



Report from WG II (Satellite data and products)

Dohyeong Kim and Werner Balogh
(Co-Chairs)

Ken Holmlund and Mitch Goldberg (Rapporteurs)

Presented to CGMS-46 Plenary session, agenda item E.6

**Coordination Group for
Meteorological Satellites**



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 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: Election of WG II Co-Chair **Werner Balogh (WMO)**

WGII/3: Review of Actions and Recommendations

WGII/4: Interaction between WGII and ISWGs

WGII/5: International Science Working Groups and initiatives **16 WPs**

(IWWG, IPWG, ITWG, ICWG, IROWG, GSICS, SCOPE-CM, SCOPE-Nowcasting)

WGII/6: Other international science community reports (Oceans, CEOS VCs, ...) **5 WPs**

WGII/7: High priority topics to members **5 WPs**

WGII/8: Preparation for future generation of Indian geostationary and scatterometer missions **2 WPs**

WGII/9: Agency reports **9 WPs**

WGII/10: WPs responding to, or raising, CGMS Actions **2 WPs**

WGII/11: Space Weather matters

WGII/12: Review and updating HLPP **2 WPs**

Σ = **41 WPs** (2017: 36; 2016: 37; 2015: 64; 2014: 50)

~46 participants
Monday 9.00-18.00
Tuesday 9.00-18.30

WGII/5 - International working groups/initiatives

➤ *GSICS – performance monitoring “specification and requirements”*

CGMS-45.05 GSICS to produce annual state of the observing system report to be delivered at CGMS

GSICS-EP-18.A01 : GRWG to prepare specifications and methodologies for CGMS agency development of operational instrument performance monitoring systems

A.GRWG.2018.10b.1: GRWG Chair to coordinate each agency to provide to define minimum information for performance monitoring “specification and requirements” by 15 May 2018.

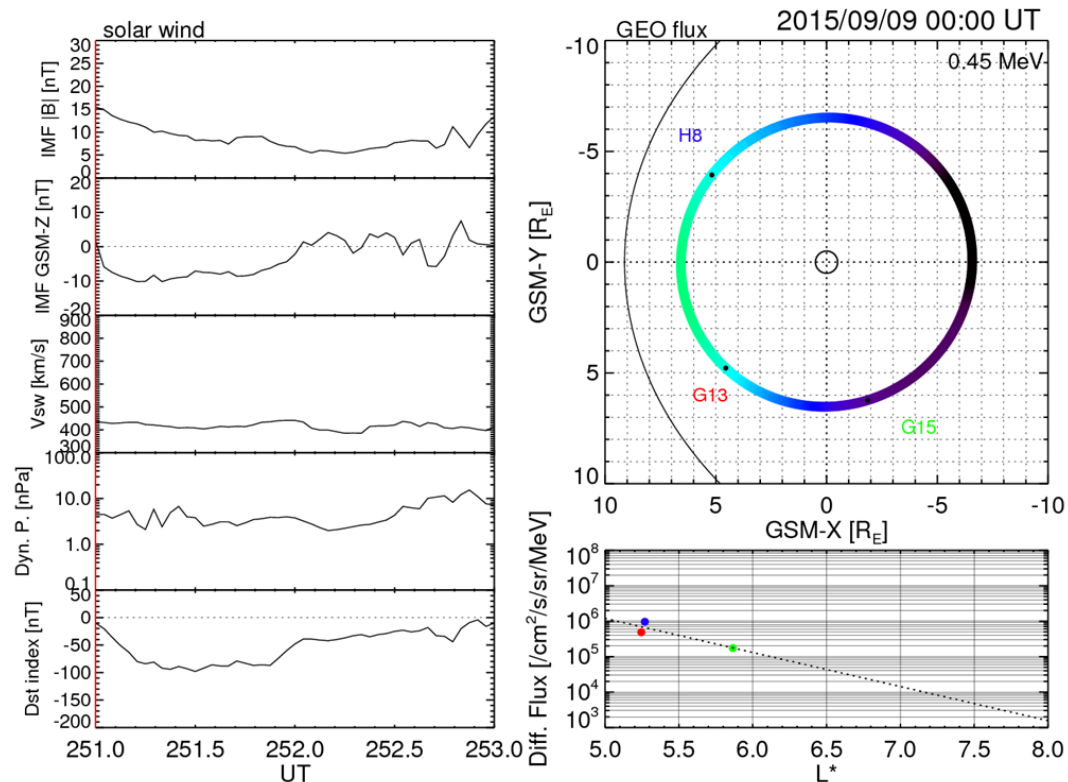
		Parameters
Engineering	Spacecraft	Status (attitude, velocity, position, etc.)
	Instrument	Temperature (Detector, Blackbody, Cooler, Radiator, Blackbody, Stage Outgas Htr, Optics, Loop Heat Pipe, Scan Mirror, Motor, Antenna, Optics, Power, FPM, etc.), Voltage (Power), scan rate, SRF, service status, *current(dark, motor, etc.)
Calibration	Calibration	DC and Temperature (Space, blackbody, solar diffuser), Coefficient(Gain, Intercept)
	Radiometric Cal.	SNR, NEdT(NEdN), Trend(slope), Consistency, Stability
	Geometric Cal.	Bias, stability, residual, band-to-band/pixel-to-pixel co-registration, #(valid) of landmark(or stars), Errors(striping) status
	Cross/Vicarious/ Model O-B	GEO-LEO Tb Bias, Reflectance Ratio, Desert/DCC/Lunar calibration, O-B Bias
GDWG inputs		Implementing user notification function (e.g. alerting via email in case of calibration anomaly) Linking calibration event logging information
Product		Level1B data, Image Max/Min/Mean/Median/Invalid, stability

WGII/5 - International working groups/initiatives

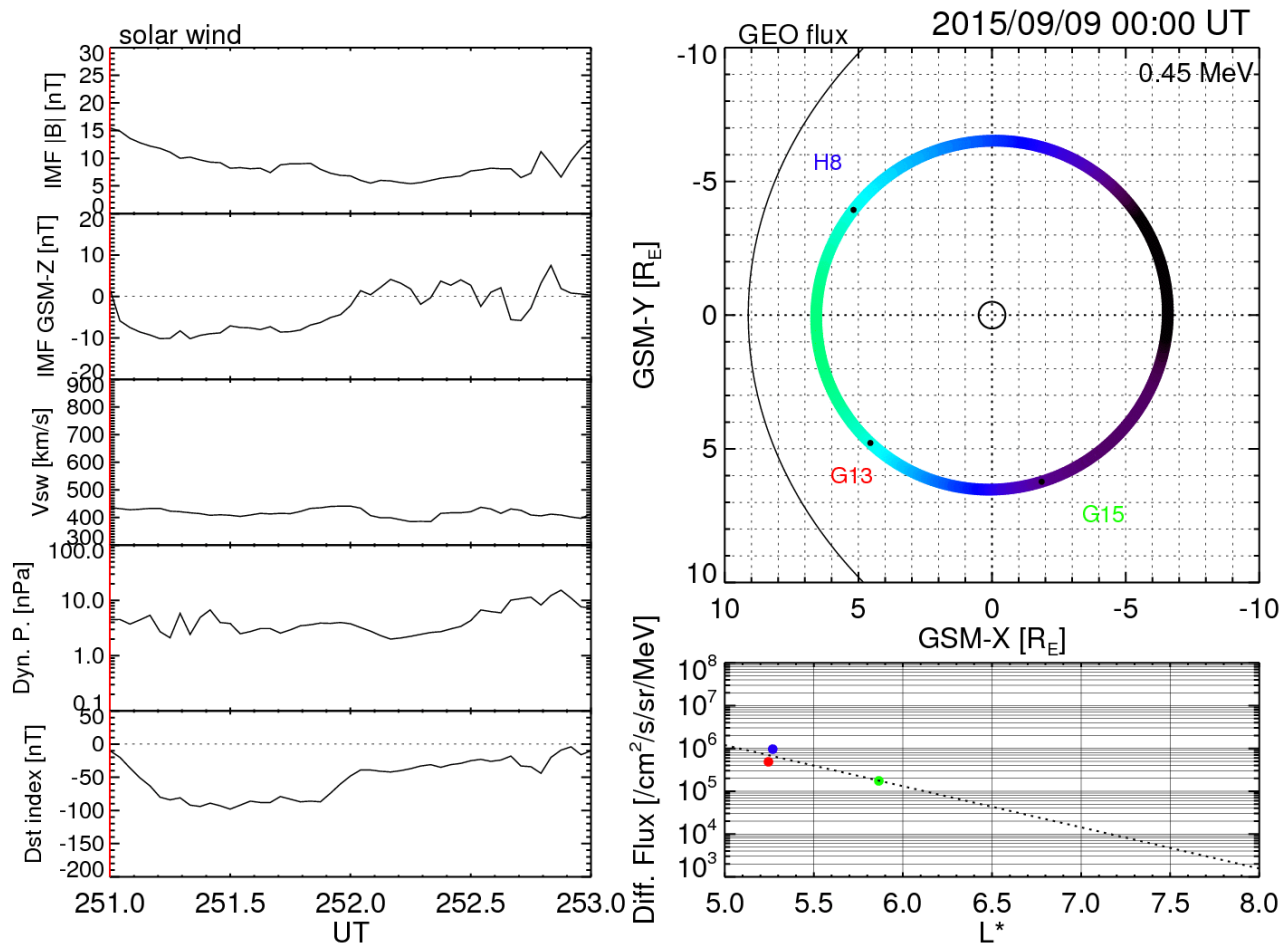
➤ GSICS

- CGMS members to provide points of contacts for space weather instrument inter-calibration. (Ref. CGMS-46-GSICS-WP-01)

Distribution of high energy electron flux in GEO from several meteorological satellites



Distribution of high energy electron flux in GEO from several meteorological satellites



WGII/5 - International working groups

➤ *Soundings*

- CGMS members to provide a summary of their known unfilled spectroscopy needs, and to develop a means of facilitating interaction between laboratory spectroscopy groups to spur cooperation and mitigate the lack of resources (financial and persons). (Ref. CGMS-46-ITWG-WP-01)
- R-CGMS member are encouraged to take due consideration to climate applications requirements during the planning for new meteorological satellite missions. (Ref. CGMS-46-ITWG-WP-01)
- R-CGMS members should give due consideration to potential impacts of changes to instrument data processing changes. Specifically ITWG proposes that if the expected maximum change (temporally, geographically) in the observed brightness temperature of any channel of the instrument exceeds 0.1K or 20% of NEdT (whichever is smaller) it should be made clear in notifications to users. User notifications to be made no later than 8 weeks in advance of the change and with test data (at least a few orbits, ideally more) provided whenever possible.

WGII/5 - International working groups

➤ **Radio Occultation**

- R-CGMS members should consider hosting radio occultation payloads on future missions (Ref. CGMS-46-IROWG-WP-01).
- **Action** IROWG to establish principles for consistent quality control for RO to enable easier quality assessment

➤ **Winds**

- IWWG to provide information to clarify their preference for flying the Metop satellites in a TRISTAR configuration.
- IWWG to look at improving quality indicators for high resolution wind derivation for mesoscale and regional applications.
- IWWG to consider developing climate projects from Atmospheric Motion Vectors (AMVs) and to report to the CEOS/CGMS WGClimate with a potential pilot project. (Ref. CGMS-46-IWWG-WP-01)

➤ **Precipitation**

- Next meeting 5 -9 November, 2018, Seoul, Korea

➤ **Clouds**

- Next (2nd) meeting 29 October - 2 November 2018, Madison, USA

WGII/5 - International working groups/initiatives

➤ ***SCOPE-Climate Monitoring***

- SCOPE-CM Executive Panel Chair to convene a strategy planning meeting with high-level representatives from SCOPE-CM members and other interested agencies, who are empowered to authorise resources, to agree on a revised strategy for SCOPE-CM and a new Implementation Plan, which shall be reported back to CGMS-47. (Ref. CGMS-46-WMO-WP-10)

➤ ***CEOS-CGMS WG Climate***

- Space Agency Response to the 2016 GCOS Implementation Plan
- Gap analysis report and Coordinated Action Plan based on ECV Inventory 2.0

➤ ***CGMS Baseline***

➤ ***ECWMF OSEs vs FSOI***

- CGMS members to provide comments on the impact studies conducted by ECMWF on OSEs vs. FSOI and how CGMS members can benefit from the findings. (Ref. CGMS-46-WMO-WP-13)

➤ ***SCOPE - Nowcasting***

- 4 pilot projects

SCOPE-NWC Projects

Category	Product	Region	Provider	User	Gaps
Basic nowcasting	RGB composites	WMO Region II (Asia) and Region V (SW Pacific)	JMA, CMA, KMA	NMSs in Region II and V	No standard products available; products limited
Advanced nowcasting	Volcanic Ash Products	Global	CMA, JMA, KMA, EUMETSAT, NOAA	NMHSs, VAACs	No standard products available; products limited
Advanced nowcasting	Blended satellite global precipitation product (GEO+LEO)	Global coverage	Hydro Estimator, NASA TRMM (3B42), NOAA (real-time MW)	Civil authorities, NMHSs, Flash flood guidance systems, general users	Rapid, facilitated access to quantitative precipitation estimates
RT Atmospheric Composition products	Dust Monitoring and Prediction Products	WMO Region II (Asia) and V (South-West Pacific)	CMA, JMA, KMA	SDS-WDCs, NMSs (to issue results and warnings) in RA II and RA V	Regional diversity of aerosol-related products not harmonized

OUTLOOK:

RGB composites: Continue to develop improved RGB recipes that maximize sensor-to-sensor consistency and remain engaged with users

Volcanic Ash: Planning for the final stage of the inter-comparison is underway

Precipitation: Development of validation procedures and transition from prototype to operational implementation

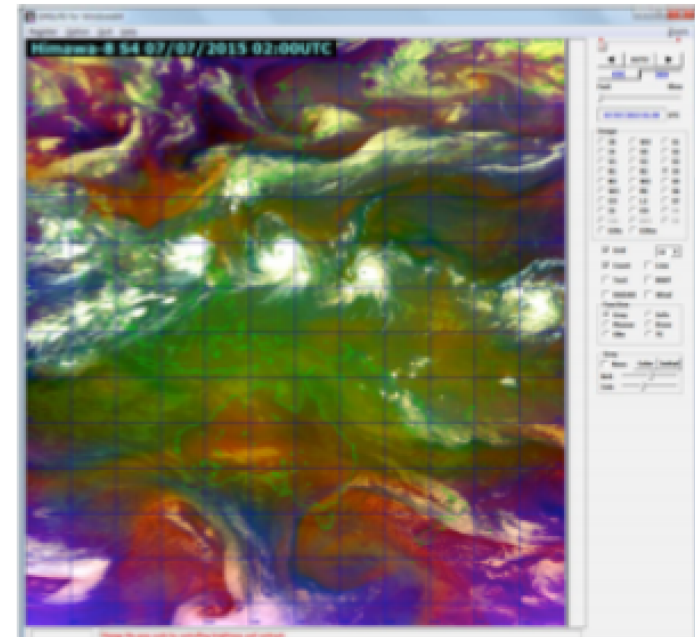
Dust Products: Focus on comparing and validating CMA, JMA, and KMA dust products; integration with forecast models

Pilot Project 1: RGB Composites – Benefits and Outlook

- Much improved RGB availability for NMHSs within WMO Regions II and V
- Improving inter-sensor product consistency
- Better coordination between data providers and host agencies
- Improved end user engagement and understanding of RGB's

Outlook: Continue to develop improved RGB recipes that maximize sensor-to-sensor consistency and remain engaged with users

SATAID



Proposed New Pilot Projects

Category	Product	Region	Pilot Leads	User	Gaps
Nowcasting in a Big Data World	Multi-sensor feature based nowcasting of convective impacts	Demonstration studies in area of interest	NOAA and ABCM (M. Pavolonis and L. Majewski)	NMSs	Lack of standards and coordination on products that diagnose and nowcast convective storms using satellite data in tandem with other data sources
Advanced Nowcasting	Utilization of low-level satellite-derived moisture fields for nowcasting convective development	TBD	EUMETSAT (J. Grandell)	NMHSs	Full utilization of hyperspectral infrared measurements for convective forecasting
Advanced Nowcasting	Incorporating satellite-based MW observations about condensed water into nowcasting applications	Tropics	JPL (Z. Haddad)	NMHSs Airlines	MW measurements, such as GMI, can be better utilized for nowcasting



Weather - Climate - Water

WGII/5 - International working groups/initiatives

➤ **GOFC-GOLD (Fire)**

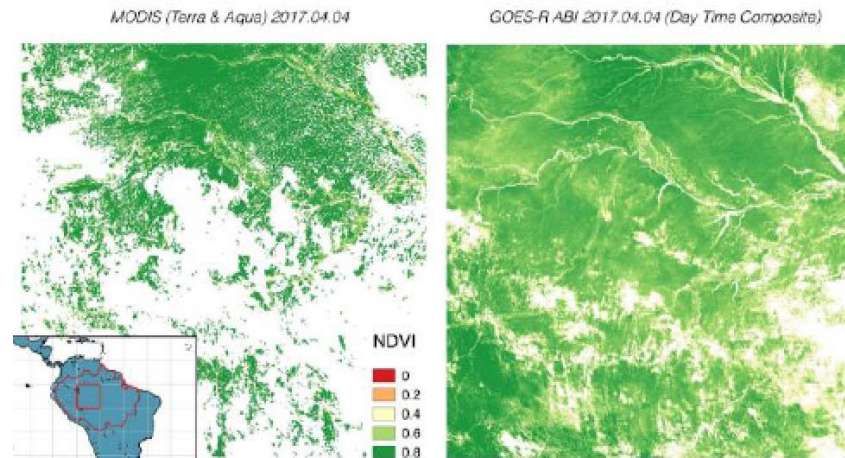
- CGMS members to provide points of contact for GOFC-GOLD to the CGMS Secretariat (Ref. CGMS-46-GUEST-WP-02)

➤ **AEROSAT (aerosols)**

- CGMS members to provide points of contact for AEROSAT to the CGMS Secretariat (Ref. CGMS-46-GUEST-WP-01)

➤ **Land Monitoring from Geostationary Satellites**

- NASA presentation (NASA-WP-4 #4)



WGII/6 - Other International Science Community reports

➤ ***Operational Satellite Oceanography***

- CGMS to endorse the "First International Operational Satellite Oceanography Symposium" as a CGMS activity and to nominate points of contact for serving on the Symposium Programme Committee. (Ref. CGMS-46-NOAA-WP-11)

➤ ***NOAA CMA Flood Mapping Initiative***

- CGMS members interested in participating in the CMA/NOAA operational flood mapping initiative to contact Mitch Goldberg (mitch.goldberg@noaa.gov). (Ref. CGMS-46-NOAA-WP-10)

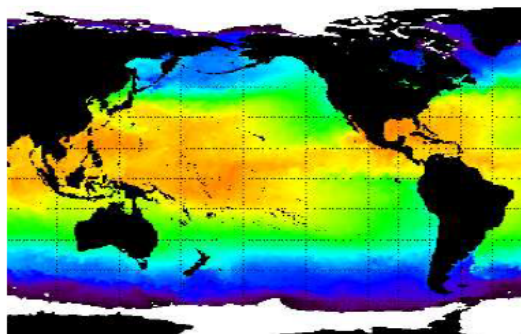
➤ ***Second International Indian Ocean Expedition***

- R-CGMS Secretariat to consider organizing a special plenary session or a side event on operational oceanography at CGMS-47 to help advance the operational nature of ocean observation. (Ref. CGMS-46-NOAA-WP-11, CGMS-46-IOC-UNESCO-WP-02)

➤ ***Polar Space Task Group***

- CGMS members to provide points of contact to support the work of the WMO Polar Space Task Group (PSTG) to the CGMS Secretariat and to engage with the Global Cryosphere Watch (GCW) for that task. (Ref. CGMS-46-WMO-WP-12)

First International Operational Satellite Oceanography Symposium



18 to 19 June 2019 Washington, DC Area **FIRST INTERNATIONAL OPERATIONAL SATELLITE OCEANOGRAPHY SYMPOSIUM**

Satellite remote sensing of ocean properties is a technology of continuously increasing maturity and scope. Sea surface temperature, sea surface height, ocean color, sea ice, ocean winds, roughness-derived parameters (e.g., oil spills) and other measurements are now available on a routine and sustainable basis. Some of these products are integral to operational applications for routine and event-driven environmental assessments, predictions, forecasts and management. Yet ocean satellite data are still underutilized and have a huge potential for contributing further to societal needs and the "blue economy".

The First Operational Satellite Oceanography Symposium aims to enable the understanding the barriers (perceived or actual) and facilitate the widespread incorporation of satellite ocean observations into the value chain from data to useful information across the range of operational applications. In this symposium, an international community of satellite operators, information producers and users will exchange facts and ideas to 1) understand user needs and expectations, and 2) develop interoperability standards and establish best practices that will lead to more universal use of ocean satellite data.



**NOAA Center for
Weather and
Climate
Prediction**

**College Park, MD
USA**

18 & 19 June 2019

**Convenient
access from
Washington DC**

STEERING COMMITTEE

Bojan Bojkov (EUMETSAT)
Chris Brown (NOAA)
Paul DiGiacomo (NOAA)
Veronica Lance (NOAA)
Francois Montagner
(EUMETSAT)

Web Address to follow

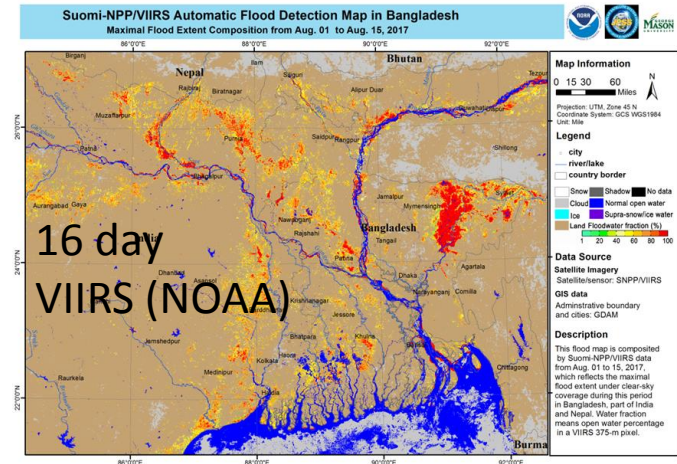
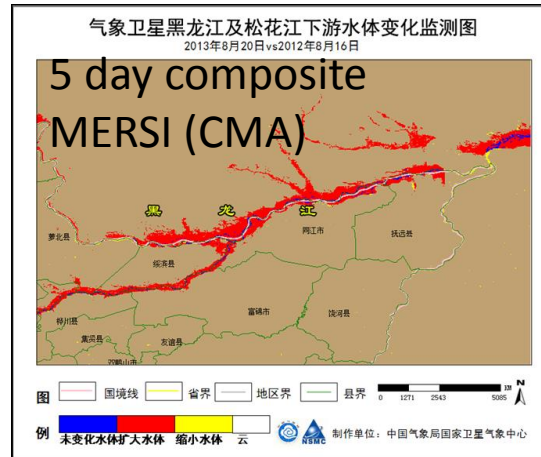
**Coordination Group for
Meteorological Satellites**



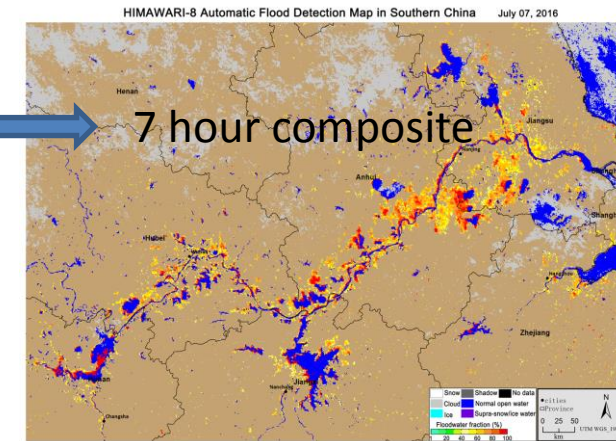
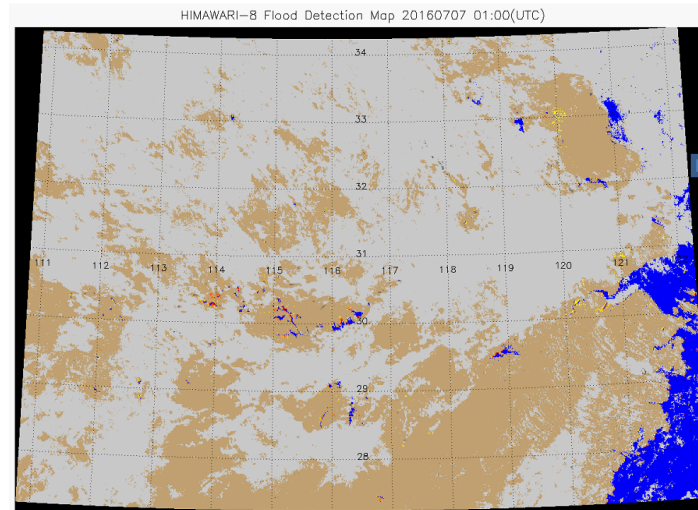
CGMS

New Capabilities: Flood mapping from operational LEO and GEO meteorological imagers

Floods monitoring from LEO satellites in cloudy prone regions often requires multiday compositing



The much improved temporal resolution from the new generation of geostationary satellites can mitigate cloud contamination



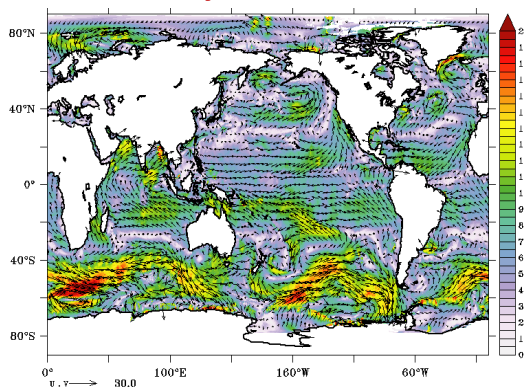
WGII/7 - Selected topics of high priority

- ***Possible gaps on passive microwave measurements (PMW) for nowcasting***
 - EUMETSAT and IMD to establish contact for collaboration on SAF Nowcasting activities (Ref. CGMS-46-IMD-WP-06)
- ***Validation of Himarawi 9 /AHI Level 1 and -2 data products***
- ***CMA report on development of non-meteorological products***
- ***GOES-16 Contributions to a Weather Ready Nation***
- ***Reprocessing of NOAA/JPSS SNPP Sensor Data Records***
 - Recommendation: CGMS to take note of the status of the NOAA/JPSS SNPP Reprocessing of Sensor Data Records reprocessing effort and encourage all satellite operators to reprocess their mission data and make them easily accessible. (Ref. CGMS-46-NOAA-13)

WGII/8 - Preparation for future generation of Indian Geostationary and Scatterometer Missions

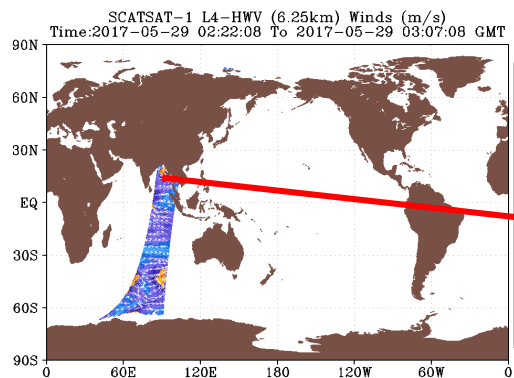
ISRO's R&D (Value Added) Products : SCATSAT-1 (www.mosdac.gov.in)

Global Analyzed Vector Winds

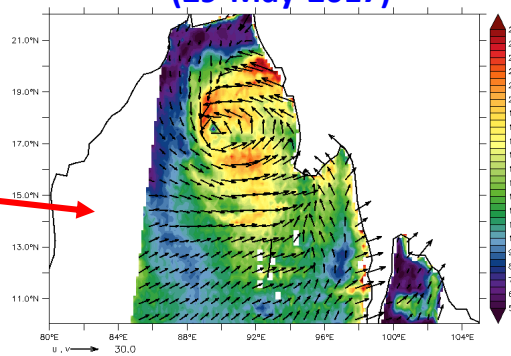


Daily Single NetCDF with 13 wind derived parameters generated by merging Level-2B SCASAT-1 data with NCMRWF (UK-Met Office NWP) model through Parallel-OI. Period: 03-Oct-2016 to till date

High spatial density winds (L4HW: 06.25km)



Cyclone MORA (29-May-2017)

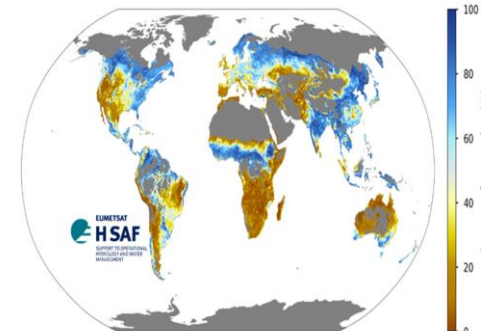
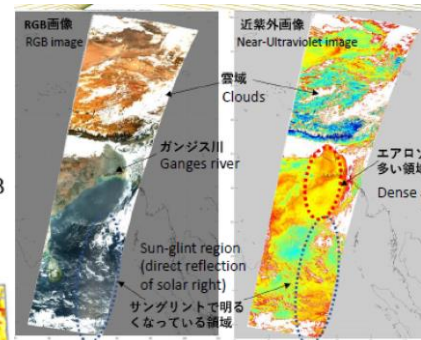
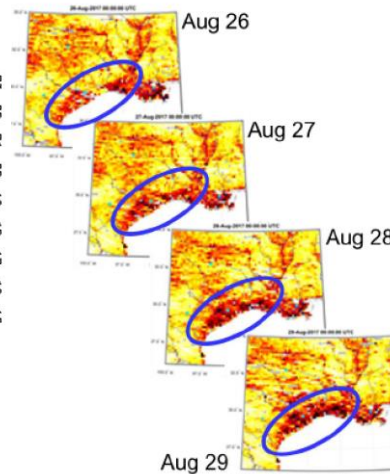
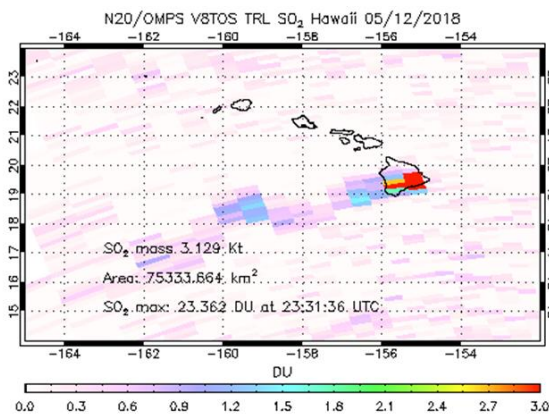
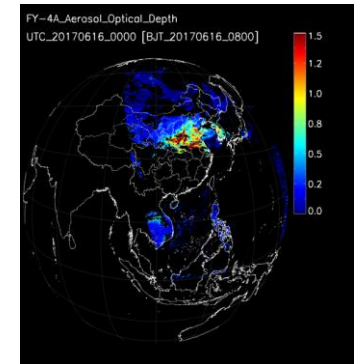
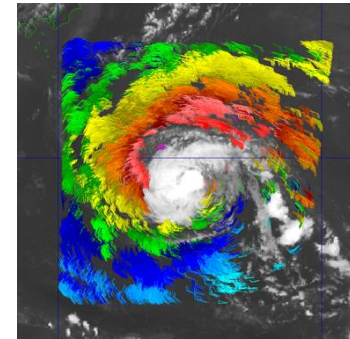
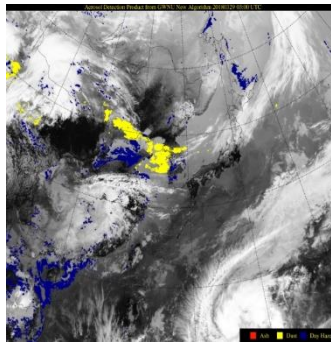
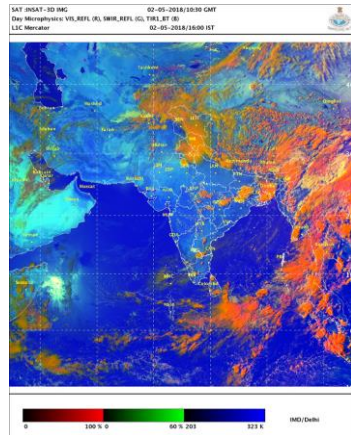


AWVs Product parameters

Sr. No.	Parameter	Unit
1.	Uobs (observed zonal wind speed)	m/s
2.	Uanal (analyzed zonal wind speed)	m/s
3.	Uestd (analysis error standard deviation in zonal wind speed)	m/s
4.	Vobs (observed meridional wind speed)	m/s
5.	V (analyzed meridional wind speed)	m/s
6.	Vestd (analysis error standard deviation in meridional wind speed)	m/s
7.	Taux (analyzed zonal wind stress)	Pa
8.	Tauy (analyzed meridional wind stress)	Pa
9.	Divg (analyzed wind divergence)	Sec ⁻¹
10.	Curl (analyzed wind stress curl)	Pa/m
11.	Qlh (analyzed latent heat flux)	W/m ²
12.	Qsh (analyzed sensible heat flux)	W/m ²
13.	NS (number of samples per day)	Number

WGII/9 - CGMS agency reports on highlights and issues in dataset and product generation

➤ IMD, KMA, ROSHYDROMET, JMA, CMA, NOAA, NASA, JAXA, EUMETSAT



WG II/12 - Review and updating of the HLPP

- The WG reviewed the items of the HLPP related to its work and provided progress updates on the following items:
 - 3.2.2 – Assimilation of high resolution winds
 - 3.2.3 – Development of ash products
 - 3.2.6 – Data utilisation, products generation and
 - 3.5.1 – Sustained interaction with Nowcasting communities
 - 3.6.1 – Support for line-by-line reference model development
 - 3.6.2 – Validation and inter-comparison of LBL models/spectroscopy
 - 3.7.1 – Trade off studies for infrared sounders

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

- The WG reviewed the actions and recommendations of past CGMS sessions related to its work
- The following actions were proposed to be closed:
 - A44.13
 - A45.01
 - A45.07
 - A45.08
 - A45.09
 - A45.10
 - A45.11
- Further details are provided in the updated list of CGMS actions and the updated HLPP

Attention to CGMS summary

➤ **GSICS**

- **Action:** CGMS members to provide points of contacts for space weather instrument inter-calibration. (Ref. CGMS-46-GSICS-WP-01)

➤ **ITWG**

- **Action** CGMS members to provide a summary of their known unfilled spectroscopy needs, and to develop a means of facilitating interaction between laboratory spectroscopy groups to spur cooperation and mitigate the lack of resources (financial and persons). (Ref. CGMS-46-ITWG-WP-01)
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Attention to CGMS summary

- ***Take not of new SCOPE-CM projects***
- ***GOFC-GOLD (Fire)***
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