# Joint RA-II & RA-V Meeting in Conjunction with AOMSUC-15

### *Date*

***31 October 2025***

*09:00-17:30 CST*

## *Meeting Notes*

## *Opening of the Meeting*

The meeting was opened by Mr. Xian Di from CMA/NSMC, who warmly welcomed all participants to the Joint RA II and RA V Meeting.

Ms. Natalia Donoho, Chief of the WMO Space Programme, also extended a warm welcome to the participants. She highlighted key WMO activities in the Asia-Pacific region and underscored the importance of this meeting in strengthening collaboration between satellite data providers and the user community across the region.

Ms. Donoho further recalled the Early Warnings for All (EW4ALL) initiative launched by the UN Secretary-General in 2022, emphasizing its vital role in addressing global gaps in early warning systems. She expressed her appreciation to the China Meteorological Administration (CMA) for its generous hospitality and for successfully hosting the recent conference and training sessions in Beijing and Qingdao.

Following the opening remarks, participants introduced themselves in a roundtable (see *Annex 1*).

## *Updates on working structure and Operating Plans of RA II and RA V*

Mr. Yongqing Chen (WMO Regional Office for Asia and the South-West Pacific) presented updates on the governance structures and operating plans of Regional Associations II (Asia) and V (South-West Pacific) for 2025–2027, aligned with the WMO Strategic Plan 2024–2027. The newly elected regional leaders established working groups and expert teams to advance priorities including the Early Warnings for All (EW4All) initiative, enhancement of the Regional Basic Observing Network (RBON) and SOFF, and improvements in climate, hydrological, and satellite-based services. Both regions emphasized capacity development, data sharing through WIS 2.0, and collaboration via AOMSUC, VLab, and SWCEM activities, underscoring strengthened RA II–RA V cooperation in advancing Earth system observations and early warning capabilities.

*Please refer to the full presentation in Document 1.*

## *Updates on RA II ET-SOA and RA V ET-SAT*

Ms. Agnes Lane, Chair of the EW4ALL Satellite Task Team, presented the results of the gap analysis conducted in support of the implementation of the Early Warnings for All (EW4ALL) initiative in Regional Associations II (Asia) and V (South-West Pacific). The analysis was carried out by the RA II/RA V Task Team on EW4ALL, drawing on inputs from AOMSUC Country Reports, Hydromet Diagnostics, and the 2020 Satellite Data Survey (*see Document 2*).

The report examined three key areas—satellite product availability, infrastructure and data access, and training needs—focusing on five priority hazards under EW4ALL: *floods, droughts, tropical cyclones, thunderstorms,* and *squall lines*.

**Key Findings**

**1. Satellite Product Gaps**

- Strong user demand for high-resolution rainfall products, convective activity, and lightning data.
- Although many rainfall and drought-related satellite products exist (e.g., GSMaP, CMORPH, HRP), users report limited awareness and accessibility.
- No satellite-based lightning observation coverage currently available for RA II and RA V.
- Need for improved tropical cyclone wind field monitoring, including higher-frequency wind

products and better reliability of intensity estimates.

**2. Infrastructure Gaps**

- Limited internet connectivity constrains real-time use of geostationary data in several countries.
- GEO data reception challenges persist due to non-operational receiving systems in some NMHSs.
- Data storage capacity remains insufficient in many countries in the region, affecting data archiving and analysis.
- Visualization limitations were reported, particularly difficulty integrating satellite, radar, and model data using currently available tools.

**3. Training Gaps**

- Limited user awareness of available satellite datasets and online access points.
- Need for technical training on scatterometer high-resolution winds, open-source visualization tools, data management, and satellite system administration.
- Insufficient capacity in NWP model integration, lightning product use, and rapid-scan imagery utilization.

**Recommendations**

- **Product Development:**
  - Consult users to ensure rainfall and drought products meet operational needs.
  - Encourage training on precipitation, drought, and wave-height products.
  - Promote LightningCast as an interim tool for lightning monitoring.

- **Capacity Building:**
  - Provide targeted training on receiving station management, data storage, and online access tools for low-bandwidth environments.
  - Strengthen user training on FY-2/4, GK-2A, and LEO data utilization.

- **Infrastructure Improvement:**
  - Support sustainable solutions for internet connectivity and data archiving systems.
  - Explore expansion of LEO direct reception where feasible and promote GEONETCast-type services for regional data dissemination.
  - Enhance visualization capabilities for multi-dimensional data analysis and integration with radar/NWP systems.

**Next Steps**

- Validate the findings of the gap analysis with Members in RA II and RA V.
- Prioritize the recommended actions and integrate them into the EW4ALL Implementation Plan.
- Continue collaboration through the Task Team on EW4ALL and related initiatives such as Weather Ready Pacific.

The full draft report is available at: *EW4All Gap Analysis  for review by TT EW4All  2025-11-01.docx*. Members were encouraged to review the document and provide additional feedback.

It was also noted that the WMO Regional Office for Asia and the South-West Pacific, in collaboration with the WMO Space Programme, has developed an EW4ALL Satellite Products Dashboard for the global satellite-user community, available at: 🌐 https://community.wmo.int/en/ew4all-satellite-products.

## *CMA NSMC Services Supporting the Region*

Mr. Zheng Wei provided an overview of the FengYun (FY) meteorological satellite constellation and its applications in Regional Associations II and V. He highlighted the constellation's contribution to weather, climate, and disaster monitoring, and outlined recent developments in data services and international cooperation.

CMA has launched 22 FengYun satellites to date, including nine currently operational (five in low-Earth orbit and four in geostationary orbit). The latest missions—FY-3H (launched in September 2025) and FY-4B (operational since December 2022)—enhance atmospheric composition, greenhouse gas, and high-frequency observation capabilities. The next-generation FY-4C is scheduled for launch in December 2025, followed by FY-4M in 2026, the world's first geostationary microwave meteorological satellite.

FengYun satellites support monitoring of tropical cyclones, floods, droughts, volcanic eruptions, and air quality. CMA provides open data access through the NSMC Data Service Portal and applications such as SWAP (for GEO) and SMART (for LEO). The FengYun Earth and FY-ESM platforms offer real-time imagery, analysis tools, and emergency data support for global users, with over 170 emergency activations benefiting 37 countries.

CMA continues to promote international cooperation under the Belt and Road Initiative, offering training, technical exchanges, and scholarship programmes to strengthen partner countries' capacities in satellite meteorology.

Participants expressed appreciation for CMA's continued support in advancing regional early warning capabilities and data accessibility, noting the importance of FengYun satellites in achieving the goals of Early Warnings for All (EW4ALL) across RA II and RA V.

*Useful links:* http://www.nsmc.org.cn/en | http://data.nsmc.org.cn | https://data.nsmc.org.cn/FYESM/en/emergency/index.html

The full presentation can be accessed here: *FengYun meteorological satellite application in RAII-20251031.pptx*.

### *WMO Members' reports*

The session continued with presentations of reports submitted by WMO Members. A summary of the key outcomes from these reports is outlined in the table below.

| Country (Focal Point) | Access to Satellite Data | Internent Access | Data Storage Capacity | Visualization Tools Used | Training needs |
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| **Afghanistan (Nasim Muradi, Fawad Auobi)** | **GEO:**<br>– MSG: Previously received via *EUMETCast* (currently not operational); access now through web portals.<br>– FY-4: Accessed via online portal. | Not specified. | Not specified. | – *TmetVis*: Software package for visualizing satellite data distributed via the *EUMETCast* system (by SADCA). | – Weather forecaster training.<br>– Staff training on data analysis and downloading.<br>– Training on visualization software for satellite data.<br>– Support in accessing user access points. |
| **Australia (Agnes Lane, Bodo Zeschke)** | **GEO:**<br>– Himawari: via *HimawariCast* and *HimawariCloud*.<br>– Previously operated an FY-2 ground reception system (no longer operational).<br>– Exploring reception of GK2A from KMA (forecasters currently use GK2A via CIRA/SLIDER).<br><br>**LEO:**<br>– Five polar-orbiting tracking ground stations: Crib Point, Learmonth, Shoal Bay, Casey, and Davis.<br>– Satellites received: METOP-B, METOP-C, SNPP, NOAA-20, NOAA-21. | Reliable internet connectivity | Sufficient storage capacity; however, retrieval of archived data can be challenging | – *Visual Weather*: proprietary software.<br>– *Panther* and *TC MicroWave Viewer*: systems developed in-house by the Bureau.<br>– *McIDAS/CIMSS*: previously used (still active on some workstations).<br>– Online tools such as *CIRA SLIDER*. | No urgent needs identified, though there is an ongoing requirement for developing case studies. |
| **Bahrain (Abdulaziz AlBalooshi)** | **GEO:**<br>– MSG (IODC and 0° services) and MTG: Direct reception.<br>– Access to *EUMETView* online service.<br>– EUMETSAT's terrestrial data distribution is being considered as a supplement or backup to satellite reception. | Internet connectivity is robust, including for downloading MTG data. | With the increased data volume from MTG, data storage and archiving have become important. It's addressed by using scalable, cloud-based storage for satellite data. | – **MSG/MTG:** *IBL Satellite Weather System*.<br><br>While effective for MSG, hardware upgrades and system optimization are needed to fully utilize MTG data. | – Urgent need for training on satellite spectral channels and their operational applications.<br>– Strengthening of skills in RGB composite interpretation (dust, convection, fog, etc.).<br>– Training in satellite-based nowcasting to leverage frequent data updates. |
| **Bangladesh (Shahanaj Sultana)** | – **Himawari:** via *HimawariCast* and *HimawariCloud*.<br>– **FY-4:** Access via FTP; *CMACast* | Internet connection is reliable and stable | Insufficient storage capacity to handle the | – **Himawari:** *SATAID* software.<br>– **FY-4:** *MICAPS* | Training in satellite meteorology, product application, and interpretation; training on satellite |

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| | ground station currently under upgrade.<br>⚠ The current visualization system is experiencing technical problems and requires **urgent support.**<br>– **GK2A:** Satellite ground station available but currently **not operational** due to technical issues. | enough to support operational requirements. | large volume of satellite data received. | (currently not operational due to software issues) and *SWAP* software.<br>– **GK2A:** *Globe AN* version 2.0. | data analysis is urgently required on a regular basis, both domestically and abroad. |
| **Brunei Darussalam (Awang Mohamad Noor'arifin Bin Haji Awang Yussof, Muhammad 'Afifi Bin Junaidi)** | – **Himawari**: via *HimawariCast*, *HimawariCloud*, and JMA web portal.<br>– **GK2A**: via KMA's web-based portal.<br>– **FY-4B**: via CMA NMSC's web portal (**strong interest** in receiving near-real-time data via *CMACast*). | Currently using a **50 Mbps** internet connection, which is stable for day-to-day operations. However, as data demand increases, there is a need for a more efficient internet service to support broader data access and operational requirements. | There is currently no system for archiving historical satellite data. The *Himawari* workstation used for operations does not perform data archiving and is limited to **1 TB of storage**, allowing only about one month's worth of data before it is overwritten. | **Himawari:** *SATAID* software. | – Training on advanced data visualization and data processing to help customize satellite products for specific operational needs.<br>– Further specialized training in the use and application of satellite products. |
| **Fiji (Grace Voi)** | – **Himawari**: via *HimawariCast* and *HimawariCloud.*<br>– **GK2A**: via FTP server and web portal. | Due to bandwidth limitations, only 30-minute HimawariCloud data is downloaded for visualization in *Visual Weather*. | Sufficient storage infrastructure to manage received satellite data; however, long-term archival capability is not available. | – **Himawari:** *IBL Visual Weather* (annual licence maintained).<br>– *SATAID* (used for tropical cyclone applications).<br>– **GK2A:** Visualization issue — IBL team could not process data as it required a specific format. | – Training on IBL system usage.<br>– Satellite visualization and interpretation training.<br>– Training on using satellite data in tropical cyclone operations. |
| **Hong Kong, China (TANG Wai Ho (Alan))** | **GEO:**<br>- **Himawari**: via *HimawariCast, HimawariCloud*<br>**- FY-2 series [FY2G, 2H]: CMACast** | Internet connection is reliable and stable. | Storage infrastructure is currently sufficient for operational needs, though | – *PROTEUS:* Commercially licensed software.<br>– *Imagery Portal* and *GIS Platform:* | – Aviation services make extensive use of satellite products.<br>– Beyond tropical cyclones, further training and tools are needed to enhance monitoring of turbulence, |

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| | **- FY-4B: CMACast & Direct reception**<br>**- GK2A & GK2B: Real-Time FTP service**<br>**- GOES series [GOES-18, 19]: Internet**<br>**- METEOSAT series [Meteosat-9,10,12]: Internet**<br>**LEO:**<br>- **FY-3** series [FY3C, FY3D]: Direct reception<br>**- AQUA**: Direct reception<br>- **NOAA** series [N-20, 21 SNPP]: Direct reception<br>- **METOP** series [Metop-B, C]: Direct reception<br>- **RCM, S1A SAR winds, SMAP, COSMIC-2**: HTTP | | only selected datasets are archived long-term. As AI/ML applications expand, internal storage capacity becomes increasingly important to support large-scale data analysis. | Developed in-house.<br>– *CSPP LEO/GEO:* Free and open-source software.<br>– *JMA SATAID:* Used to display Himawari data converted from HimawariCloud format (real-time animation not supported). | icing, sand/dust, and volcanic ash (including the spread of $SO_2$). |
| **Indonesia (Alpon Sepriando)** | - **Himawari**: via *HimawariCast*, *HimawariCloud*<br>- **GK2A**: via FTP | Internet connection is stable at 100 Mbps. | Current storage capacity (**≈350 TB**, with **≈328 TB used**) is insufficient to handle the increasing satellite data volume. A larger capacity is urgently required, particularly in preparation for Himawari-10. | BMKG utilizes free and open-source software, including *SATAID*, *QGIS*, and *Python*.<br>– BMKG Portal provides satellite-derived products and serves as a one-stop platform for displaying satellite data and related products. | 1. Workshop on AI/ML for satellite data analysis.<br>2. Short training on data management, archiving, and retrieval of satellite data.<br>3. Training focused on the application of advanced satellite data from experienced practitioners.<br>4. Internships or exchange programmes to train IT professionals in satellite system administration, including data processing, server management, and troubleshooting. |
| **Iran (Parvaneh Asgarzadeh)** | – **MSG:** via *EUMETCast*.<br>– **FY-2H:** via *CMACast* operated by the Iranian Space Agency (not yet integrated into operational forecasting activities at IRIMO).<br>– **MODIS, METOP AVHRR, Landsat, Sentinel, SMOS:** via *web-based portals.* | Internet access is **unreliable**, with occasional connectivity issues affecting timely access to web-portal data. | Current storage capacity allows for approximately **30 hours** of data retention. | – *GIS tools*.<br>– Custom platforms (*Synergie system*)<br>– *PCWInSat*<br>– *XRIT2PIC* (for visualizing MSG data). | There is a strong need for advanced training in satellite data processing, integration, and interpretation to support operational forecasting and research. Priority areas include:<br>– AI-assisted analysis.<br>– Cloud-based data management.<br>– Utilization of new-generation |

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| **Kyrgyzstan (Tatyana Chernikova)** | – **MSG:** via *EUMETCast* (as part of the SADCA project); visible and infrared imagery from MSG satellites used to analyze cloud cover.<br>– **FY-2H:** direct reception; *CMACast* installation initiated but not yet completed (currently not operational).<br>– The agency does **not access** satellite data through online platforms or data portals. | Stable internet connection enabling uninterrupted access to network resources and external data sources. | Sufficient server infrastructure and disk space to store and process all currently received satellite data. | – *TMetVis:* provided through the *SADCA* project for visualizing MSG data.<br>– *SWAP:* used to visualize FY-2H data. | 1. Satellite Data Processing & Visualization: Training on CMACast operations, data processing, and modern visualization tools.<br>2. Software & Data Integration: Use of *TMetVis*, *SWAP*, and integration of satellite, in situ, and model data.<br>3. IT & System Maintenance: Maintenance of legacy backend systems (e.g., SUSE Linux) for satellite data reception and processing. |
| **Lao PDR (Phousavanh SIYAVONG)** | - **Himawari**: via *HimawariCast*<br>- **GK2A**: via FTP | Not specified. | Not specified. | Not specified. | Not specified. |
| **Malaysia (Nabil Bin Rosli)** | - **Himawari**: *HimawariCast*, *HimawariCloud*<br>- **FY-2/4:** CMACast & FTP server<br>- **GK2A**: via FTP server | Internet connectivity at HQ is stable and sufficient for operational needs. Some regional forecast offices occasionally experience slower access to high-resolution imagery due to limited bandwidth. | Long-term storage for full-disk imagery is limited and prioritized for operational time frames. | *eMET* (IBL development): a centralized web portal integrating multiple real-time forecasting tools and datasets. | Further training needed in:<br>– Cloud microphysics interpretation for convection and aviation applications.<br>– Nowcasting techniques integrating radar and satellite data.<br>– AI and machine learning applications for satellite-based storm detection.<br>– Multi-sensor data integration (radar, satellite, lightning, NWP). |
| **Maldives (Ahmed Muslim)** | - **FY-2/4:** CMACast | Internet connection is stable and supports basic operational needs; however, bandwidth limitations prevent downloading large datasets. | Data storage infrastructure can accommodate the volume of satellite data received via CMACast for approximately 3–4 days. | – *MICAPS* and *SWAP*: CMACast visualization software. | Training on SWAP and MICAPS to enhance the effective use and application of satellite data received via the CMACast system. |
| **Mongolia** | **GEO:** | Internet is | Sufficient for | – *McIDAS-V*. | – Satellite Data Applications: |

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| **(Javzmaa Sereenendorj)** | **-*Himawari*: HimawariCast & HimawariCloud**<br>**- FY4A: CMACast**<br>**LEO:**<br>– *NOAA, MODIS, Suomi NPP:* Direct reception. | generally stable but can be slow during peak hours or when transferring large datasets. | short-term operations, though long-term data archiving is limited. | – *GIS software* (*ArcGIS*, *QGIS*).<br>– *Custom-developed tools*. | Advanced use of FY, Himawari, and other satellite data for monitoring dust, clouds, precipitation, and drought.<br>– NWP and Model Interpretation: Enhanced skills in interpreting and applying model outputs.<br>– Nowcasting & IBF: Capacity building for short-term severe weather forecasting and user-oriented warnings.<br>– AI & Machine Learning: Use of AI for data processing, forecast verification, and decision support.<br>– Hazard Assessment & Communication: Integration of meteorological, hydrological, and environmental data into risk-based warning systems. |
| **Myanmar (Pa Pa Swe)** | – **Himawari:** via *HimawariCast*.<br>– **FY-2/4:** via *CMACast*, web portal | Internet connection is unstable. | Storage available for IR, visible, and NWP data for approximately two years. | – *SATAID* (for Himawari data visualization).<br>– *SWAP* web version (for FY data visualization). | – Continuous training on *CMACast* operation, maintenance, and product utilization for both technical and forecasting staff.<br>– Comprehensive *HimawariCast* training on satellite data and product applications.<br>– Technical training on *GK2A* products and related tools. |
| **Samoa (Sepi Gafa)** | – **Himawari:** via *HimawariCast*. | Internet connection reliable to support operational needs. | Insufficient storage infrastructure to handle the full volume of satellite data. Current capacity is **500 GB**; **1 TB** is required. | – *SATAID* (for Himawari data visualization). | Tropical cyclone refresher training, with a strong focus on the use of EIR and available Himawari channels for TC monitoring operations. |
| **Saudi Arabia (Humaid Albadi, Saleh Alsaedi, Muath Alsulami)** | **GEO:**<br>– *Meteosat-10, 12:* via EUMETCast.<br>– *CMACast:* installation in progress. | Internet connection is reliable and stable, sufficient to support | Current storage capacity for satellite data is **314 TB**, but expansion is | – *IBL Visual Weather* (operational use).<br>– *McIDAS-V* (research use).<br>– Visualization of low- | Technical training on visualizing and interpreting new satellite products. |

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| | **LEO:**<br>– Accessed via web portals. | operational needs. | needed to accommodate increasing data volumes. | orbit satellite data (e.g., sea wave height, ASCAT wind) remains a challenge. | |
| **Solomon Islands (Lenny Konamauri)** | **GEO:** *Himawari* via *HimawariCast* and web portal.<br>**LEO:** via web portals. | Sufficient to access satellite data through internet-based platforms and regional data-sharing portals. | Limited storage infrastructure, insufficient to manage the increasing satellite data volume; currently no capacity for long-term storage. | – *SATAID* (for HimawariCast data visualization). | – Satellite data interpretation for forecasting and disaster monitoring.<br>– NWP output application and downscaling.<br>– Wave and ocean monitoring for coastal forecasting.<br>– Data management and archiving of large datasets.<br>– Visualization and GIS data integration.<br>– Python/R for data processing and visualization. |
| **Sri Lanka (Athula Karunanayake)** | **GEO:**<br>– *INSAT-3D:* via IMD website.<br>– *FY-4:* via CMACast.<br>– *Himawari:* via HimawariCast.<br>– *Meteosat:* via EUMETView portal.<br><br>**LEO:**<br>– *FY-3:* via CMACast.<br>– *ASCAT, GSMaP, MIMIC-TWP:* via Internet. | Internet bandwidth needs upgrading to support full data access and transfer. | Sufficient storage infrastructure (≈**10 TB**) to manage current satellite data volumes. | – *SATAID*.<br>– *IBL Visual Weather*.<br>– *SWAP*. | – Meteorological satellite data utilization.<br>– Severe weather monitoring and early warning.<br>– Climate monitoring and environmental applications.<br>– Ocean and land surface observations. |
| **Thailand (Sumridh Sudhibrabha)** | **GEO:**<br>– *Himawari:* via HimawariCast and HimawariCloud.<br>– *FY-4B:* via CMACast (under shipment).<br><br>**LEO:**<br>– *MODIS, GOME-2A, OMI:* via Internet (the local receiving system is currently broken and under maintenance). | Generally reliable at HQ, with occasional slowdowns during peak hours. | Current storage capacity of **~20 TB**; an additional **100–200 TB** (plus backup) needed for research purposes. | – *SATAID*.<br>– *PanoplyCL*.<br>– *Custom web dashboards*. | – Weather & Air Quality Applications: Nowcasting, NWP assimilation, storm monitoring, AOD retrieval, particulate matter, radiation.<br>– Validation & Evaluation: Comparison with ground and station data.<br>– AI/ML & Data Fusion: Integration of satellite, radar, and model data. |
| **Uzbekistan (Satfullayev** | – **MSG:** via *EUMETCast* (as part of the SADCA project); | Stable internet connection | Sufficient server infrastructure and | – *TMetVis:* provided through the *SADCA* | Satellite Data Processing & Visualization: Training on CMACast |

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| **Khayrullo)** | – **FY-2/4:** *CMACast* installation initiated but not yet completed (currently not operational).<br><br>– The agency does **not access** satellite data through online platforms or data portals. | enabling uninterrupted access to network resources and external data sources. | disk space to store and process all currently received satellite data. | project for visualizing MSG data. | operations, data processing, and modern visualization tools. |

## *Sharing experience across the regions*

### *RA II WIGOS Coordination Group activities*

A presentation on the RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products, and Training was delivered, highlighting key achievements and ongoing activities under the RA II Operating Plan 2024–2027 (Progress of satellite activities in RA-II.pptx).

Since its launch in 2013, the project has enhanced coordination among satellite operators, strengthened user readiness for the new generation of geostationary satellites, and promoted capacity development through the Asia-Oceania Meteorological Satellite Users' Conferences (AOMSUCs) and related training events. Regular RA II satellite newsletters and the project webpage (hosted by JMA) provide continuous updates and resources for Members.

The presentation also reviewed request-based high-frequency observation services offered by CMA (FY-ESM), JMA (HimawariRequest), and KMA (GK2A Rapid Scan and Region of Interest Services). These mechanisms support targeted monitoring of tropical cyclones, volcanic eruptions, wildfires, and other high-impact events, enabling timely access to satellite data for disaster risk reduction.

Participants acknowledged the continued value of the RA II WIGOS Project in improving satellite data access, application, and coordination across the region, and encouraged ongoing collaboration with RA V and satellite operators to enhance early warning capabilities under EW4ALL.

*Further information is available at the project webpage:*
https://www.jma.go.jp/jma/jma-eng/satellite/ra2wigosproject/ra2wigosproject-intro_en_jma.html

### *RAIDEG*

Ms. Sarah Kimani (Kenya Meteorological Department, Chair of RAIDEG) delivered a pre-recorded presentation providing updates from the RA I Dissemination Expert Group (RAIDEG) (*please refer to Document 3*).

She reported that the African user community is actively preparing for the transition to Meteosat Third Generation (MTG) data, with EUMETCast Africa serving as the primary distribution mechanism for satellite data and products across the Region. Data are currently processed through the PUMA system (Preparation for the Use of MSG in Africa) and visualized using Synergie, which is being progressively replaced by the Skyceiver visualization software.

RAIDEG's current activities include:

- Conducting a survey on the initial use of MTG data and assessing readiness for the transition from MSG to MTG.
- Analyzing the early MTG data disseminated across Africa.
- Supporting MTG data and product validation campaigns in the Region.
- Identifying training needs and implementing capacity-building programmes to support the effective use of the new generation of satellite data and products.

The presentation also highlighted the establishment of an informal communication channel via WhatsApp, which facilitates regular information exchange and collaboration among African satellite data users, strengthening the RA I user community network.

### *SDR-Group-RA-III-IV*

Mr. Marcial Garbanzo (RA IV ET-SDR Co-Chair, UCR, Costa Rica) provided updates on the activities of the WMO Coordination Group on Satellite Data Requirements (SDR) for Regional Associations III and IV, including outcomes from recent teleconferences and the RA III/IV EW4ALL Satellite Data.

The Group involves active participation from 18 member countries, including representatives from VLab. *Further information is available at:* https://sdr.ucr.ac.cr.

The survey, conducted across 29 countries with 61 responses, assessed the use of satellite data for monitoring weather hazards such as floods, droughts, tropical cyclones, and thunderstorms. Results showed that while basic training in satellite data use is widespread, there remains a strong need for advanced, applied training, particularly in data processing, visualization, and multi-source integration.

Key challenges identified include data latency and resolution, limited access to visualization software, and insufficient training on advanced satellite applications. The majority of respondents (over 60%) reported moderate success in using satellite data for hazard monitoring, with only a small portion achieving high operational success.

The presenter noted that several advanced satellite products—such as NOAA Flood Map, NDVI vegetation indices, and GSMaP precipitation data—are underutilized across the regions. It was recommended enhanced awareness and "how-to" training on such tools, inclusion of key products in GEONETCast, and virtual regional workshops focusing on practical workflows for high-priority hazards.

It was further highlighted that Regions III and IV are also actively utilizing WhatsApp as an informal communication channel to foster user engagement and strengthen collaboration.

For more information, please refer to the *Document 4*.

## *WMO-CGMS Virtual Laboratory (VLab) updates and plans*

### *VLab as a Global Network of Training Providers*

Dr. Marcial Garbanzo-Salas, VLab Technical Support Officer, presented updates on the WMO–CGMS Virtual Laboratory for Education and Training in Satellite Meteorology (VLab), a global partnership of 15 Centres of Excellence and satellite operators supporting Members in transforming satellite data into practical applications. He highlighted outcomes from VLMG-11 (January 2025), including the use of AI tools and Jupyter Notebooks for interactive training, and emphasized the need for stronger collaboration between satellite operators and training centres.

Examples of VLab in action were shared, including a blended regional course held in Antigua, Guatemala (February 2025) for 25 participants from 9 NMHSs in Latin America and the Caribbean. The course achieved a 100% completion rate and strengthened regional collaboration through an active professional network. VLab continues to support ongoing Regional Focus Group (RFG) sessions, which serve as continuous, training and forecasting forums across the world.

Dr. Garbanzo-Salas highlighted emerging directions, including AI-assisted learning, cloud-based data labs, and integration of satellite training within the EW4ALL initiative, reinforcing VLab's mission to convert global satellite investments into local capacity and impact.

*More information:* https://wmo-sat.info/vlab | VLab as a Global Network of Training Providers v2 AOMSUC-15.pptx

### *The activities from CMA TC and Nanjing University*

Mr. Jiang Lei (CMA Training Centre – CMATC, WMO RTC Beijing) presented an overview of CMATC's long-standing contributions to meteorological education and satellite application training. Established in 1955 and serving as a WMO RTC since 2003, CMATC has trained over 11,000 participants from 170 countries.

He highlighted CMA's new "1+2+6" training system (2024–2030), integrating one national centre (CMATC, Beijing), two regional training centres (Hunan and Xinjiang), and six sub-regional centres across China. This structure aims to deliver more specialized, complementary, and effective capacity development in meteorology, combining education, research, and operational consultation.

CMATC has conducted over 59 satellite-related training courses since 1999, benefiting nearly 4,700 face-to-face and 11,000 distance-learning participants. These courses include WMO Voluntary Cooperation Programme events, tailored national and regional sessions, and modules integrated into the Asia-Oceania Meteorological Satellite Users' Conference (AOMSUC). Training focuses on the application of FengYun satellite products in weather forecasting, disaster risk reduction, and environmental monitoring.

CMATC continues to modernize its distance learning system (CMA-MOOC) and plans to expand offerings

aligned with the Early Warnings for All (EW4ALL) initiative, particularly through the "Mazu" multi-hazard early warning service network, and through joint training needs assessments to identify capacity gaps and tailor future training programs.

*More information is available at: Training Activities on Meteorological Satellite Applications in CMATC.pptx*.

Prof. Wang Suchun (WMO-CGMS VLab Centre of Excellence Nanjing / WMO RTC Nanjing) presented an overview of the 32-year contribution of CoE Nanjing to international satellite training, which has benefited over 6,300 participants from all WMO Regions.

The Centre's training philosophy follows a "Demand–Design–Implementation–Evaluation" cycle, ensuring operational relevance and measurable impact. Recent examples included the 2025 FengYun Satellite Training Course for disaster monitoring and a bilateral training course for Namibia on satellite ground data reception. Prof. Wang highlighted CoE Nanjing's alignment with the EW4ALL pillars, integration of AI-assisted satellite analysis, and the need to strengthen long-term learning and collaboration among developing countries through the VLab network and CGMS partners.

*More information is available at: CoE Nanjing Presentation.pptx*.

### *The activities from BoM, BMKG, and KMA*

Mr. Bodo Zeschke, AOMSUC International Conference Steering Committee Liaison Officer for Training, presented key activities undertaken by the Australian Bureau of Meteorology (BoM), BMKG Indonesia, and the Korea Meteorological Administration (KMA) (Australian VLab.pptx, Indonesian VLab.pptx, Korean VLab.pptx).

*Australian VLab Centre of Excellence*
The Australian VLab Centre of Excellence reported continued success of its Regional Focus Group (RFG) meetings, now exceeding 128 sessions, serving as an interactive platform for sharing regional satellite applications and case studies. Recent topics included AI-driven convective hazard forecasting and the integration of machine learning tools such as NOAA's LightningCast. VLab resources have been incorporated into BoM's Graduate Diploma of Meteorology and online learning platforms, supporting ongoing professional development across the region.

*Indonesian VLab Centre of Excellence*
BMKG was formally designated as a WMO–CGMS VLab Centre of Excellence in July 2023, following a decade-long preparatory process. In 2025, BMKG delivered several regional training initiatives, including the Marine Services Course for Southeast Asian Countries and the South–South Triangular Cooperation (SSTC) Programme on Climate Services for the Food, Energy, Water, and Health Sectors, engaging participants from over ten countries through blended learning formats. BMKG also contributed expertise to the development of WMO Satellite Enabling Skills and the Structured Basic Satellite Training Programme, enhancing regional capacity building and climate service delivery.

*Korean VLab Centre of Excellence*
The Korea Meteorological Administration (KMA) presented updates on its 2025 training activities, including ODA-supported field visits in the Philippines, the KOICA Global Invitational Training Programme on Disaster Prevention and Early Response, and a Laos Disaster Response Early Warning System course. These initiatives trained meteorological staff from more than ten countries in the application of GK2A satellite data for forecasting and disaster management. KMA also continues to expand international access to its training materials and satellite resources through its public VLab portal, supporting capacity development in satellite-based early warning across developing regions.

## *Summary and Closure of the meeting*

The Chair emphasized the importance of responding to the needs expressed by WMO Members, ensuring that their requests are duly considered and translated into concrete actions to strengthen future initiatives and collaborations. The active engagement and valuable contributions of Members throughout the meeting were highly appreciated, with the Chair noting that the exchange of national experiences and best practices remains essential for advancing collective regional capacity. The meeting concluded with expressing sincere appreciation to CMA for its warm hospitality and outstanding organization in hosting AOMSUC-15 and the associated events in China, which greatly contributed to the success of the meeting.

## Meeting agenda

| *Time* | *Topic* | *Speaker* |
|---|---|---|
| **09:00-09:15** | **Opening of the meeting** | CMA, WMO, Chair |
| 09:15-09:30 | Updates on working structure and Operating Plans of RA II and RA V | Yongqing Chen, WMO RAP |
| 09:30:09:50 | Results of the Gap Analysis in support of EW4ALL | Agnes Lane, Chair of EW4ALL Satellite Task Team (*online*) |
| 09:50-10:10 | CMA NSMC Services Supporting the Region | CMA NMSC |
| 10:10-10:30 | *Coffee-break* | |
| 10:30-12:30 | **WMO Members' Reports**<br>1. Afghanistan<br>2. Australia<br>3. Bahrain<br>4. Bangladesh<br>5. Brunei Darussalam<br>6. Fiji<br>7. Hong Kong, China<br>8. Indonesia<br>9. Iran<br>10. Kyrgyzstan<br>11. Laos<br>12. Malaysia | (10 min per each country, incl. Q&A) |
| 12:30-13:30 | *Lunch break* | |
| 13:30-15:20 | **WMO Members' Reports (continued)**<br>13. Maldives<br>14. Mongolia<br>15. Myanmar<br>16. Samoa<br>17. Saudi Arabia<br>18. Solomon Islands<br>19. Sri Lanka<br>20. Thailand<br>21. Uzbekistan | (10 min per each country, incl. Q&A) |
| 15:20-15:40 | Discussion on user requirements for satellite data utilization<br>• Access to satellite data<br>• Visualization tools<br>• Training needs | Discussion |
| 15:40-16:00 | *Coffee-break* | |
| **16:00-16:30** | **Sharing experience across the regions** | |
| 16:00-16:15 | **RA II WIGOS Coordination Group activities (CMA, JMA, KMA)** | Mr. Ono, JMA (on behalf of CMA, JMA, KMA) |
| 16:15-16:30 | RAIDEG | Sarah Kimani, KMD (*online*) |
| 16:30-16:45 | SDR-Group-RA-III-IV | Marcial Garbanzo Salas, UCR, SDR-RA-III/IV Co-Chair |
| **16:45-17:20** | **WMO-CGMS Virtual Laboratory (VLab) updates** | |
| 16:45-17:00 | VLab as a Global Network of Training Providers | Marcial Garbanzo Salas, UCR, VLab TSO |
| 17:00-17:10 | The activities of CMATC | DENG Jingmian, CMATC |
| 17:10-17:20 | The activities of NUIST | REN Lu, NUIST |
| 17:20-17:40 | The activities from BoM, BMKG, and KMA | Bodo Zeschke, BoM, AOMSUC ICSC Liaison Officer for Training |
| **17:45-18:00** | **Summary and Closure of the meeting** | CMA, WMO RAP, Chair |

## Meeting participants

| No | Name | Organization/Country |
|---|---|---|
| 1 | Xian Di | CMA/NSMC, Meeting Chair |
| 2 | Allen Huang | AOMSUC ICSC Chair |
| **Members** | | |
| 3 | Fawad Auobi | Afghanistan |
| 4 | Agnes Lane (online) | Australia |
| 5 | Abdulaziz Albalooshi | Bahrain |
| 6 | Shahanaj Sultana | Bangladesh |
| 7 | Mohd Noor'Arifin Bin Hj Awang Yussof | Brunei Darussalam |
| 8 | Muhammad 'Afifi bin Junaidi | Brunei Darussalam |
| 8 | Parvaneh Asgarzadeh | Iran |
| 10 | Phousavanh Siyavong | Laos |
| 11 | Nabil Bin Rosli | Malaysia |
| 12 | Pa Pa Swe | Myanmar |
| 13 | Ahmed Muslim | Maldives |
| 14 | Javzmaa Sereenendorj | Mongolia |
| 15 | Tatiana Chernikova | Kyrgyzstan |
| 16 | TANG Wai Ho (Alan) | Hong Kong, China |
| 17 | Saleh Ali Safar Alsaedi | Saudi Arabia |
| 18 | Moath Abdulaziz Al-Sulami | Saudi Arabia |
| 19 | Lenny Konamauri | Solomon |
| 20 | Grace Voi | Fiji |
| 21 | Alpon Sepriando | Indonesia |
| 22 | Sepi Gafa | Samoa |
| 23 | Athula Kumara Karunanayake | Sri Lanka |
| 24 | Sumridh Sudhibrabha | Thailand |
| 25 | Somprat Srithagon | Thailand |
| 26 | Inoke Tuifutuna Lelenga | Tonga |
| 27 | Khayrullo Satfullaev | Uzbekistan |
| **Satellite operators** | | |
| 28 | Zheng Wei | CMA/NSMC |
| 29 | Hiroshi Ono | JMA |
| 30 | Takumi Maruyama | JMA |
| 31 | Nozomu Fukuhara | JMA |
| 32 | Tsuneyuki Harada | JMA |
| 33 | Sunae jeong | KMA |
| 34 | Changbeom cho | KMA |
| 35 | Byung-il lee | KMA |
| 36 | Sergey Tasenko | Roshydromet |
| 37 | Konstantin Litovchenko | Roshydromet |
| **VLab Centres of Excellence** | | |
| 38 | Jiang Lei | CMATC |
| 39 | Prof. WANG Suchun | Nanjing University |
| 40 | Bodo Zeschke | BoM |
| **WMO Secretarait** | | |
| 41 | Natalia Donoho | WMO SPC |
| 42 | Yongqing Chen | WMO RAP |
| 43 | Zoya Andreeva | WMO SPC |