/recommendations to CGMS which depending on criticality becomes an action managed at the CGMS level.
- CGMS for the first time is developing a High Level Priority Plan (HLPP) which covers a 5 year time period, updated every year. First HLPP covers 2014-2018.
- CGMS wants input from the science working groups to the HLPP
- ITWG needs to provide input to the HLPP by end of April in preparation for the next CGMS meeting – May 19-24, 2014.

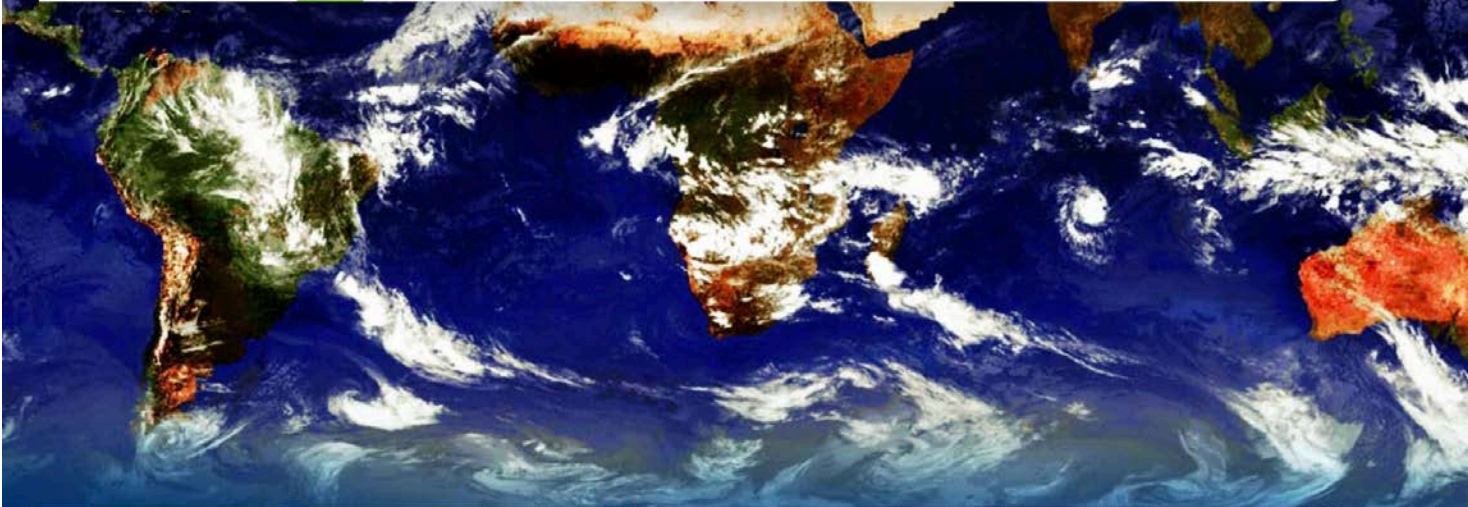


# The Coordination Group for Meteorological Satellites

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### LATEST NEWS

07th Feb 2014  
CGMS-42 plenary session

**CGMS - 41**  
DOWNLOAD REPORT

The main goals of the coordination activities of the Coordination Group for Meteorological Satellites are to support operational weather monitoring and forecasting as well as climate monitoring, in response to requirements formulated by WMO, its programmes and other programmes jointly supported by WMO and other international agencies. It is the policy of CGMS to coordinate satellite systems of its members in an end-to-end perspective, including protection of in-orbit assets and support to users as required to facilitate and develop shared access to and use of satellite data and products in various applications.

### Members:

- CMA
- CNES
- CNSA
- ESA
- EUMETSAT
- IMD
- IOC/UNESCO
- JAXA
- JMA
- KMA
- NASA
- ROSCOSMOS
- ROSHYRDOMET
- WMO

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There are four CGMS Working Groups within the scope of CGMS: WGI on global issues on satellite systems and telecommunication coordination; WGII on satellite data and products; WGIII on operational continuity and contingency planning; and WGIV on global data dissemination.

In addition, there are four Working Groups interacting with CGMS: The International ATOVS Working Group - ITWG; the International Precipitation Working Group - IPWG; the International Winds Working Group - IWWG; and the International Radio Occultation Working Group - IROWG. The last three Working Groups originate from CGMS WGII and plenary sessions.

- [Working group I \(WGI\): Global issues on satellite systems and telecommunication coordination](#) [ + ]
- [Working group II \(WGII\): Satellite data and products](#) [ + ]
- [Working group III \(WGIII\): Operational Continuity and Contingency Planning](#) [ + ]
- [Working Group IV \(WGIV\): Global data dissemination](#) [ + ]
- [International TOVS Working Group: ITWG](#) [ + ]
- [International Precipitation Working Group: IPWG](#) [ + ]
- [International Radio Occultation Working Group: IROWG](#) [ + ]
- [International Winds Working Group: IWWG](#) [ + ]

- **Working Groups**
  - Advanced Sounders
  - NWP
  - Climate
  - Radiative Transfer
  - Products and Software
  - International and Future Systems
- **Technical Subgroups**
  - Direct broadcast packages/RARS
  - RTTOV
  - CRTM

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There are among other three major initiatives resulting from CGMS:

- [Global Space-based Inter-Calibration System - GSICS](#)
- [Sustained, Co-Ordinated Processing of Environmental Satellite Data for Climate Monitoring](#)
- [Virtual Laboratory - Vlab](#)
- [CEOS-CGMS JOINT WG ON CLIMATE](#)

ON

# More on the working groups at the annual CGMS meeting

- **WG 1: Telecommunications**
  - Frequency allocations, interference
- **WG 3: Contingency Planning**
  - “help your neighbor in case of satellite failure”
- **WG4: Global Data Dissemination**
  - Direct Readout, Software packages, EuMETCAST, GEONETCAST, CMACAST
  - Data exchange

# WG2: Satellite Products

- Image Processing Techniques
- Satellite Data Calibration and Validation
- Infrared/Microwave sounding and ITWG
- Precipitation and IPWG
- Atmospheric Motion Vector and IWWG
- Radio Occultation and IROWG
- Cloud and Ash/Dust
- Ocean parameters
- Other parameters and products

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## CEOS-CGMS Joint Working Group on Climate


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The first meeting of the joint Working Group on Climate of the Committee for Earth Observation Satellites (CEOS) and the Coordination Group for meteorological Satellites (CGMS) took place on 5-7 March 2014 at EUMETSAT HQ, Darmstadt, Germany. The main topics included the next steps to be taken in implementing the Climate Strategy, the gap analysis that can be initiated from the ECV Inventory, the impact of the strategy report issued by the Carbon Task force.

The goals of this working group are to establish an inventory of existing records of Essential Climate Variables derived from observations from space, to plan the production of more Climate Data Records and to optimise planning of future satellites to expand records and avoid data gaps.

The meeting was followed by a workshop of the SCOPE-CM (Sustained, Co-Ordinated Processing of Environmental Satellite Data for Climate Monitoring) international initiative supported by the World Meteorological Organisation and a network of operators of environmental satellite systems, where work plans for cooperative Climate Data Record generation projects were established.





# Report of the 41<sup>st</sup> Meeting

## of the Coordination Group for Meteorological Satellites



8-12 July 2013, Tsukuba, Japan



**1. INTRODUCTION**

The main goals of the coordination activities of the Coordination Group for Meteorological Satellites are to support operational weather monitoring and forecasting as well as climate monitoring, in response to requirements formulated by WMO, its programmes and other programmes jointly supported by WMO and other international agencies.

It is the policy of CGMS to coordinate satellite systems of its members in an end-to-end perspective, including protection of in orbit assets and support to users - e.g. through appropriate training - as required to facilitate and develop shared access to and use of satellite data and products in various applications. This policy reflects in the structure of this 5-year High Level Priority Plan, which covers:

1. Coordination of observing systems and protection of assets
2. Coordination of data access, contributions to the WMO Information System
3. Enhance the quality of satellite-derived data and Products
4. Outreach and training activities
5. Cross-cutting issues and new challenges

This rolling 5-year plan is seen as part of a longer term perspective, in particular as regards the new challenges raised by climate monitoring in the context of the implementation of the Global Framework for Climate Services approved by the Extraordinary Congress of WMO on 31 October 2012.

It will be reviewed on an annual basis, considering in particular new requirements and perspectives arising from interactions with the user and scientific communities, the development of applications, e.g. NWP, and relevant research activities. It will ensure proper interaction with other space agencies and their relevant constituencies (e.g. CEOS including its working groups and virtual constellations).

## **HIGH LEVEL PRIORITY TASKS**

The high level priority tasks are presented according to the logic of the CGMS end-to-end systems

### **1 COORDINATION OF OBSERVING SYSTEMS AND PROTECTION OF ASSETS**

#### **1.1 Coordination of observing systems**

- 1.1.1 Coordinate the implementation of the CGMS baseline missions (updated nominal locations/orbits, operators), including optimisation of the distribution of Low Earth Orbit (LEO) sun-synchronous orbits to ensure efficient temporal sampling of the atmosphere and of the oceans;
- 1.1.2 Support satellite impact studies including regional verification;
- 1.1.3 Facilitate the evolution of research short-term missions to an operational status (where appropriate e.g. HEO missions);
- 1.1.4 Investigate through IROWG how a coordinated and optimised system could be set up for radio occultation observations for atmosphere and ionosphere monitoring;
- 1.1.5 Identifying partnership opportunities on space and ground segments and establish CGMS coordinated mechanisms for hosted payloads, e.g. for solar wind monitoring;
- 1.1.6 Identify potential gaps and ensure appropriate contingency measures are in place including analysis of budget constraints and associated risk assessment.

## **1.2 Coordination/Optimisation of data collection systems**

- 1.2.1 Coordinated participation in the activities of the International Forum of Users of Satellite Data Telecommunication Systems, to prepare the future use of the International Data Collection System (IDCS);
- 1.2.2 Assess Data Collection Platform (DCP) and Argos Data Collection System (A-DCS) status and evolutions including International channels, taking into account requirements of tsunami alert systems and in-situ ocean observations (e.g. buoys);
- 1.2.3 Share lessons learnt and share experiences on certification of DCS platforms (especially High Rate DCPs);
- 1.2.4 Share information on the development of their High Rate DCPs and share lessons learned on mitigating interference between DCPs;
- 1.2.5 To confirm user requirements for sharing data/information delivered using DCS (outside the regional area). Evolve the mechanisms to share DCP data.

### **1.3 Radio Frequency (RF) Protection**

- 1.3.1 Establish a coordinated position on the future of L-band services;
- 1.3.2 Investigate how to mitigate Earth Exploration Satellite Service (EESS) X-band (8025 – 8400 MHz) congestion and coordinate interference assessments on a regular basis and, as necessary, establish inter-agency coordination mechanisms to facilitate sharing and use of this frequency band by LEO and GEO systems;
- 1.3.3 Facilitate an effective preparation of national positions for the World Radio-communication Conference (WRC) favorable for the CGMS-related issues.

### **1.4 Coordination of Direct Readout Systems and Regional Retransmission Services**

- 1.4.1 Maintain the CGMS Direct Broadcast Global Specifications, including evolutions for future systems, and optimise and harmonise the approach to direct read-out dissemination, whilst investigating possible alternatives;
- 1.4.2 Facilitate the transition to new direct readout systems (GOES-R, JPSS, FY-3);
- 1.4.3 Work together to define a set of recommendations seeking affordable future receiving stations or alternatives to direct read-out solutions;
- 1.4.4 Further enhance the Regional ATOVS Retransmission Services (RARS) initiatives through their extension to advanced sounders for at least half of the globe;

## **2 COORDINATION OF DATA ACCESS AND CONTRIBUTION TO THE WMO INFORMATION SYSTEM**

- 2.1 Support the user-provider dialogue on regional/continental scales through regional coordination groups maintaining requirements for dissemination of satellite data and products through the various broadcast services;**
- 2.2 Support the implementation of sustained, coordinated Digital Video Broadcast (DVB) satellite services for the Americas, Africa, Europe and the Asia Pacific regions;**
- 2.3 Increase access to, and use of, data from R&D and pre-operational missions;**
- 2.4 Investigate the feasibility of introducing a coordinated dissemination service for meteorological information in helping to mitigate disasters;**
- 2.5 Investigate the feasibility of introducing a coordinated dissemination service for information in support of the ocean user community;**
- 2.6 Evaluate the set of applicable (or TBD) standards for dissemination mechanisms in use by CGMS members and assess if there is a need, in view of future systems, to amend, modify or revise such standards (or to derive new ones);**
- 2.7 Utilise operationally the WIS infrastructure for satellite data provision and discovery;**
- 2.8 Provide coordinated CGMS inputs to WMO on satellite and instrument identifiers or data representation and metadata within the WIS (including the Regional Meteorological Data Communications Network).**

### **3 ENHANCE THE QUALITY OF SATELLITE-DERIVED DATA AND PRODUCTS**

#### **3.1 Establish within GSICS a fully consistent calibration of relevant satellite instruments across operational CGMS agencies, recognising the importance of collaboration between operational and research CGMS agencies;**

3.1.1 Establish a consistent inter-calibration for thermal IR channels using hyper-spectral sounders as reference. The implementation will be done successively by the individual satellite operators.

3.1.2 Establish a consistent inter-calibration for solar channels using instruments with adequate in-orbit calibration and vicarious methods as reference. The implementation will be done successively by the individual satellite operators.

**3.2 Establish commonality in the derivation of satellite products for global users where appropriate (e.g., through sharing of prototype algorithms);**

3.2.1 Infer guidance from the ongoing intercomparison of AMV products for the future developments towards consistent AMV products. Consider in the guidance the future perspective of having the geostationary ring populated with 16-channel imagers.

3.2.2 Establish a coherent development of volcanic ash products (notably from current and future geostationary imagers) utilising the JMA testbed.

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

3.2.4 Using current and future geostationary imagers, generate and disseminate consistent basic nowcasting products, initially in pilot areas, as identified in SCOPE-Nowcasting.

**3.3 Foster the continuous improvement of products through validation and inter-comparison through international working groups and SCOPE-type mechanisms;**

3.3.1 Apply the IPWG validation protocol to precipitation combination datasets generated using multiple satellite and in-situ data sources

3.3.2 Increase the scientific and operational maturity of all SCOPE-CM phase 2 projects by 2015



**3.4 Harmonise the metadata (e.g. quality descriptors) and format of products to be exchanged, in adherence to the Service and Discovery metadata standards formulated in the context of WIGOS/WIS;**

3.4.1 Promote such standards within ocean communities, such as on SST, ocean colour, and ocean surface topography, to facilitate common data representation and near-real time exchange

**3.5 Develop, and start implementing, methods to describe the error characteristics of satellite data and products;**

3.5.1 Address the error characteristics of wind products at the next International Winds Workshop in 2014 and provide a set of guidelines to be considered at the operational centres.

**3.6 Strengthen interaction with users in selected thematic areas by establishing a close relation with them as beta-testers and foster optimum use of satellite data.**

3.6.1 Establish a sustained interaction with the operational Nowcasting communities with a view to fully utilise the commonality of the future geostationary imagers.

3.6.2 Report on the progress within the Nowcasting community toward the use of hyperspectral sounders and work toward common products to serve the requirements of the global community.

3.6.3 Integrate the use of precipitation datasets recognized by IPWG in meteorological and hydrological applications, through dissemination of open visualization and analysis tools.

## **4.2 Training**

- 4.2.1 Continue to foster optimum use of satellite data for weather forecasting, climate applications, and environmental assessments including hazardous events such as volcanic ash and flooding;
- 4.2.2 Update and develop new VLab training material where necessary, and in collaboration with partner institutions such as Collaboration among Education and Training Programmes (COMET) and Committee on Space Research (COSPAR);
- 4.2.3 Provide shared, regular support to funding the VLab Technical Support Officer function through the WMO VLab Trust Fund, and to the VLab Centres of Excellence as per agreed expectations.

## **4.3 User Conferences**

- 4.3.1 Conduct regional satellite users conferences to (i) share experience and foster the exchange of ideas; ii) promote better access, and improve the utilisation of, existing satellite data and products; (iii) prepare the user community on new satellite systems' data products and services, (iv) engage young people entering the field and (v) other items as appropriate.

## **5 CROSS CUTTING ISSUES AND NEW CHALLENGES**

### **5.1 Advancing the architecture for climate monitoring from space**

- 5.1.1 Assess how CGMS can optimally contribute to the implementation of the GFCS by taking an active role in the construction of the Architecture for Climate Monitoring from Space;
- 5.1.2 Evaluate the “CGMS baseline for the operational contribution to the GOS” in the light of the logical view of the architecture;
- 5.1.3 Extend the use of the Global Space-based Inter-Calibration System (GSICS) and the Sustained Co-Ordinated Processing of Environmental satellite data for Climate Monitoring (SCOPE-CM) frameworks;

- 5.1.4 Analyse long term data sets for specific climate relevant phenomena to demonstrate their impact on climate applications;
- 5.1.5 Establish priorities of multi decadal ECV products (including ECVs addressed by the International Science Working Groups) and contribute to creation of key FCDR that provide the basis for many ECVs;
- 5.1.6 Ensure the data holdings of CGMS members are appropriately reflected in the Architecture for Climate Monitoring from Space (physical view) through their systematic contributions to the Essential Climate Variable (ECV) Inventory;
- 5.1.7 Establish an integrated approach for accessing climate data records produced by CGMS members;
- 5.1.8 Promote a common approach to the long-term preservation of data through the exchange of information and the establishment of a coordinated consensus on best practice;
- 5.1.9 Work with CEOS towards a sustainable implementation of the global architecture for climate monitoring from space.

# CGMS-41 Actions/Recommendations applicable to ITWG

- CGMS agencies with direct broadcast to provide access to software for converting satellite data packets to calibrated sensor observations (level 1b), and complete related information on the WMO website
- GSICS to take on calibration event monitoring activities following the recent work on calibration event monitoring. Such information should be included in the next update of the WMO OSCAR database.
- NOAA to coordinate its new direct readout initiative which focuses on advanced sounder data from POES, METOP, FY3, METEOR-M, Aqua/Terra with the WMO RARS program.
- ROSHYDROMET to report at CGMS-41 on the technical modalities for the near-real time provision of Meteor-M global data sets and associated ancillary information, as needed to fully contribute to the GOS.
- NOAA and WMO to discuss the relation of the Direct Broadcast Data Initiative (see NOAA-WP-13) to RARS, and how RARS can take advantage of this initiative

# CGMS-41 Actions/Recommendations applicable to ITWG

- NOAA to provide a report on the benefit of Day-Night imagery (e.g. as experience with SNPP/VIIRS) at CGMS-42 in order to assist CMA in refining its requirements for an imager for the early morning orbit mission.
- R & D or operational satellite operators should consider the provision of some high-accuracy, SI-traceable and stable reference instruments as anchors for operational instruments, in particular, for climate purposes.
- CGMS Satellite Operators to address the anticipated or potential gaps identified in the WMO Gap Analysis, in particular:
  - infrared and microwave sounding on the early morning orbit,
  - hyperspectral sounding missing in some geostationary sectors,
  - long-term follow-on of radio-occultation constellation,
  - global precipitation measurement precipitation radar follow-on mission,
  - long-term Earth Radiation Budget monitoring
  - limb sounding for high-vertical resolution observations in the stratosphere and mesosphere (of temperature, humidity, wind, aerosol, ozone and other trace gases).

# CGMS-41 Actions/Recommendations applicable to ITWG

- All CGMS Members to provide updates on satellite programmes to be included in OSCAR, through their annual reports to CGMS and by other means as appropriate
- CGMS satellite operators to support NWP centres to perform Observing System Experiments (OSEs) on the regional impact of a potential gap of sounding from the early morning orbit.
- CGMS Members to support CMA in further investigations of the benefit and technical consequences of potential move of a mid morning mission to an early morning mission.
- IMD with GSICS assistance to employ GSICS Satellite Intercalibration tools to intercompare geostationary imager to IASI and/or AIRS. IMD to identify a focal point, and to present findings at CGMS-41

# Possible Actions from ITSC-19 to CGMS

- Actions raised from ITSC-19 should be important and requiring CGMS support to realize benefits:
- Examples:
  - CGMS agencies to support validation campaigns to assess the absolute calibration of “weather” satellites for climate applications.
  - CGMS agencies to provide prelaunch simulated datasets to prepare for operational utilization
  - CGMS agencies to support radiative transfer model assessments and improvements including LBL, recognizing the cross-cutting importance of radiative transfer to weather forecasting, environmental assessments and climate applications.



# ITWG as a CGMS working group

- Part of CGMS strategy is to use the science working groups (ITWG, IPWG, IROWG, IWWG) as the expert groups to provide priorities and to respond to actions when needed.
- CGMS will ask ITWG for subject matter expert support and potentially for some analysis.
  - But ITWG meets every ~ 18 months.
  - CGMS meets every year
- CGMS will need ITWG working groups to provide support at a higher frequency (On call)
  - Potentially we will need to have virtual meetings of the working groups when needed.
- So the role of working group co- chairs is more important than ever.

# Each working group will be provided

- The excel spreadsheet of all CGMS-41 actions
- The CGMS-41 report.
- Co-chairs should review the spreadsheet and the report
- Niels already provided a topic list to the co-chairs