

Report from WG II (Satellite data and products)

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(Co-Chairs)

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Presented to CGMS-47 Plenary session, agenda item E.5.5

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: Review of Actions and Recommendations

WGII/3: Interaction between WGII and ISWGs

WGII/4: International Science Working Groups and initiatives

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

12 WPs

WGII/5: Cross-Coordination between Various Working Groups 1 WP

WGII/6: Other international science community reports (Oceans, CEOS VCs, ...) 0 WP

WGII/7: Space-based lightning observations 4 WPs

WGII/8: High priority topics to members 6 WPs

WGII/9: CGMS agency reports on highlights and issues data set and product generation

12 WPs

WGII/10: WPs responding to, or raising, CGMS Actions 5 WPs

WGII/11: Space Weather matters: SWCG interactions with WGII 2 WPs

WGII/12: Review and updating of the WGII TOR (due 2020) 1 WP

WGII/12: Review and updating HLPP 1 WP

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

~46 participants
Monday 9.00-18.45
Tuesday 9.00-18.15

WGII/5 - International working groups/initiatives

- **GSICS**
 - Annual observing system report. Integration with WIGOS, and Instrument Landing Pages. (See GSICS plenary report)

- **Soundings (ITWG)**
 - Next meeting October 31 – Nov 6, 2019 in Quebec. Will provide assessments on CGMS unfilled spectroscopy needs, and provide recommendations for next generation improvements in sounding capabilities. There also will be a GSICS side event.

- **Radio Occultations (IROWG)**
 - Next meeting September 19-25, 2019 in Elsimore, Denmark with ROM SAF. Vision remains backbone constellation > 20,000 high quality occultations per day. Should be considered essential (WMO 40). **Will not be achieved.**
 - Commercial providers may be able to supplement, but concerns about data sharing and quality remains an issues. Encourage Agencies to report at IROWG-7 on their assessments.

- **Precipitation (IPWG)**
 - Need for higher temporal resolution sampling. (See IPWG plenary report)

- **Clouds (ICWG)**
 - CGMS members consider multi-sensor (satellites and ground based) applications for convective when developing /updating product requirements.(See IPWG plenary report)

- **Polar Space Task Group, CEOS-CGMS JWG-CLIMATE, SCOPE-CM and VLAB**
 - Reported in Plenary

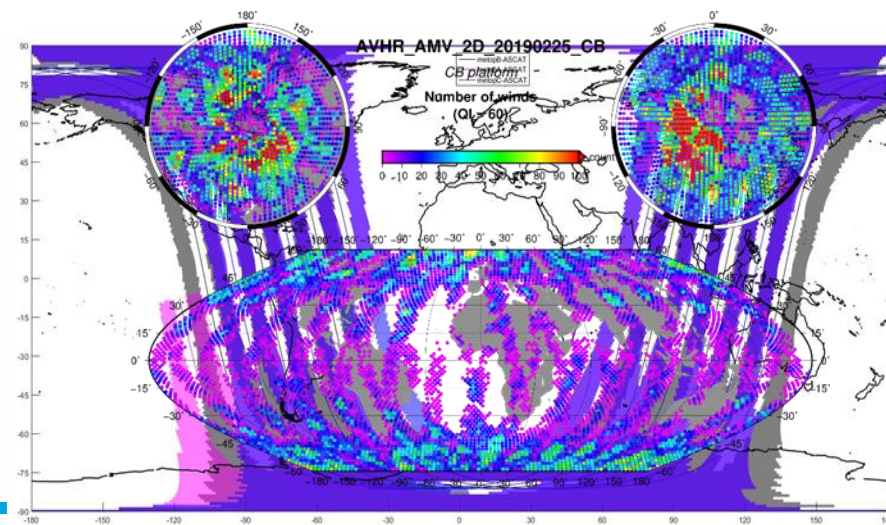
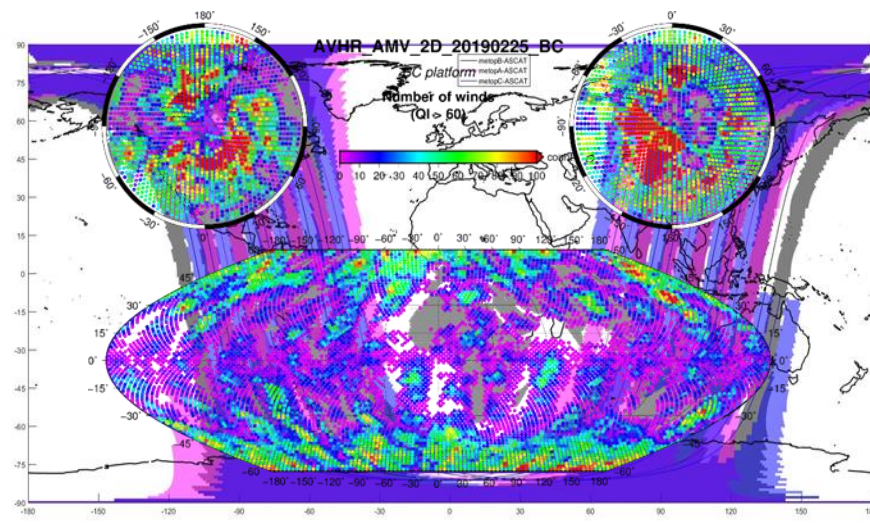
WGII/5 - International working groups/initiatives

➤ Winds (IWWG)

- Next meeting (IWW15) KNMI, De Bilt, Netherlands (20 April - 25 April 2020)
 - The scope of the 4th AMV Inter-comparison Study will be discussed at IWW15.
 - Partners from Aeolus, MISR, and the ICWG will participate

A46.05 - IWWG to provide information to clarify their preference for flying the Metop satellites in a TRISTAR configuration. (Ref. CGMS-46-IWWG-WP-01)

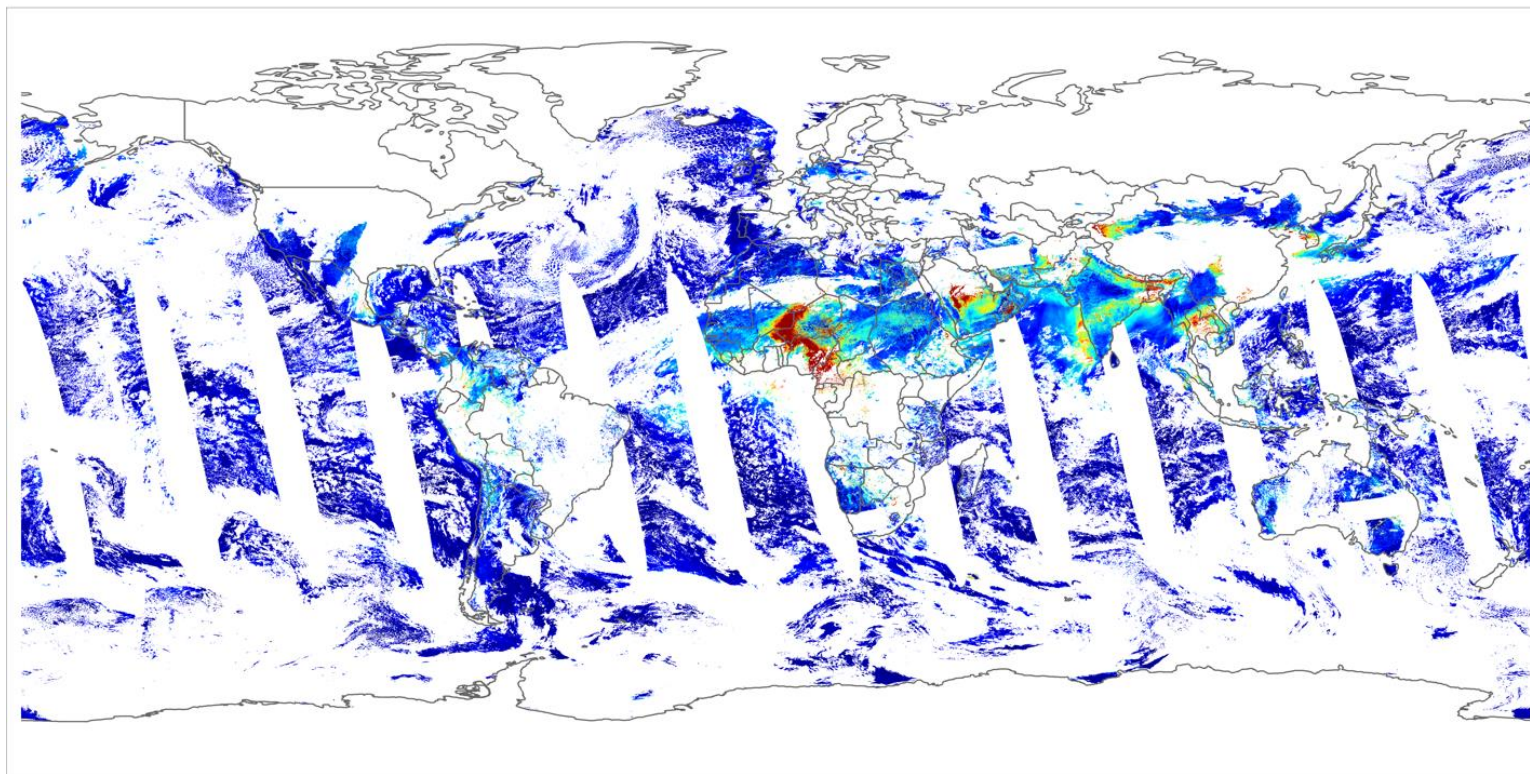
- For dual Metop AMVs, both TRISTAR and TRIDENT configurations are possible. However, the TRISTAR configuration enables the creation of two complementary products C-B and B-C that are asymmetric, impacting both the coverage and quality.
- For the ASCAT winds community, the TRISTAR configuration has a significant benefit by improving the coverage of the ASCAT measurements.



Aerosol Optical Depth (AOD) – Value of two satellites half orbit apart

S-NPP and NOAA-20 synergy (1)

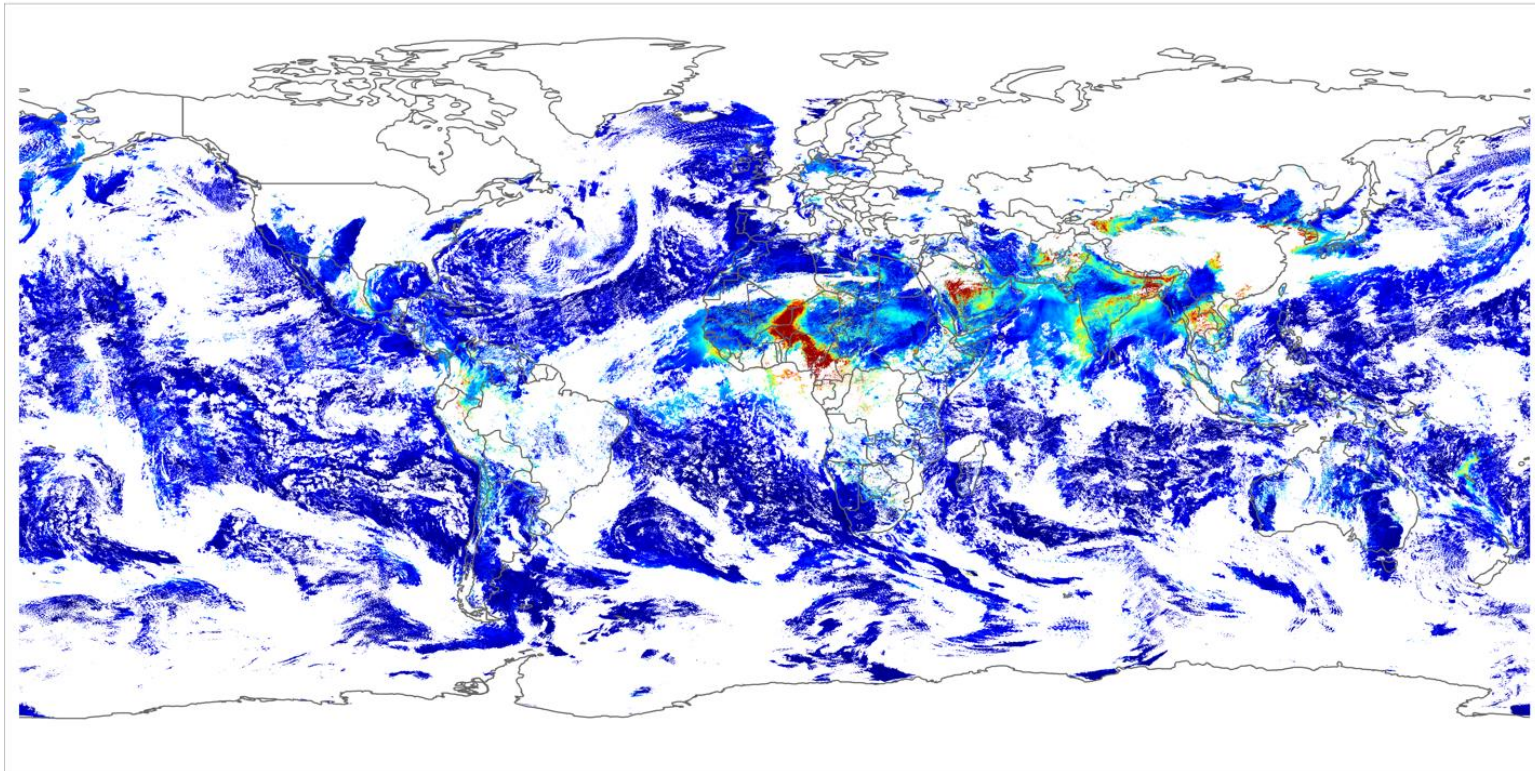
2018051 S-NPP High Quality AOD at 550nm



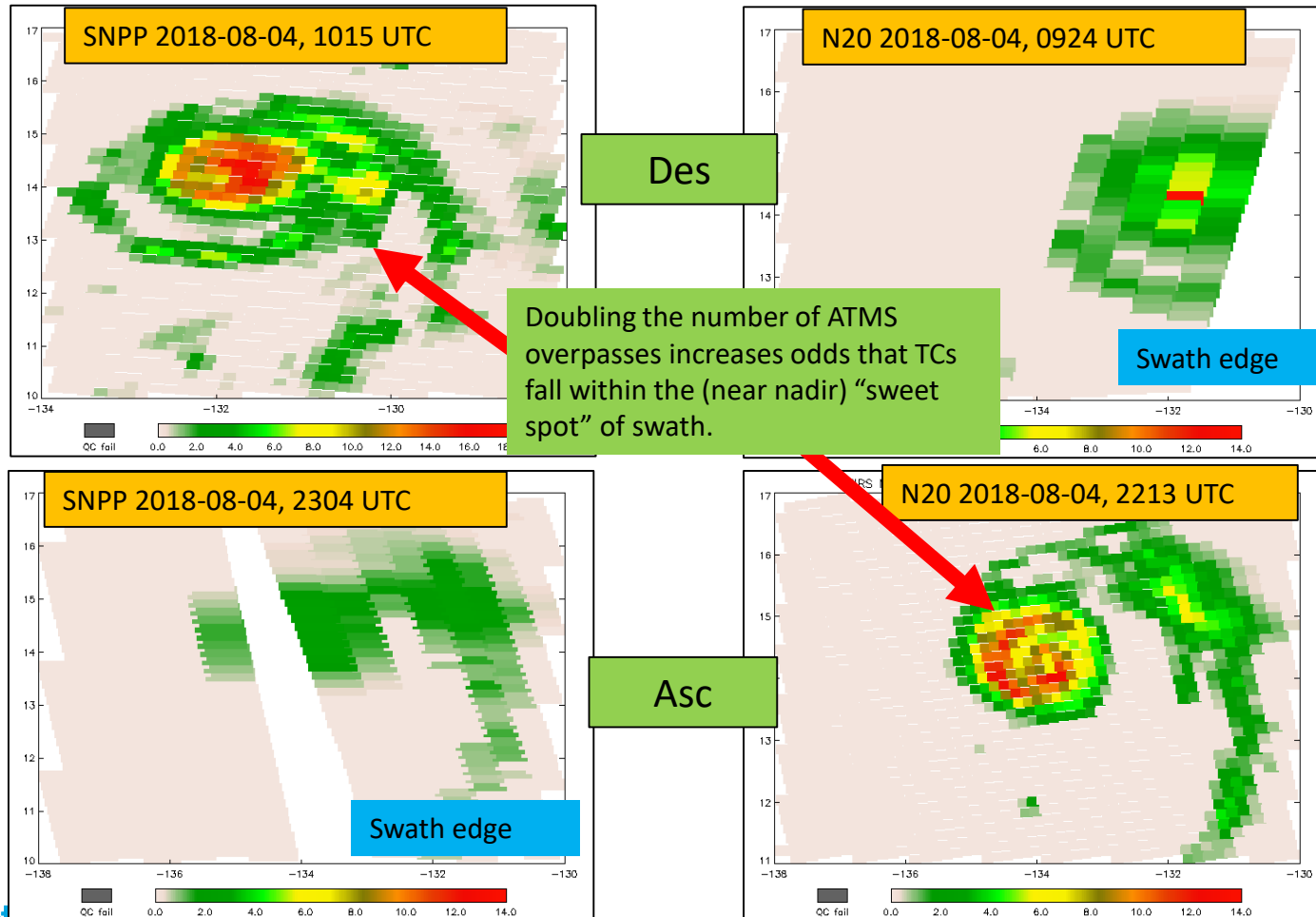
Value of two satellites half orbit apart

S-NPP and NOAA-20 synergy (2)

2018051 S-NPP & NOAA20 High Quality AOD at 550nm

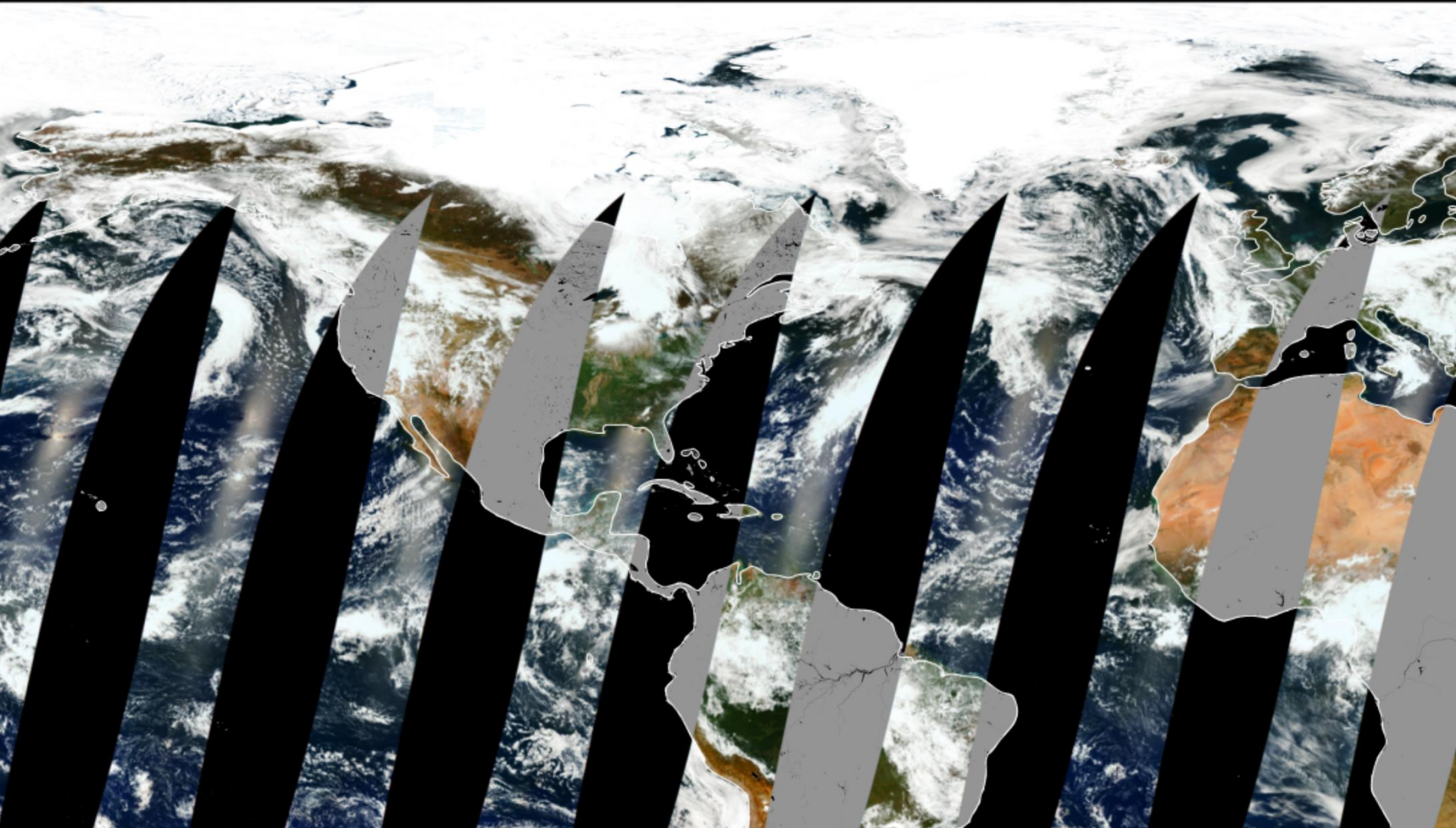


Better with two - 50 minute separation is useful!! - Hurricane Hector



May 16, 2019 3A, 3B, SGLI sequence

Is this optimized??

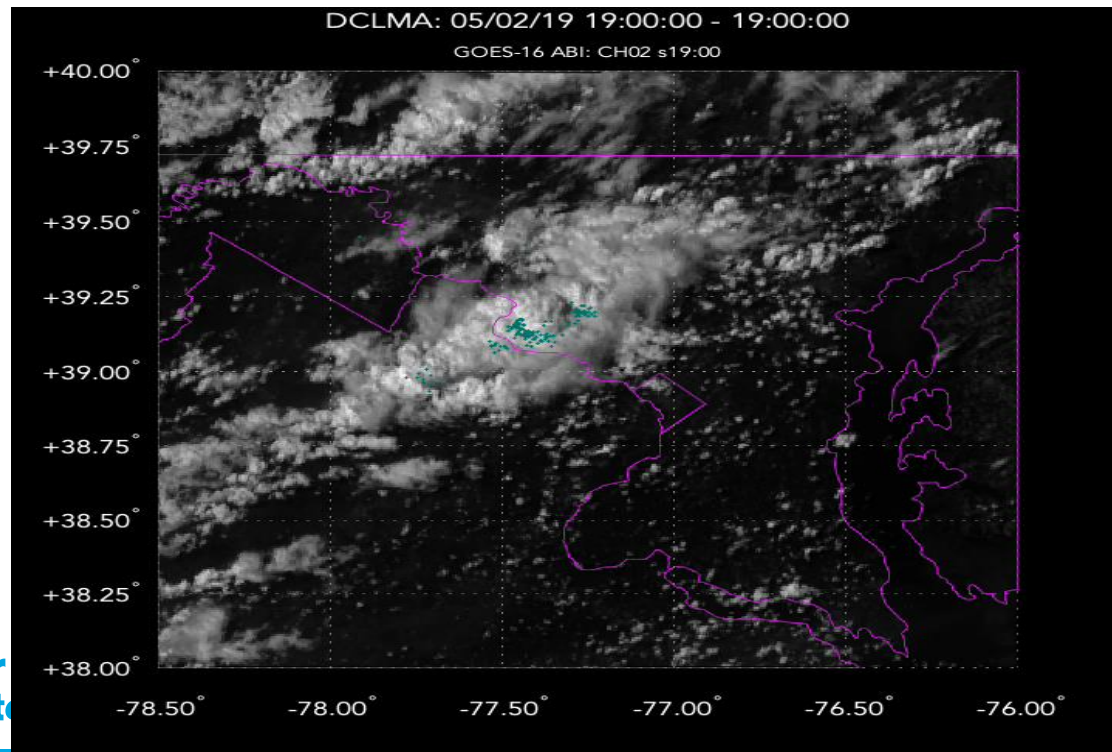


WGII/5 – Cross –coordination between various Working Groups

- WGIII presented their report on outcome of the risk assessment workshop
 - Assessment is performed against CGMS baseline
 - Does not necessarily take into account instrument performance or impact
 - Assessment should consider risk vs impact
 - Hence mitigation approaches should be considered
 - Instruments
 - Research Missions
 - Other
 - WGII ISWGs, GSICS and JWGClimat can support

WGII/7 – Space-based lighting observations

- Assessments and plans from CMA, EUMETSAT, NOAA and NASA
 - Recommend a session on space-based lightning at the next ICWG.
 - Algorithms, products, applications, users
 - Recommend NOAA NWS to provide a paper at CGMS-48 on the benefits for weather forecasters.



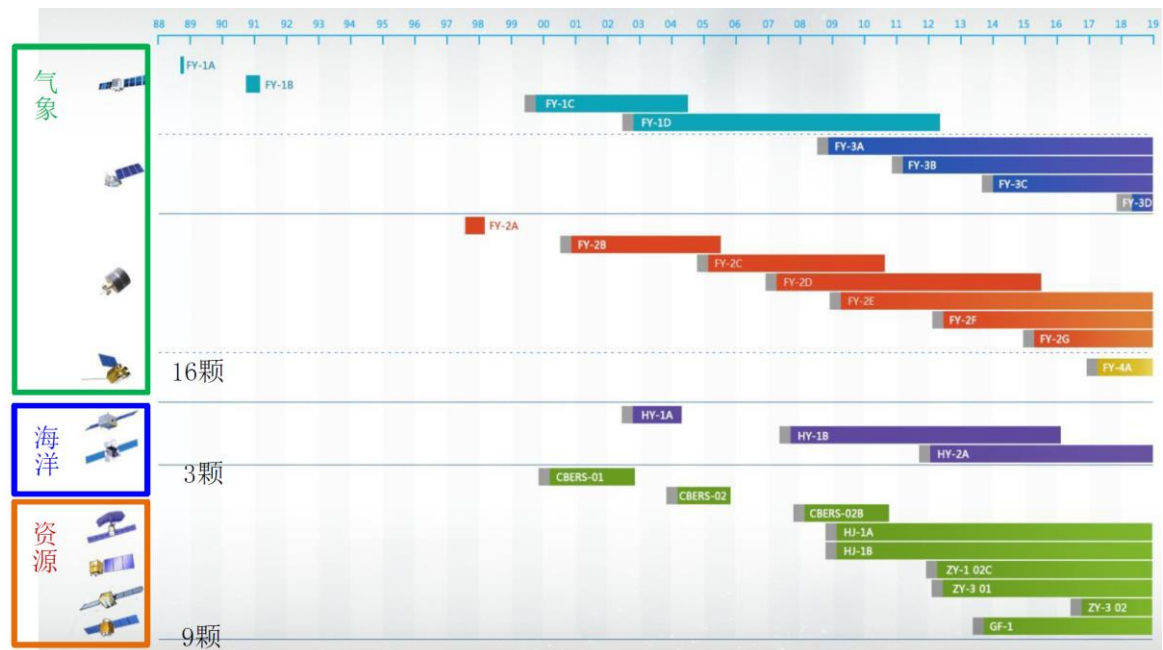
WGII/8 – Selected topics of high priority to members

- WMO reported on the WMO Commission for Agricultural Meteorology and the use of satellite products to support agriculture. Nine training courses were organized by WMO and EUMETSAT.
 - Recommendation: Encourage papers at CGMS-48 on use of satellite products for agriculture applications.
- WMO requested support from CGMS for satellite-based bathymetry, based on a request from the Tropical Cyclone community
- WMO reported on the coordination of SAR data for tropical cyclone winds. ESA Sentinel 1 operators ingest storm prediction tracks to modify acquisitions.
 - Note: NESDIS STAR has been getting SAR data for NWS as demonstration. Latency remains a concern.
 - Recommendation: ESA to present paper on SAR applications for storms and flooding with information on enhanced acquisitions and latency.
- NOAA report on use of JPSS imagery, products and direct readout for Arctic applications. The high refresh of polar satellite data near the poles is attractive for direct readout applications since a time sequence of products can be easily obtain.
 - Action to ITWG to coordinate polar applications through direct readout software packages.

WGII/8 – Selected topics of high priority to members

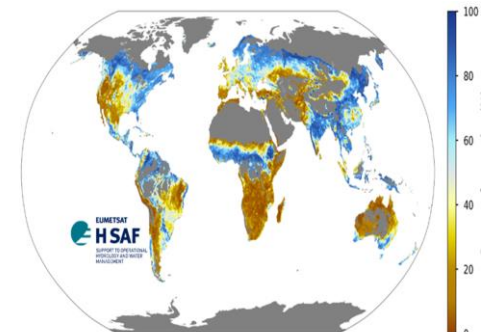
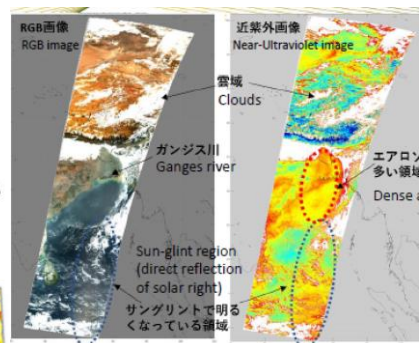
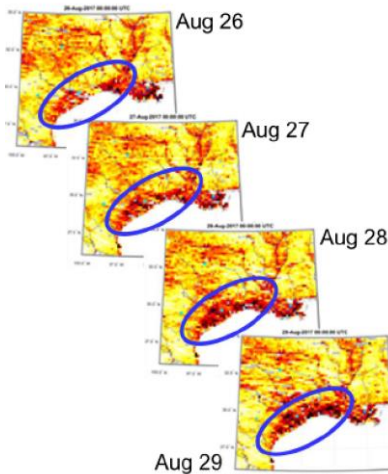
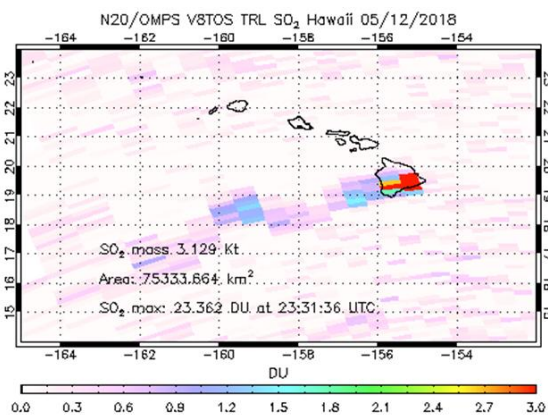
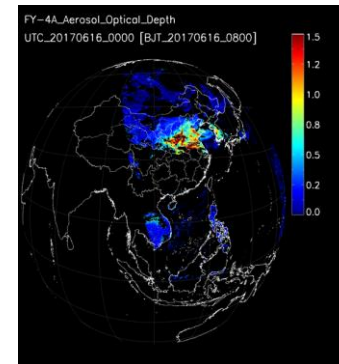
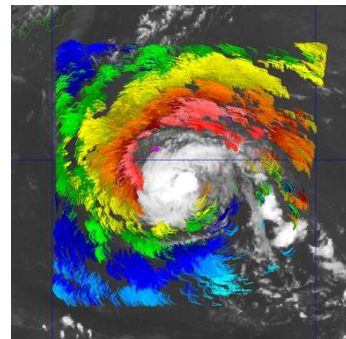
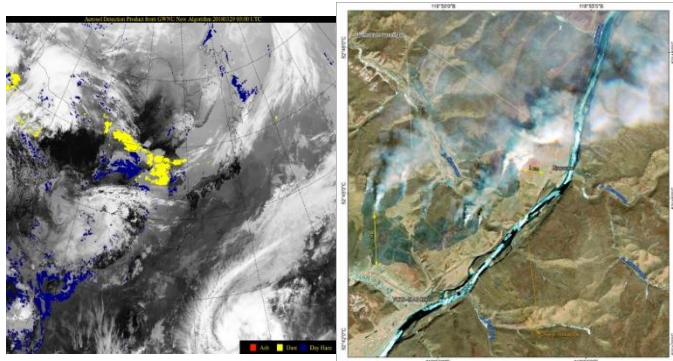
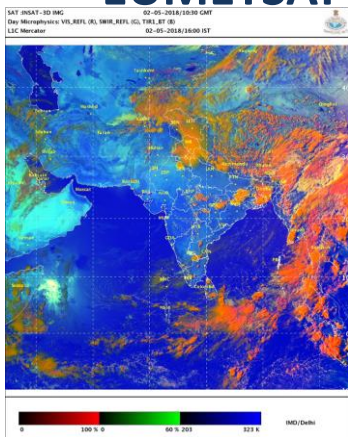
- CMA reported on their development of a climate benchmark satellites with possible deployment in 2025 -- IR and Reflected Solar.
- CMA reported on their plans for retrospective calibration of historical Chinese Fengyun satellite data. They would like GSICS to organize an expert workshop with Joint Working Group on Climate and SCOPE-CM.

➤ 1998 - 2019



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

- **IMD, KMA, ROSHYDROMET, ROSCOSMOS JMA, CMA, NOAA, NASA, JAXA, EUMETSAT**

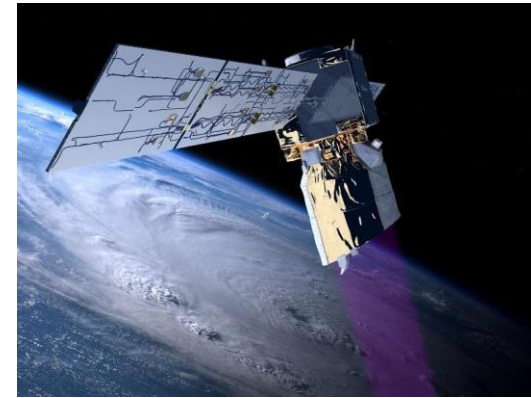


WGII/9 - CGMS agency reports on highlights and issues in dataset and product generation

Hyperspectral Infrared:

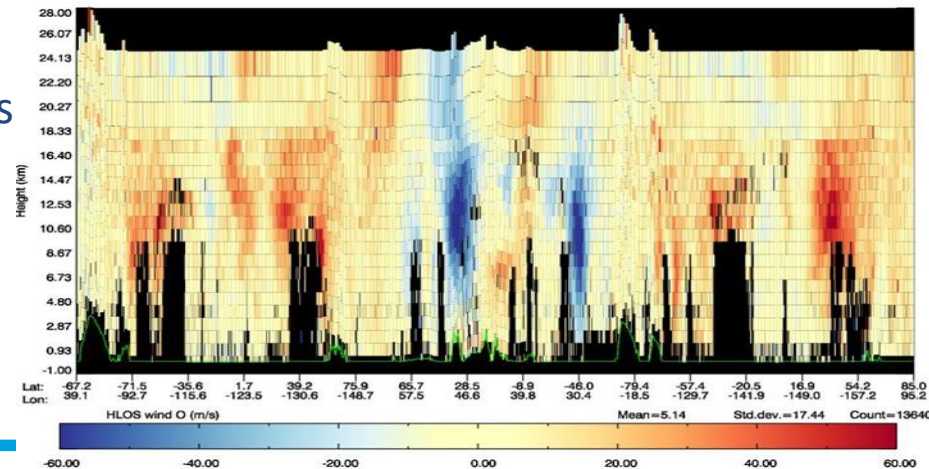
- Continues to provide backbone for GSICS intercalibration
- A top contributor to NWP error reduction
- Orbital Coverage improving
 - In addition to IASI, CriS and AIRS
 - FY-3D HIRAS
 - FY-3E Early morning
 - Meteor IKFS/2 on Meteor to be launched into 1500 ECT orbit 5 July 2019
- Now also available in GEO
 - FY-4A GIIRS
 - FY-4B launch towards end of 2019
 - And in the future GISAT launching in 2019
 - MTG-IRS in 2023

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



Aeolus Mission Status

- Aeolus satellite and operation performing excellent
- The Aladin instrument generally works very well (most system requirements met) but some issue remain
 - A switch to the redundant laser-B planned for mid-June 2019
 - Laser-B has improved design -> more and stable emit energy expected, i.e. longer lifetime
- NRT processing from L1B to L2B at ECMWF and direct ingestion into ECMWF Integrated Forecast System (IFS)
- ECMWF will provide EUMETSAT with NRT Aeolus L2B BUFR data for direct GTS and EUMETCAST ingestion when data are publically released
 - anticipated in Autumn 2019
- ESA organize regular NWP Impact Workshops in cooperation with EUMETSAT



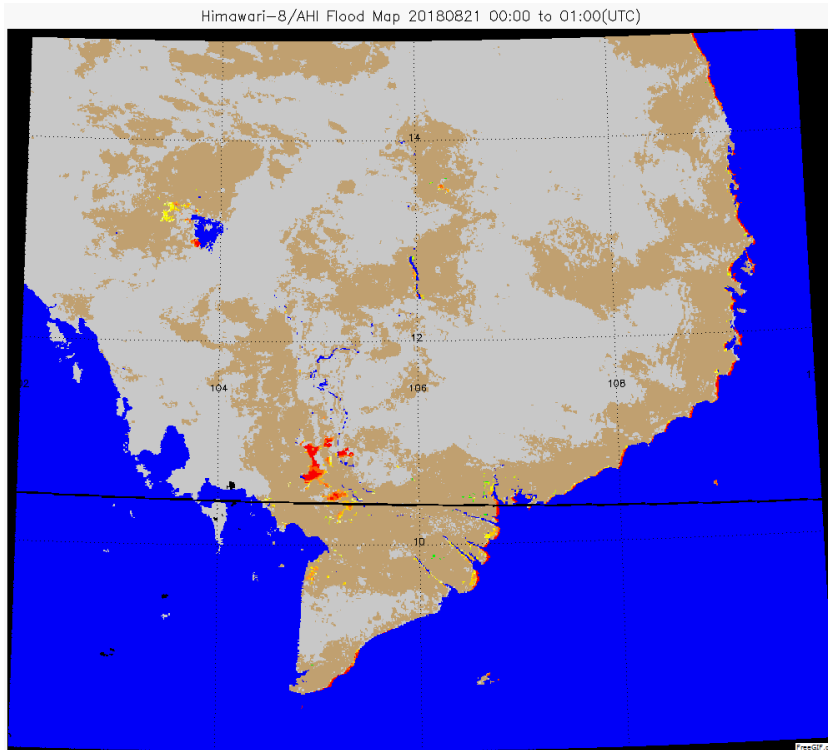
WGII/10 – Working papers responding to or raising CGMS actions

- NMA activities:
- Aerosol and Fire monitoring
 - Aerosat and GOF/GOLD meetings were attended
 - They provide a reasonable international framework for collaboration
 - CGMS members are encouraged to join these initiatives

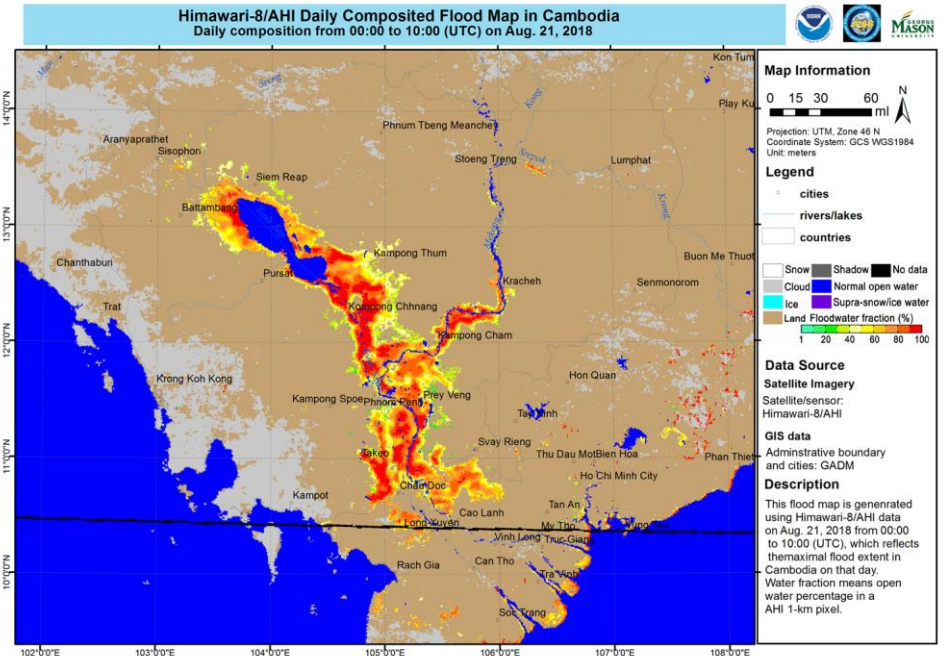
WGII/10 – Working papers responding to or raising CGMS actions

- NOAA-CMA Flood Pilot Study.
- Selected 8 cases and report will be completed by end of 2019
- The pilot study will include an evaluation stage where potential users from National Meteorological and Hydrological Services (NMHSs) working through the WMO will be asked about the utility of the product and establish requirements via WMO.
- NOAA will provide software for processing flood maps via geostationary satellites direct broadcast and/or cloud data using its Community Satellite Processing Package (CSPP) for Geostationary Satellites.
- NOAA already provides flood mapping software for JPSS direct broadcast.
- NOAA will support training through WMO/CGMS VLAB coordination.
- CMA likewise will provide software and training for their satellites and may provide the product on CMACAST.

GEO-LEO Applications – Flood Mapping (Part 1)



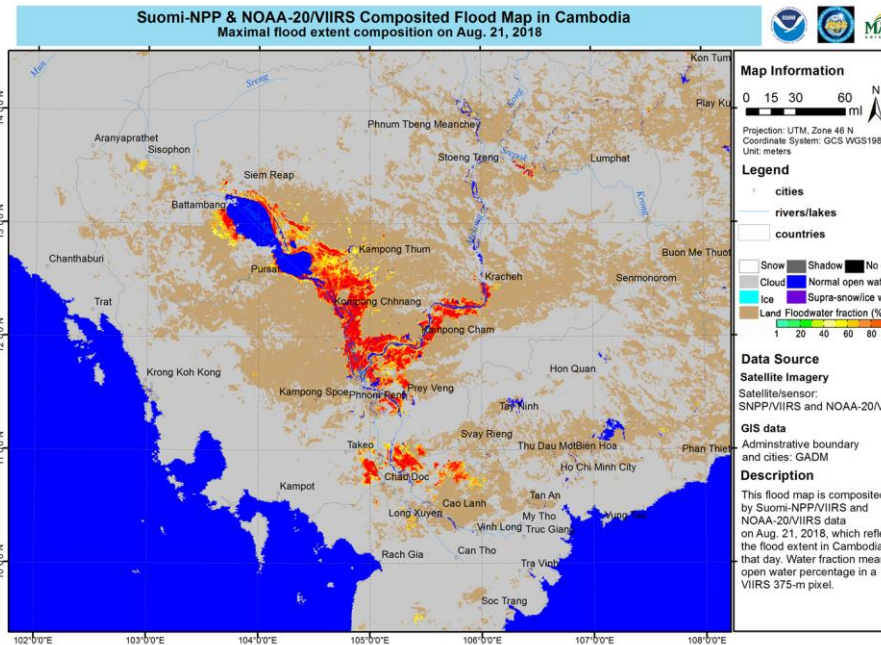
Aggregation of Flood “pixels” using AHI



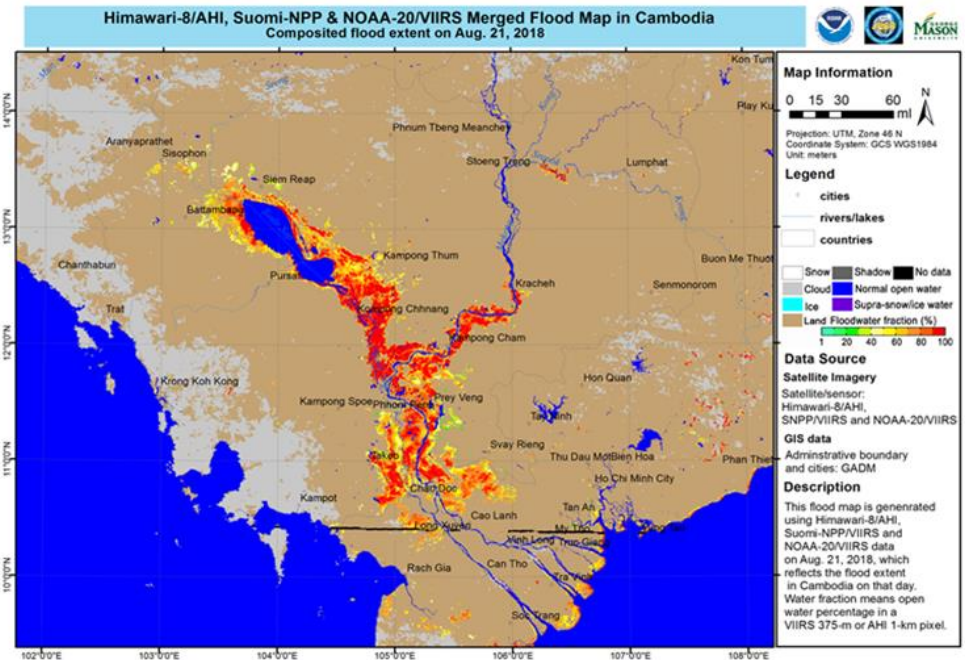
AHI Composite Flood Map (10 hours)

GEO-LEO Applications – Flood Mapping (Part 2)

Adding the GEO allows better areal extent while preserving LEO better spatial resolution



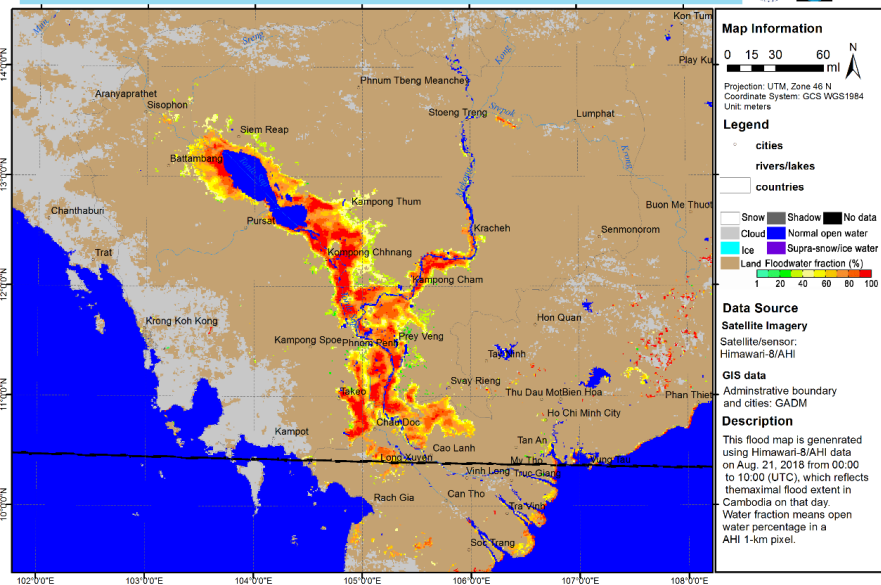
JPSS (SNPP&NOAA-20) Composite



JPSS + AHI Composite

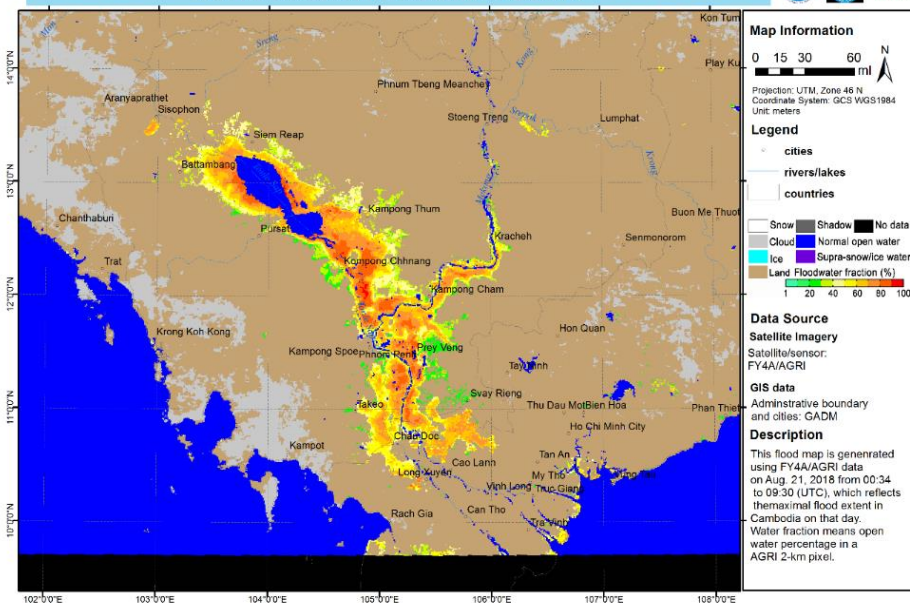
~ 10 hour composite comparison between AHI and AGRI

Himawari-8/AHI Daily Composited Flood Map in Cambodia
Daily composition from 00:00 to 10:00 (UTC) on Aug. 21, 2018



Himawari

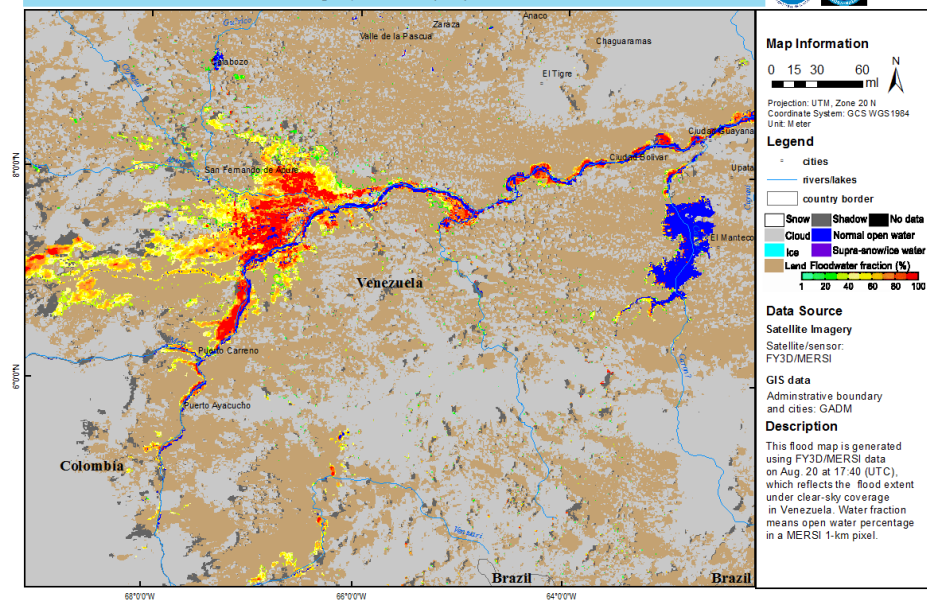
FY4A/AGRI Daily Composited Flood Map in Cambodia
Daily composition from 00:34 to 09:30 (UTC) on Aug. 21, 2018



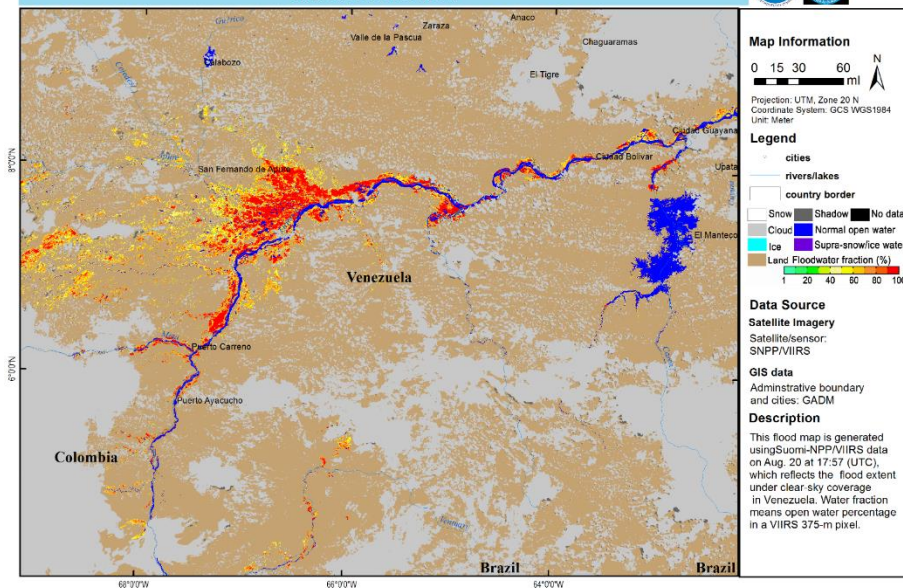
FY4A

CMA FY3D vs JPSS (SNPP)

FY3D/MERSI Flood Map in Venezuela
Aug. 20, 2018 17:40 (UTC)



Suomi-NPP/VIIRS Flood Map in Venezuela
Aug. 20, 2018 17:57 (UTC)



WGII/10 – Working papers responding to or raising CGMS actions

- Implementation of CGMS Agencies' Cal/Val Landing pages with links from OSCAR

The screenshot shows the 'Calibration Landing Page' for the 'SYSTEM OF CALIBRATION AND DATA VALIDATION'. The page includes a navigation menu with links for Home, Satellites, Inter-calibration, Archive, Validation, and Information. There are also links for Login and Register, and language options for RU and EN. The main content area lists information available on the page, such as instrument specifications, events, data outages, and monitoring. A table lists satellite instruments and their corresponding links. Below the table, there is a section for 'Meteor-M No.2/IKFS-2' with links to instrument specifications, events, data outages, and monitoring reports.

SYSTEM OF CALIBRATION AND DATA VALIDATION Home Satellites Inter-calibration Archive Validation Information Login Register

RU | EN

Calibration Landing Page

On this page you can find information about:

- instrument specifications;
- instrument events;
- data outages;
- instrument monitoring;
- relevant documents.

Satellite	Instrument
Meteor-M No.2	IKFS-2
Meteor-M No.2	MSU-MR
Meteor-M No.2	MTVZA-GY
Meteor-M No.2	Severjanin
Electro-L No.2	MSU-GS

Meteor-M No.2/IKFS-2

INSTRUMENT SPECIFICATIONS [IKFS-2 \(WMO OSCAR\)](#)

INSTRUMENT EVENTS [IKFS-2 instrument is fully functional](#)

DATA OUTAGES [Data outages](#)

INSTRUMENT MONITORING [Calibration report](#)

WGII/11 – Space weather matters: SWCG interactions with WGII

Reported under SWCG report

WGII/12 – Review and Updating of the WGII TOR

- No updates at this stage
- Due next year

WG II/13 - Review and updating of the HLPP 1/2

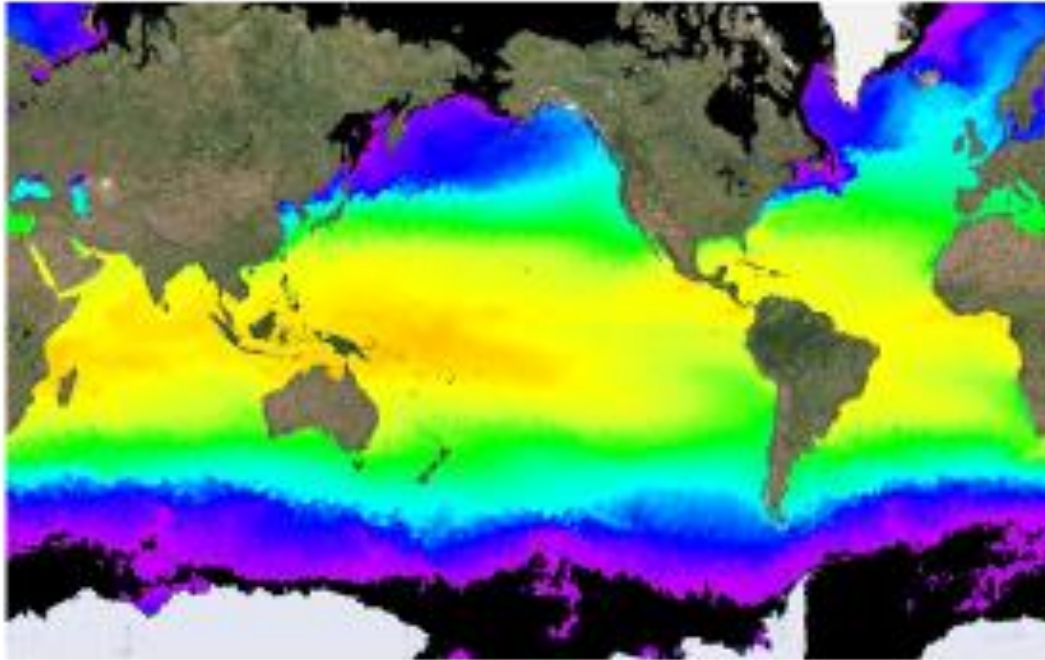
- The WG reviewed the items of the HLPP related to its work and provided progress updates on items relevant to WGII
- In addition three new items are proposed
 - 4.1.3 – Establish calibration for the reflective solar spectrometers
 - 4.1.4 – Establish calibration methodologies for MW instrument
 - 4.2.3 – Assess the impact of Aeolus HLOS wind profiles on NWP, and investigate AMV HA issues using Aeolus data.
- And a reformulation of 4.2.2 (in order to provide clarity) to:
 - 4.2.2 – Investigate the best configurations to be used by the AMV producers for use in global and regional NWP models respectively, and clearly define the appropriate requirements for each of them.

WG II/13 - Review and updating of the HLPP 2/2

- **It is proposed to move to WG IV**
 - **4.2.6 Consider the full range of user capabilities (ranging from advanced Short range NWP to more conventional nowcasting) when planning data utilisation, products generation and dissemination strategies, in particular for the new geostationary satellites;**
 - **4.5.1 Establish a sustained interaction with the operational Nowcasting communities with a view to fully utilise the commonality of the future geostationary imagers and sounders.**

WGII/14 – Any other business

➤ On Operational Satellite Meteorology



First International Operational Satellite Oceanography Symposium

The Executive Steering and Programme Committees are pleased to invite community members from all levels of the value chain (data providers to users) of operational satellite oceanographic data, products and applications to attend the first International Operational Satellite Oceanography (OSO) Symposium. The themes to be addressed are 1) redefining the operational paradigm, 2) linking data providers to information providers, 3) helping users find the information they need, and 4) facilitating the end-to-end value chain. Participants can also elect to attend a day of training on Monday, 17 June 2019 at the same location.

18 - 20 June 2019
with Optional
Training Day
17 June 2019

NOAA Center for
Weather and
Climate Prediction

College Park, MD
USA

Convenient Access
From Washington DC

Abstract Submission
Deadline:
12 April 2019

WGII/14 – Any other business

➤ Update on the WMO NWP impact workshop 2020.

The 7th WMO Impact Workshop,
Seoul, May 12-15 2020

- Hosted by KMA; venue still TBD; Seoul is likely;
- Scientific Organizing Committee:
 - Sid Boukabara (NOAA/NESDIS), SeiYoung Park (KMA), Co-Chairs
 - Erik Andersson (ECMWF), Tom Auligné (JCSDA), John Eyre (Met Office), Jianxia Guo (CMA), Lars Peter Riishojgaard (WMO)
- Local Organizing Committee to be established by KMA;
- First Announcement will be distributed end of May 2019;
 - Proposed Science Questions, developed with input from CGMS;
 - Call for abstracts;
- Abstract will be due November 2019;
- CGMS agencies are encouraged to participate.

Science Questions for 7th Impact Workshop, Seoul, May 2020

(will be distributed to participants in May 2019)

Surface-based

- **S1. AMDAR:** Coverage of AMDAR
- **S2. Radar:** Radar observations
- **S3. PBL:** Observations of the PBL for regional and high-resolution NWP
- **S4. HighElev:** High elevation observing stations

Space-based

- **S5. SatLand:** Satellite sounding over land and ice
- **S6. Sounders:** Impact of multiple satellite sounders
- **S7. AMVs:** Atmospheric Motion Vectors

General

- **S8. UA:** Regional upper-air network design studies
- **S9. Sfc and Sat:** Impact of satellite observing capabilities on the design of the surface-based observing systems

- **S9-a. Sfc and Sat:** Density of marine surface pressure observations to complement satellites
- **S9-b. Sfc and Sat:** Network of stratospheric observations to complement satellites
- **S10. AdjEns:** Application of adjoint and ensemble methods
- **S11. Ocean:** Impact in ocean-coupled assimilation
- **S12. Land:** Impact in land-coupled assimilation
- **S13. Data frequency/Timeliness**
- **S14. Atmospheric composition**
- **S15. OSSEs**
- **S16. Impact Assessment for Seasonal And Climate Applications**
- **S17. Ground-Based GNSS**
- **S18. RBON:** Regional Basic Observing Network design studies
- **S19. Impact Assessment for Arctic observation**

WGII/15 – Nominations and Representatives

- No changes in WG II

WGII/15 – Date/time of intersessional meetings in 2019-2020.

- 14 November 2019
- 12 March 2020

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:

A44.02

A46.05

A46.09

A46.16

R45.01

R45.06

R45.02

R45.08

R44.06

R44.08

R44.10 → transfer to WG III

R44.13

R44.18 → transfer to WG III

R44.20

R44.22

R44.24

R44.27

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

WGII New Actions

➤ 22 New Actions

Actionee	AGN Item	Action #	Description
WMO	4.1		WMO to change current formulation of links from 'GSICS calibration' to 'instrument landing page'
ROSHYDROMET	4.2		Roshydromet to provide further details on future RO on the Meteor missions
CGMS Agencies	4.2		Agencies assessing commercial radio occultation data are requested to present their efforts at IROWG-7 to facilitate community planning.
IROWG	4.2		IROWG to provide recommendation on orbital planes in order to improve coverage.
IROWG	4.2		IROWG to evaluate outcome of Agency funded commercial weather data pilot following IROWG-7 and report back to CGMS-48.
WGII	4.3		To discuss with WMO the way forward to have access to telecommunications microwave link data in support of IPWG validation activities.
SCOPE-CM	4.10		SCOPE-CM to report back on the conclusion of the 9 pilot projects
SCOPE-CM	4.10		To develop strategy, agenda and updated ToRs
CGMS Agencies	4.11		Agencies to continue to support the WMO maintained trust-fund that enables the work of the VLAB technical officer
CGMA Agencies	4.11		Agencies endorse the VLAB 5-year strategy plan.
CGMS and VLAB	4.11		Agencies to provide links to their training events and resources for VLAB communication.
JWGC and GSICS			To organise jointly a workshop on calibration for FCDR generation, possibly also including SCOPE-CM.
WGIII	5		WGIII to provide their assessment and planning for the next risk assessment to the ISWGs, JWGC and GSICS.
ISWGs	5		The ISWGs, JWGC and GSICS to review WGIII Risk assessment and consider mitigation opportunities
ICWG	7		ICWG to organise a dedicated session (05.-1 day) on lightning observations from space (calval, algos, applications, products)
EUMETSAT	8.4		EUMETSAT to provide PoC for NOAA for OSI SAF for discussion on future collaborative work/workshop for development of cryospheric products.
CMA	8.6		CMA to provide information on ILS and SRF and other relevant documentation to the user community for the development of necessary RTMs/tools for the exploitation of HIRAS and GIIRS data. (Reference: Action (SG3.22) from the NWP SAF Steering Group)
NOAA/CMA	10.1/10.2		NOAA/CMA to provide final report from the flood mapping pilot for CGMS-48.
SWCG	11.2		SWCG to further develop white-paper on current instruments and their calibration and to provide report to GSICS for review
GSICS	11.2		GSICS to review SWCG white-paper on calibration and consider opportunities for GSICS support to aforementioned activity.
WGII	13		WG II to consider alternatives to the JMA Volcanic Ash algorithm Testbed, which is underutilised and now being closed down
CMA	13		CMA to provide PoC for the IPWG validation protocol (HLPP 4.3.1)

WGII Recommendations

WG-II recommends to Plenary the endorsement of the proposed new concept for SCOPE-CM

And encourages CGMS Agencies to actively participate in implementation of the new concept

Thank you