Report from WG II (Satellite data and products)

Stephan Bojinski and Toshiyuki Kurino (Co-Chairs)

Ken Holmlund and Mitch Goldberg (Rapporteurs)

Presented to CGMS-44 Plenary session, agenda item E.5.2

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Successful introduction of new agenda format

WGII/0: Objectives
WGII/1: Nomination of co-chair candidates
WGII/2: Review of Actions and Recommendations
WGII/3: Terms of Reference

WGII/4: International Science Working Groups and initiatives
(IWWG, IPWG, ITWG, ICWG, IROWG, GSICS, SCOPE-CM, SCOPE-Nowcasting)
8 WPs
WGII/5: Other international science community reports (Oceans, CEOS VCs, …)
Focus: El Niño 2015-2016 2 WPs
WGII/6: High priority topics to Agencies 6 WPs
WGII/7: Agency reports 9 WPs
WGII/8: WPs responding to, or raising, CGMS Actions 12 WPs

WGII/9: Review and updating HLPP

Σ = 37 WPs (2015: 64; 2014: 50)

~35 participants
Monday 9.00-18.00
Tuesday 8.30-17.30

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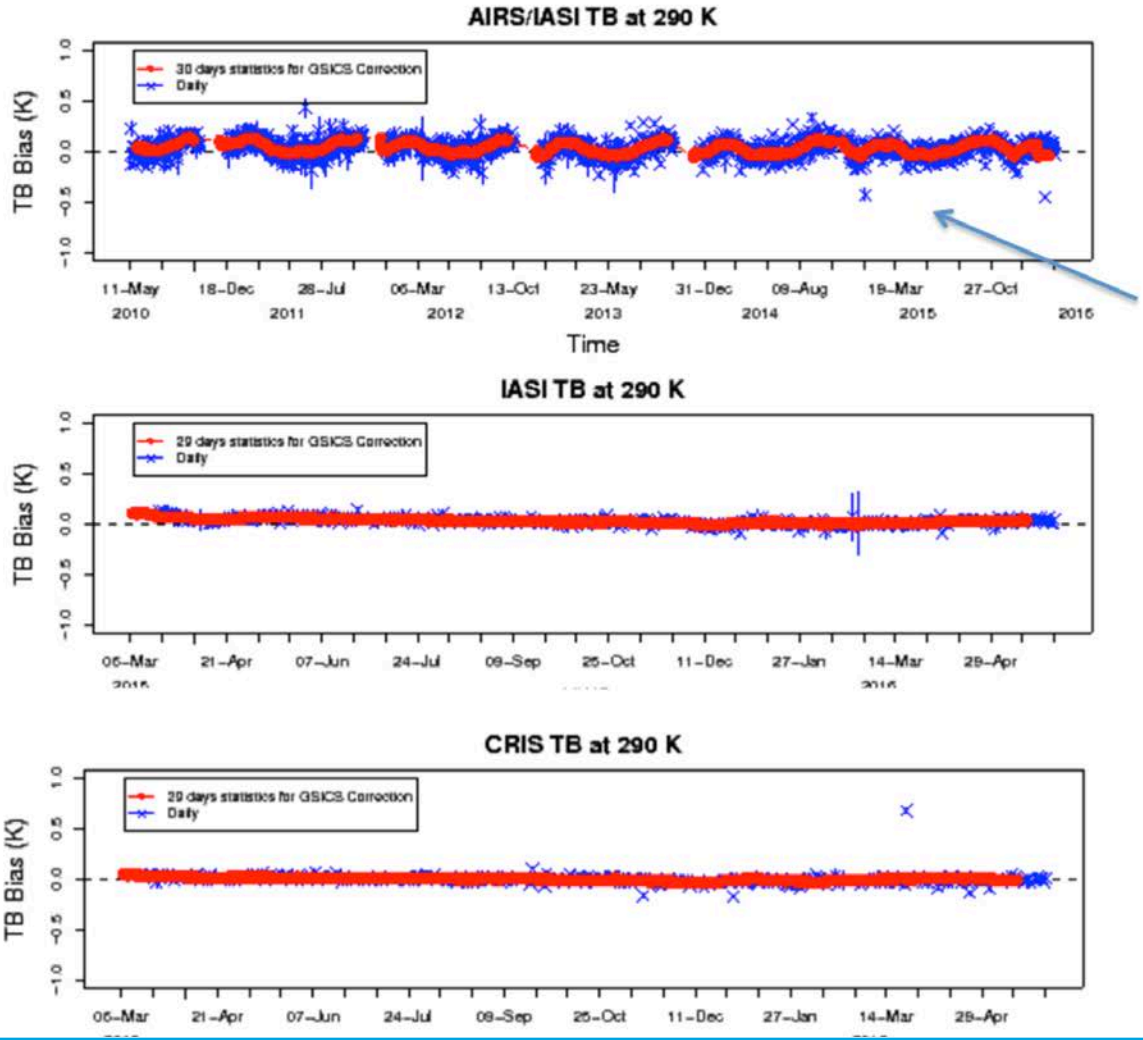
PROPOSED TERMS OF REFERENCE
CO-CHAIR NOMINATION PROCESS

- RECOMMENDATION: CGMS to endorse the proposed Terms of Reference for WG II, including the following updates:
  - A 2-yearly rotation scheme for one of its co-chairs, with KMA starting after the end of CGMS-44. Subsequently, co-chairs from CMA, JMA, ROSHYDROMET, and IMD will follow.
  - WMO to provide the second co-chair
  - NOAA and EUMETSAT to provide the rapporteurs
- KMA nominated Dohyeong Kim as co-chair; the Group accepted by acclamation.
- RECOMMENDATION: Dohyeong Kim (KMA) to become the WG II co-chair, replacing Toshiyuki Kurino (JMA).

Success story: GSICS and Improved Instrumentation.

GSICS Bias Monitoring of MTSAT2 and AHI



10.8 micron channel

MTSAT2, top panel

AHI, middle and lower panel

All are biases against hyperspectral IR sounders

AHI is extremely stable

GSICS

- ACTION: GSICS to review the GDWG Terms of Reference and associated indicated levels of effort of the members
- ACTION: GRWG to discuss with ISCCP a detailed project proposal for the use of GSICS methodologies to produce a GSICS-compliant ISCCP dataset for evaluation
- ACTION: CGMS agencies should employ the GSICS Correction as part of their operational procedures.
    - Rationale - by adding a few small parameters as ancillary data – all users of geostationary imager data can apply an adjustment which will provide bias consistency of all geo imagers enabling improved applications.
- Reference to HLPP 3.1 Establish within GSICS a fully consistent calibration of relevant satellite instruments across CGMS agencies, recognising the importance of collaboration between operational and research CGMS agencies;

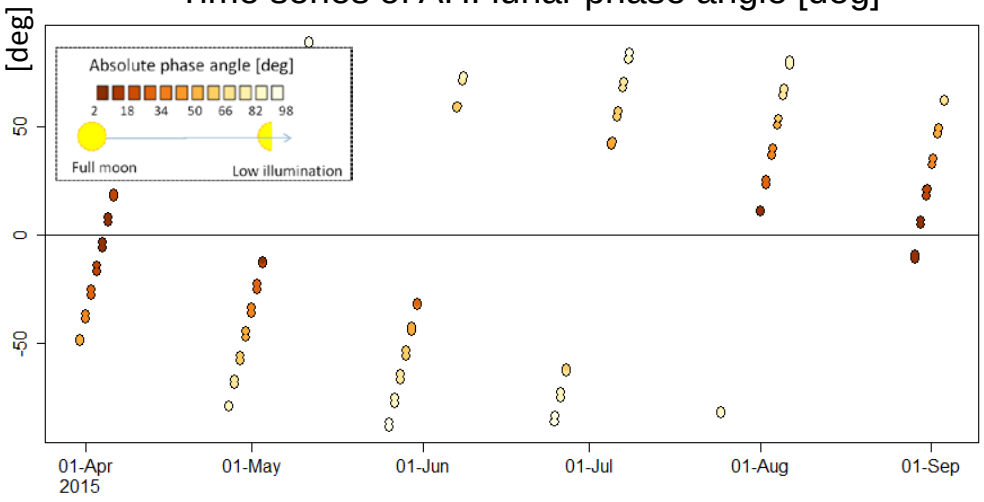
GSICS: USING THE MOON AS VIS REFERENCE TARGET

- RECOMMENDATION: Satellite operating agencies should support proposals and programs to acquire high-accuracy ground-based characterization measurements of the Moon, to develop a new, high accuracy, SI-traceable lunar reference standard for reflected solar wavelengths.
- RECOMMENDATION: Long-term continuity of absolute solar spectral irradiance measurement with SI-traceable accuracy should be ensured.
- Reference to HLPP 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.

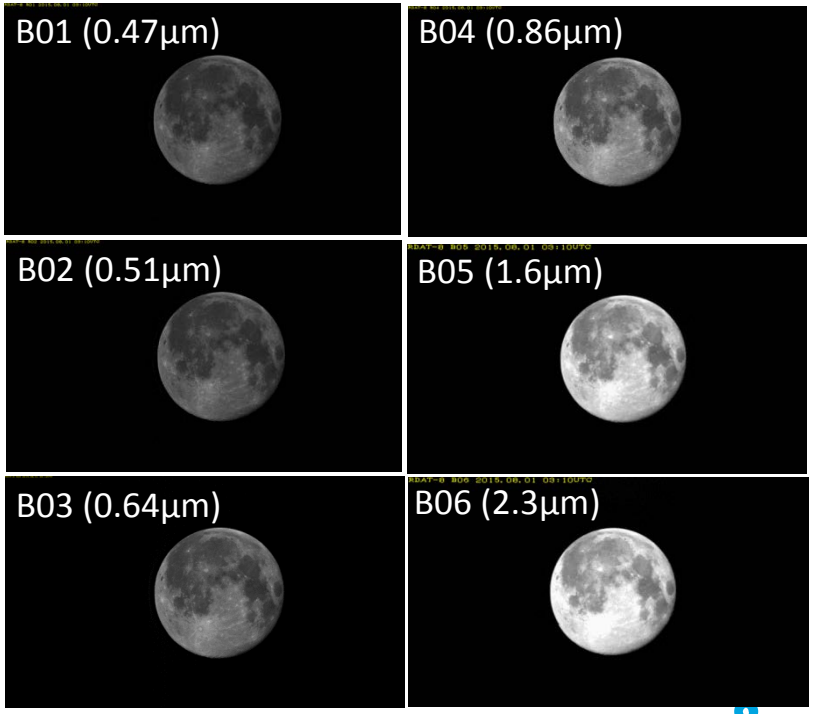
AHI Lunar Observation for GIRO Slide from JMA

- **2979** useful lunar observations for the GIRO within the applicable phase angle:
  2 deg <= |phase angle| <= 92 deg
- 47 days data
  → 60-70 lunar observation / day on average

Time series of AHI lunar phase angle [deg]



2015-08-01T03:03:26Z (phase angle: 10.5deg)



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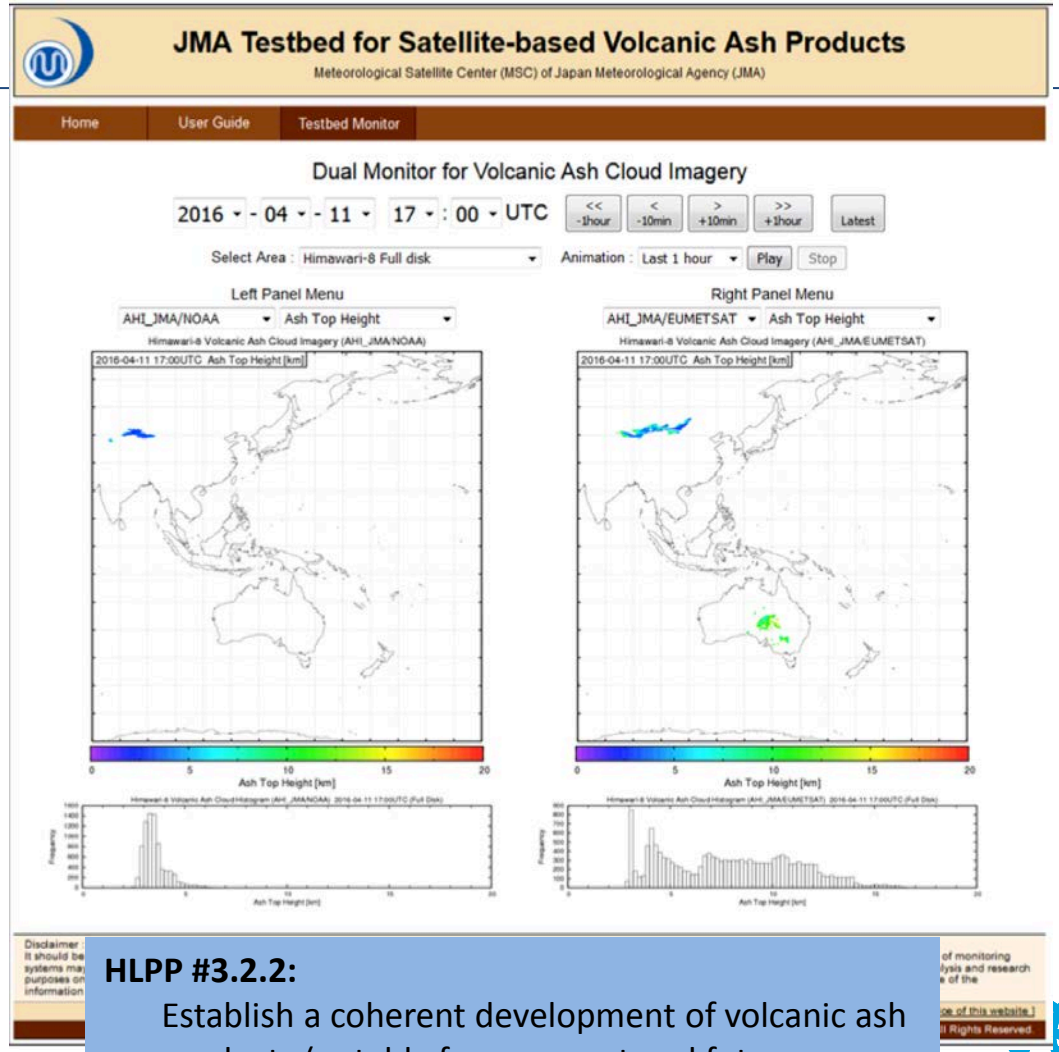
Success story: JMA Volcanic Ash Testbed



WGII/8 A41.26:

JMA to establish an environment to implement multiple algorithms to retrieve quantitative ash cloud parameters from operational satellites. This will serve as a test bed for the intercomparison of retrievals on an operational basis in the framework of SCOPE-Nowcasting

Outcome:

JMA implemented NOAA/NESDIS Algorithm

HLPP #3.2.2:

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

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SCOPE-CM

Multi-agency generation of CDRs; 9 ongoing successful projects;
Reaching the 4th year of its phase 2
Using GSICS corrections to generate CDRs based on the GEO ring

- ACTION: SCOPE-CM should review its IP, Terms of Reference, and prepare for the next phase including a possible call for proposals.
- RECOMMENDATION: GSICS to report to SCOPE-CM projects on its plan to intercalibrate the geostationary ring using hyperspectral IR sounders as transfer function.
- RECOMMENDATION: GSICS member agencies to identify roles and responsibilities and funding needs to support the geostationary ring GSICS corrections including the processing of retrospective data going back to NASA EOS AIRS (2002).

SCOPE-Nowcasting

- Progress in all four pilot projects
- Important results from volcanic ash algorithm intercomparison; analysis could not be finalized due to lack of resources
- Formalization of Steering Group, transition to pre-operational phase in 2017

- RECOMMENDATION: CGMS members to continue to support SCOPE-Nowcasting and its transition to pre-operational phase, in particular to financially support the finalization of the satellite-based volcanic ash retrieval algorithm intercomparison activitiy (Pilot Project 2) over the next 12-18 months.

- Reference to HLPP 3.2.2

ICWG

Cloud information very important to the work of other ISWGs, especially for severe weather analysis, height assignments of winds, improved cloud detection in hyperspectral sounding

- RECOMMENDATION: To enhance collaboration, ISWGs to discuss with ICWG co-chairs key items for collaboration.
- RECOMMENDATION: Research agencies to consider continuing space-borne lidar for ice/liquid water since they have proven very valuable to validate retrievals from passive sensors
- RECOMMENDATION: All operators of next-generation GEO imagers to consider the implementation of routine full-disc 10-min (or better) scanning for nowcasting

Inter-comparison of cloud products, with focus on new-gen imagers: Golden Day (19 Aug 2015), 10 min full-disc scan, 2 km horizonal resolution if possible

- ACTION: CGMS agencies to submit data to ICWG (ICARE data centre) for cloud intercomparison by 1 Sep 2016.

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- New co-chair: Andy Heidinger (NOAA)
- HLPP 3.2.3

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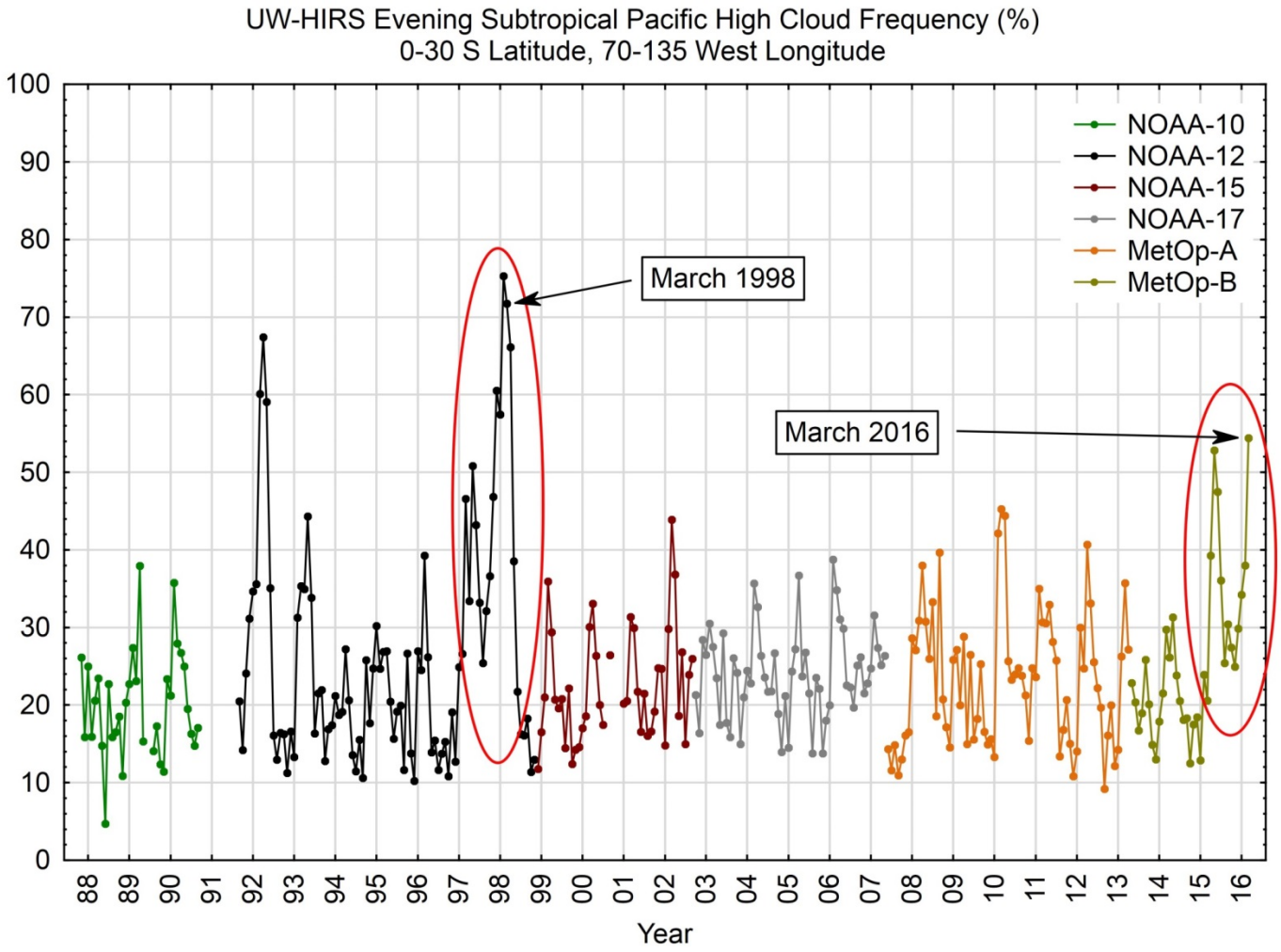
Cloudiness signal of El Niño

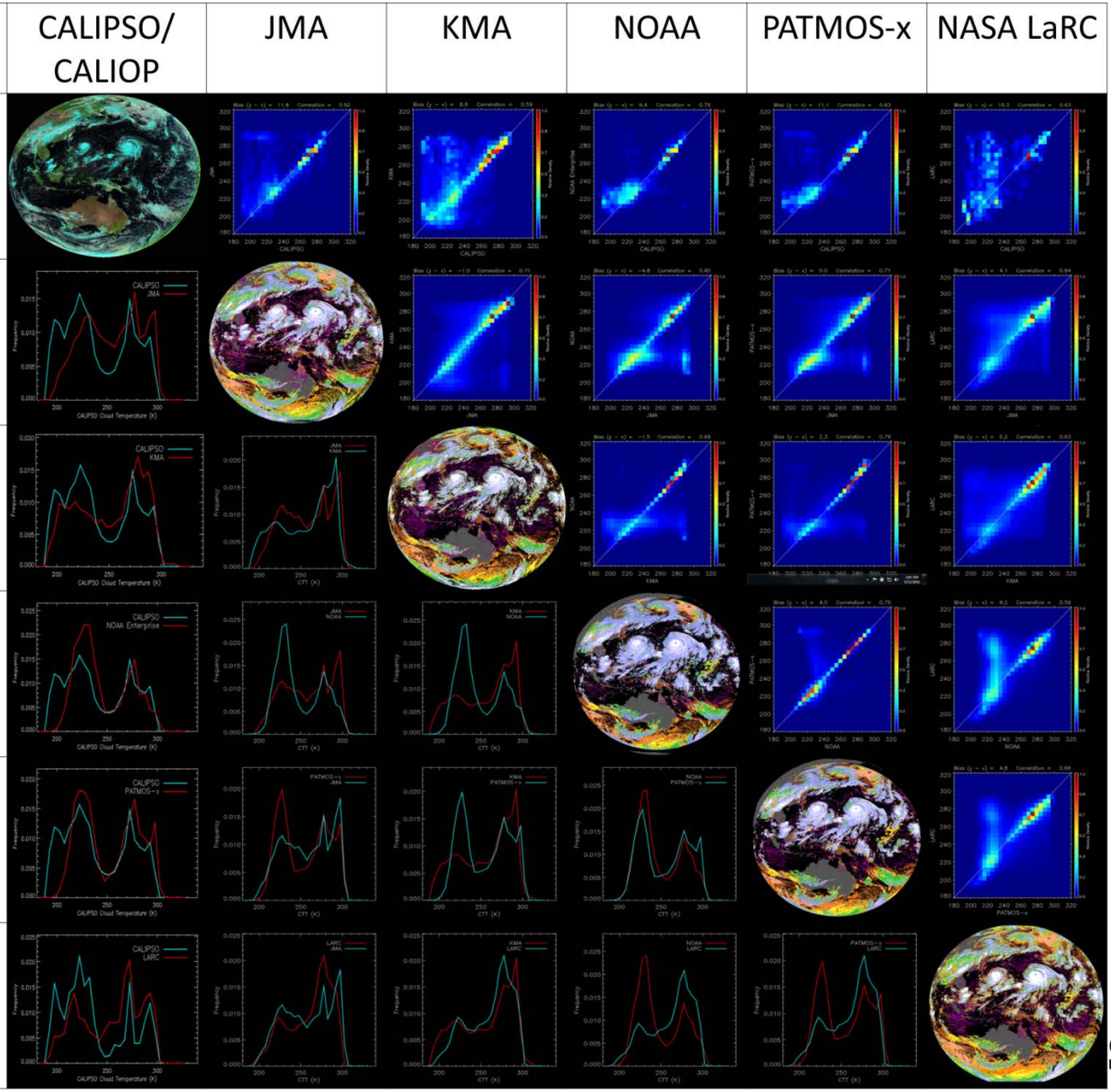


ICWG

ICWG inter-comparisons of cloud fraction for Golden Day August 19, 2015
(Heidinger et al.)

Action: CGMS agencies to submit their data for intercomparison by 1 Sep 2016

Resources for inter-comparison?



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IROWG

- Recent impact studies confirmed the value of 20 000 occultations per day, recognizing the highest impact from good coverage of RO in horizontal and vertical, and particularly extending into the troposphere.
- WG II recognized the impact of polar RO to be provided through COSMIC-2B or a similar programme
- WG II recommended experiments to confirm the impact of RO measurements, especially down to troposphere above the boundary layer, and the related cost
- WG II recommended a strong dialogue between IROWG and NOAA regarding the Commercial Weather Data Pilot.

- RECOMMENDATION: NOAA to ensure that both, equatorial and polar components of COSMIC-2 are fully funded and launched
- RECOMMENDATION: CGMS agencies to target at least 20,000 occultations/day, at appropriate global distribution, to be made available to the operational and research communities, based on recent impact studies (NWP, climate and space weather);
- RECOMMENDATION: CGMS agencies to ensure that the RO receiver design includes sufficient software/firmware flexibility to allow changes in the signal processing including processing of new GNSS signals/constellations, including ionospheric measurements;

IPWG

IPWG expressed concern over the health of the operational constellation of conically-scanning MW platforms, given the uncertainty around GCOM-W follow-on, SSMIS F20 and DMSP follow-on, and GMI-2.

- RECOMMENDATION: CGMS Members to continue an operational constellation of conically-scanning microwave platforms to guarantee sustained support for the current level of capability.

IPWG identified the need for better agency coordination for better monitoring of distinct aspects of precipitation processes, such as cloud phase, microphysics, and liquid/ice water path.

- RECOMMENDATION: CGMS to have a special discussion on the value of formation flying similar to the A Train – especially for precipitation and other hydrological applications.

Regarding a precipitation validation site in India, raingauge or radar data (24h accumulated), or merged data, would be required.

- ACTION: IPWG Rapporteur to liaise with IMD (AK Sharma) on the development of precipitation validation sites over India.
- Reference to HLPP 3.6.3

ITWG

- RECOMMENDATION: CGMS agencies to maintain the constellation of at least three polar orbits (early morning, morning, and afternoon), each with full sounding capabilities (IR and MW). The overpass times of operational satellites with sounding capability (IR and MW) should be coordinated between agencies to maximize their value.

- RECOMMENDATION: Future satellite programmes of CGMS members should include the provision of high temporal frequency MW humidity sounding radiances (alongside cloud and precipitation sensitive observations).

- RECOMMENDATION: CGMS agencies with operational direct broadcast needs are encouraged to attend the next ITWG sponsored Direct Broadcast Users Meeting in March 2017 hosted by CONAE, Argentina

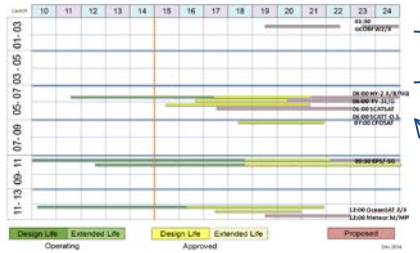
- Reference to HLPP 1.4.2, ,

IWWG

- 3rd Intercomparison planned, using same Golden Day as ICWG, use H-8 full-disc
- Significant improvements in winds expected, coupled with improved clouds
- Resources required to perform intercomparison

- RECOMMENDATION: CGMS agencies to identify resources to support the 3rd intercomparison of satellite-derived winds.

- RECOMMENDATION: CGMS agencies to explore possibilities to derive winds from new upcoming satellites and opportunities



- RECOMMENDATION: CGMS satellite operators to consider coordination of orbits for scatterometer instruments and to provide open and timely access to data in order to maximise independent coverage and benefits to nowcasting and NWP from assimilation of scatterometer wind data.

- New co-chairs: Régis Borde (EUMETSAT), Steve Wanzong (UW CIMSS)
- HLPP Reference: 3.5.2

IWWG and IODC

- ACTION: IWWG to pursue intercomparisons of Meteosat-8 and FY-2/4 winds over the IODC region. During the transition phase also Meteosat-7 should be considered.

SHORT-RANGE NWP

- RECOMMENDATION: Operators to take into account in the planning of their data acquisition, processing, and distribution systems the emerging stringent requirements on data latency from SRNWP
- ACTION: CGMS operators and WMO to work with NAEDEX-APSDEU to explore options for optimal data exchange of advanced data from next-gen GEOs.
- Reference to HLPP 1.1.2

BEST PRACTICES ON PRODUCT GENERATION AND VALIDATION

- Discussed importance of maintaining best practices for product generation
- Should include: ATBDs, cal/val plans, validation reports, quality indicators, engagement with CGMS ISWGs, other documentation
- RECOMMENDATION: CGMS agencies to provide key documentation related to the quality of their products, to allow for informed uptake by users. These documents should include ATBDs, cal/val plans, and regular validation reports.
- ACTION: CGMS to develop best practices for documenting products and their quality.
- Reference to HLPP 3.5

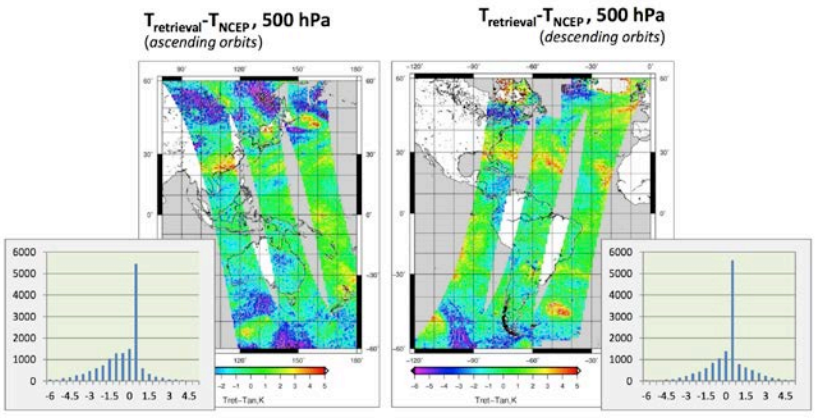
SPACE WEATHER

- RECOMMENDATION: Agencies to explore the possibilities to develop suitable processing packages to support a direct broadcast implementation of RO processing, within the DBNet to improve timeliness for space weather applications
- ACTION: IROWG to define the requirements on timeliness for RO observations.
- ACTION: WGII to determine how to implement the planning and development of space weather research and data management activities within the auspices of WGII. Deadline: CGMS-45 (from SWTT)
- Reference to HLPP 1.1.4

SOUNDING

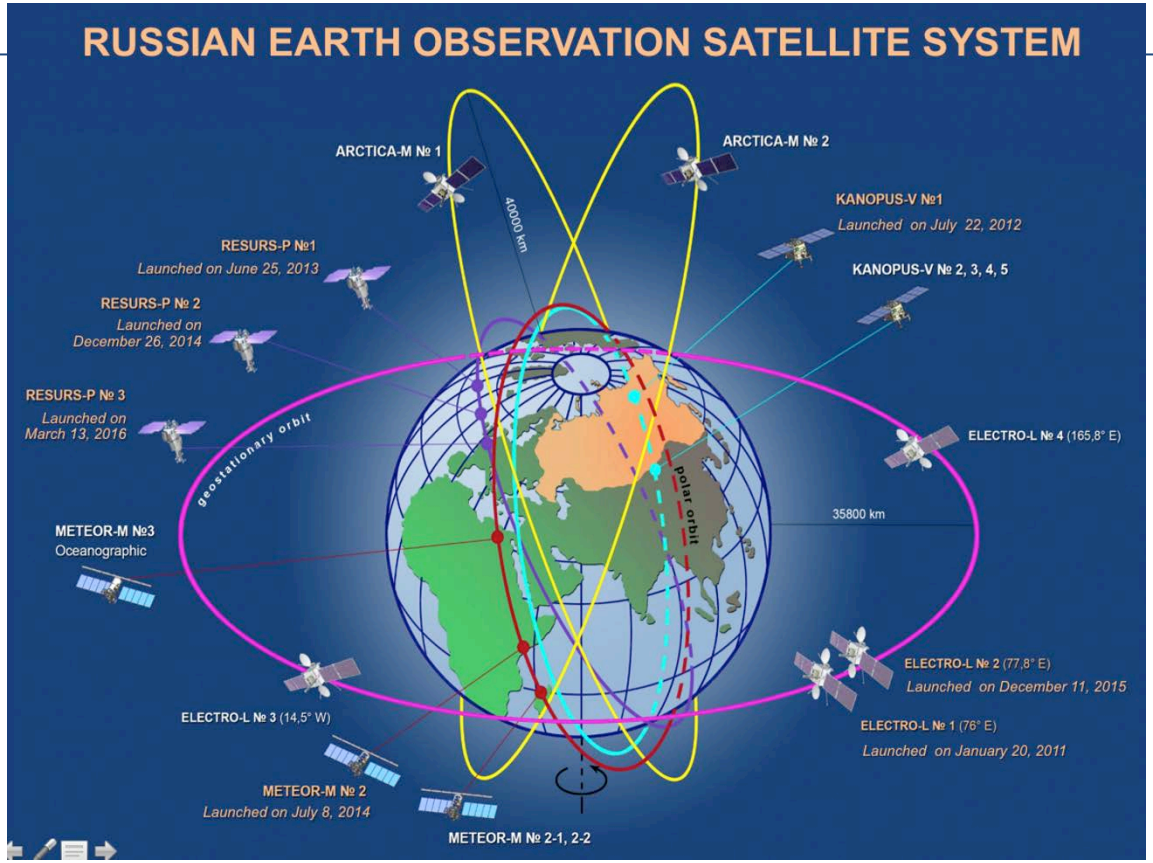
- ACTION: ROSHYDROMENT to explore the possibilities to implement an operational NRT service for the hyperspectral infrared sounder IKFS-2 on Meteor-M N2
- RECOMMENDATION: Roshydromet to develop and release a direct broadcast processing package for the Meteor-M N2 series, including level 1 processing for the MTVZA-GY microwave imager.
- RECOMMENDATION: CMA to make available data from FY-4A GIIRS and FY-3D HIRAS early in commissioning.

Temperature Error Statistics , 500 hPa, MTVZA-GY
(retrievals vs GFS NCEP analysis)



POLAR REGIONS

- RECOMMENDATION: For monitoring the Polar Regions, CGMS stressed the importance of the deployment of HEO missions such as Arktika.



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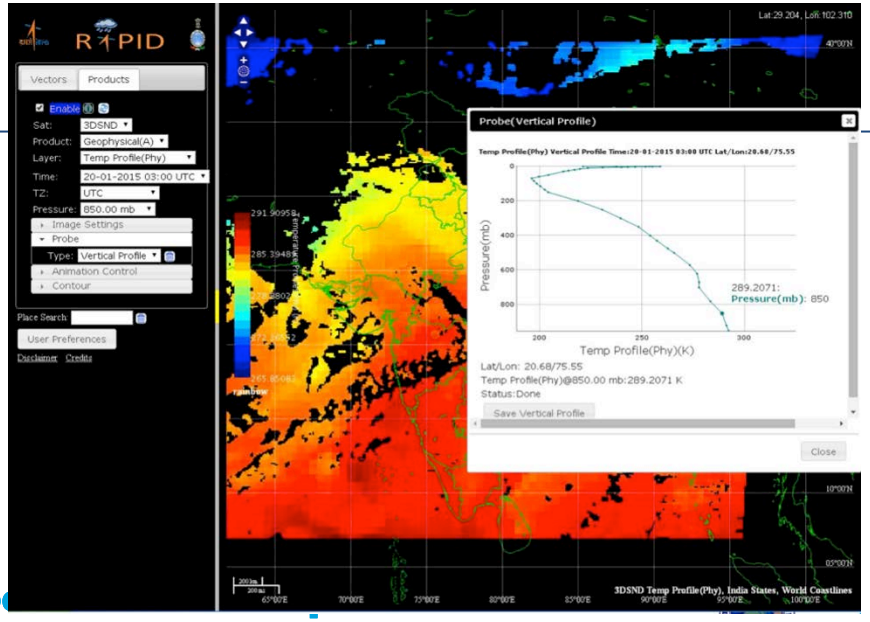
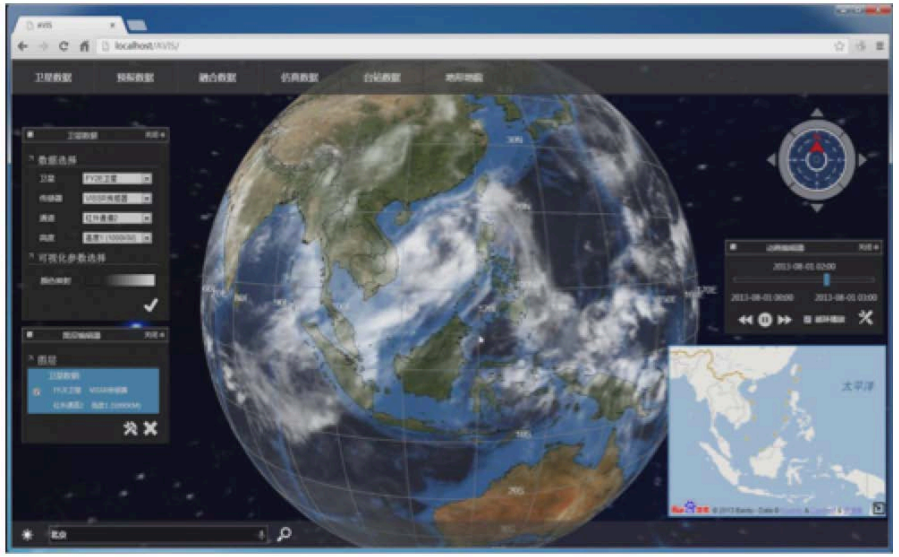
VISUALIZATION TOOLS

- ACTION: CMA to provide more information (documentation, availability details, URL) about the 3D-ADVP tool to CGMS, and for inclusion in the WMO webpage on Visualization Tools.

- ACTION: IMD to provide more information (documentation, availability details, URL) about the RAPID tool to CGMS, for inclusion in the WMO webpage on Visualization Tools.





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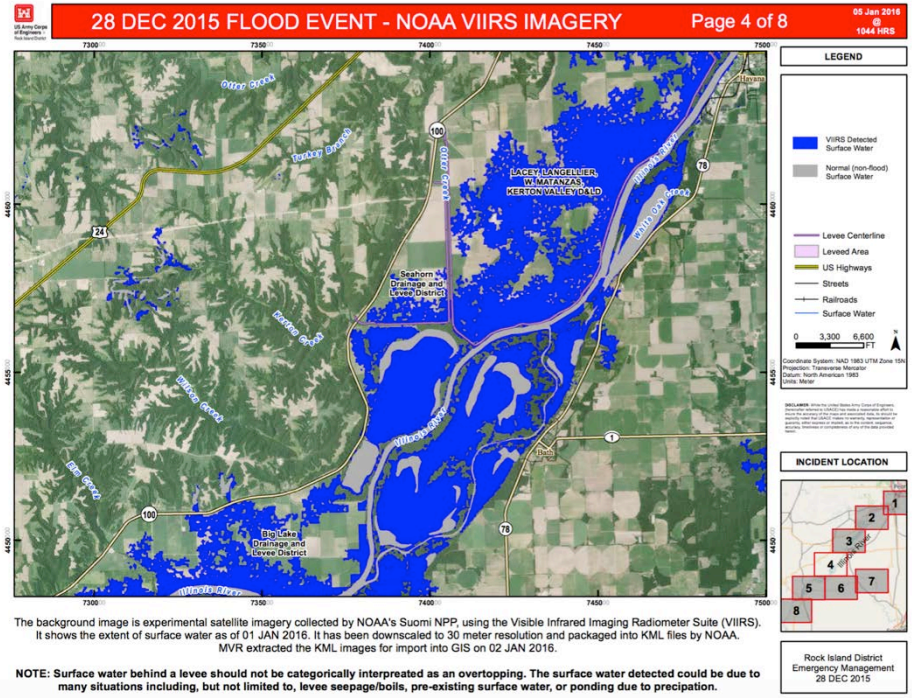
Direct Broadcast Applications

- The use of direct broadcast for local applications requiring low latency such as flood/ ice mapping, fire /smoke detection, soundings for nowcasting was presented by NOAA. DB allows testing of new products prior to operations
- RECOMMENDATION: CGMS agencies with operational direct broadcast needs are encouraged to attend the next ITWG sponsored Direct Broadcast Users Meeting in March 2017 hosted by Argentina Weather Service.



Example of JPSS Program Science experimental flood product generated from direct broadcast data being used by Army Corp of Engineers

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Summary

- Excellent progress and collaboration from Science Working Groups.

- International Science Working Groups provide excellent guidance for assessing the current and future health of the global observing systems based on impacts to applications and for development and promotion of new applications – including weather and climate.

  - ISWGs need CGMS coordination and agency commitments for actionable actions for securing and maintaining a robust observing system with real-time access to data.

  - ISWGs need CGMS agency commitments to ensure that funding is adequate to allow collaboration in ISWGs - not just travel, but also intercomparison studies, and international projects – including those established by GSICS, SCOPE, and the CEOS/CGMS Climate Working Group.