Vol. 6 No. 3, October 2015

RA II WIGOS Project Newsletter

DEVELOPING SUPPORT FOR NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN SATELLITE DATA, PRODUCTS AND TRAINING

Contents of this issue

	Page
✧ The 6th Asia/Oceania Meteorological Satellite Users' Conference (AOMSUC-6)	1
✧ The 3rd Meeting of the Coordinating Group of the WMO RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training	2
✧ The 2nd Announcement of the 1st KMA International Meteorological Satellite Conference, Seoul, Korea, 16 ~ 18 Nov. 2015	2
✧ Joint RA II/RA V Workshop on WIGOS for Disaster Risk Reduction (DRR)	4
✧ Himawari-8 and its products to support severe weather monitoring in Southeast Asia	5
✧ Himawari-8 Atmospheric Motion Vector	7
✧ Satellite Rainfall at Realtime -- GSMaP_NOW	7
✧ Members of the Coordinating Group	9
✧ From the Co-editors	10

The 6th Asia/Oceania Meteorological Satellite Users' Conference (AOMSUC-6)

The Japan Meteorological Agency (JMA) is pleased to announce its hosting of the Sixth Asia/Oceania Meteorological Satellite Users' Conference, which will take place from 9 to 14 November, 2015, in Tokyo, Japan. The event is expected to be of particular interest to experts in the fields of meteorology, climatology and environment-related satellite

observation. The latest information of the conference are provided on the following web pages:
http://www.jma-net.go.jp/msc/en/aomsuc6/

On the other hand, the third meeting of the Coordinating Group of the RA II WIGOS Project will be held in conjunction with AOMSUC-6.

Schedule

Monday 9 November: Training on meteorological satellite data usage (1) (NMHS directed)
Tuesday 10 November: Plenary session (1)
- Session 1: Current and future meteorological satellite programs
- Session 2: Himawari-8, related status and application
- Session 3: Application of JAXA LEO satellites
- Country Report: Southeast Asia, 10 countries

Wednesday 11 November: Plenary session (2)
- Country Report: Oceania, 10 countries
- Session 4: Program plans, data access and utilization
- Discussion for Poster Presentations
- Session 5: Atmospheric parameters derived from satellite observations
- Session 6: Application of satellite data to weather analysis and disaster monitoring

Thursday 12 November: Plenary session (3)
- Country Report: South Asia, 6 countries
- Session 7: Application of satellite data to numerical weather prediction
- Session 8: Application of satellite data to climate and environmental monitoring
- Session 9: Land surface and ocean parameters derived from satellite observations
- Session 10: Capacity building and training activities

Friday 13 November: Training on meteorological satellite data usage (2) (NMHS directed)
Saturday 14 November: The 3rd meeting of the Coordinating Group of the RA II WIGOS Project (NMHS directed)

Venue

9 (Mon.) – 12 (Thu.) November
Tokyo International Exchange Center/Plaza Heisei Meeting Facilities
Tokyo Academic Park, 2-2-1 Aomi, Koto-ku, Tokyo 135-8630 Japan
http://www.jasso.go.jp/tiec/map_e.html

13 (Fri.) – 14 (Sat.) November
JMA Headquarters
1-3-4 Otemachi, Chiyoda-ku, Tokyo 100-8122, Japan

(Kotaro Bessho, JMA/MSC)

The 3rd Meeting of the Coordinating Group of the WMO RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training

WMO RA II WIGOS project assists NMHSs in RA II to make better use of satellite-related information. The major focus of the initiative is to facilitate the timely provision of satellite-related information by satellite operators themselves to users, i.e., NMHSs in RA II, especially developing countries including LDCs. It is necessary to create synergy between other ongoing projects such as the SCOPE-Nowcasting and provide greater benefits with next generation satellites. For this purpose, the Japan Meteorological Agency (JMA), with the cooperation of the Korea Meteorological Administration (KMA), will hold a "3rd Meeting of the Coordinating Group of the “WMO RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training", on 14th November 2015 at the JMA headquarters in Tokyo, Japan. A proposed agenda for the meeting is 1) status of project, 2) user and provider perspective, and 3) synthesis and future project work plan. The meeting will also have participants from NMHSs in WMO RA V as an observer.

(Takeshi Otomo, JMA)

The 2nd announcement of the 1st KMA International Meteorological Satellite Conference, Seoul, Korea, 16 ~ 18 Nov. 2015

Since the successful launch of COMS, Korea's first geostationary meteorological satellite, National Meteorological Satellite Center(NMSC) of KMA has hosted several domestic or international meetings regarding the meteorological satellite development and

data utilization.

From the year of 2015, KMA / NMSC is going to upgrade its activities about the academic discussion and practical cooperation in the meteorological satellite area and provide information on Geo-KOMPSAT-2A (GK2A) user readiness through this newly beginning conference, especially focused on the GK2A Program.

The 1st KMA International Meteorological Satellite Conference (KIMSC-1) will be held on November 16~18, 2015 in Seoul, Korea, in collaboration with Electronics and Telecommunications Research Institute (ETRI).

(http://www.kmaimsc.kr/index.php)

Conference Topics

- Current Status and Future Plan of GK2A
- Space Weather Activities
- Preparation of KMA's LEO satellite
- Geophysical Products from GK2A Algorithm Development

Important Dates

Abstract Submission	16 October 2015
Attendance Registration(on-line)	31 October 2015
Presentation Submission	9 November 2015

Conference Schedule

16 November (Mon)

- Opening Ceremony
- Session I : GK-2A Ground Segment
- Session II : Space Weather
- Session III : LEO Satellite
- Welcome Banquet

17 November (Tue)

- Session IV-1 : Scene Analysis
- Session IV-2 : C loud/Rainfall

18 November (Wed)

- Session IV-3 : Radiation/Aerosol
- Session IV-4 : Atmospheric/Aircraft
- Closing Ceremony
- Student Research Competition

Call for Papers

Individuals whose professional fields related to the topics and who wish to present at the conference are invited to register.

The registration form can be downloaded in Text Form or MS-Word Form.

(http://www.kmaimsc.kr/html/menu2_sub1.php)

The form should include author information, title, and abstract, and should be e-mailed to kimsc2015@kmaimsc.kr

- Submission deadline : 16 October 2015
- Conference fee : none

This conference will offer an opportunity to share and discuss on a trend of meteorological satellite development, data processing/ application techniques and GK-2A user readiness, etc.

Venue and Accommodation

- THE PALACE HOTEL SEOUL

160 Sapyeong-daero. Seocho-gu, Korea (Banpo-dong)

(http://www.thepalaceseoul.co.kr/)

Attendance Registration

The deadline for registration is 30 October 2015.

Luncheon (Monday 16, Tuesday 17) and dinner(welcome banquet, Monday 16) will be served to every participant

(http://www.kmaimsc.kr/html/board.php?evboardNum=b31&evBFlag=write)

Visa Support

If you need any support regarding visa, please let us know.

For questions regarding venue, accommodation, visa support, and general information, contact below;

- KIMSC2015 Office Manager

Tel : +82-10-3077-4879

E-mail : kimsc2015@kmaimsc.kr

More details such as venue, accommodation and transport is provided on the website of the 1st KMA International Meteorological Satellite

Conference (KIMSC-1)
(http://www.kmaimsc.kr/index.php)

(Jongpil YOON, NMSC/KMA)

Joint RA II/RA V Workshop on WIGOS for Disaster Risk Reduction (DRR)

The Joint RA II/RA V Workshop on WIGOS for Disaster Risk Reduction (DRR) was opened by the Director-General of the Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG), Dr. Andi Eka Sakya at the headquarters of BMKG in Jakarta, Indonesia, 12-14 October 2015.

Rationale

Geographically the areas of WMO RA II and RA V are next to each other, with one of the limit lines, separating the 2 Regions, going along the Malaysia-Thailand boundary. The Asia/Oceania region includes WMO Members from both RA II (Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam) and RA V (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore). This area is a sub-region affected by several common issues related to severe weather events, such as typhoons, each one frequently crossing from RA V to RA II, impacting on more than one country in one or both WMO Regions. Thus, the development of joint activities amongst Members who have similar operational needs for early warning and disaster risk reduction purposes is of major relevance, contributing to, at least, three of the five WMO strategic priority areas, which are Capacity-building for the developing and least developed countries; Implementation of the WMO Integrated Global Observing System (WIGOS); and Disaster risk reduction.

Scope

WIGOS implementation can help bridging between different Regional Associations and their Members, through development of common plans for the WIGOS Key Activity Areas, particularly for the following ones:

- Collaboration with the WMO co-sponsored observing systems and international partner organizations and programmes,
- Design, planning and optimized evolution of WIGOS component observing systems at regional, sub-regional and national levels,
- Observing System Operation and Maintenance,
- Quality Management
- Standardization, System Interoperability and Data Compatibility
- Data Discovery, Delivery and Archival
- Capacity Development

Some projects/activities common to both RA II and RA V exist, such as the “RADAR composite map in Southeast Asia” (Meteorological Working Group of the WMO/ESCAP Typhoon Committee) but they are not captured in the same way, or not captured at all, in the Regional WIGOS Implementation Plans (R-WIP) of both Regions.

The development of a specific WIGOS project in support of improved forecasts and warnings for weather related hazards in Southeast Asia, is proposed through the organization of a WIGOS joint-workshop with representatives from RA II and RA V Members.

The expected outcomes of this workshop are the enhancement of member’s capabilities for weather forecasts and warnings through the improvement of data sharing and data integration across the Southeast Asia region, which should be achieved by WIGOS implementation activities in RA-II and RA-V.

Thus, the workshop focused on the observing systems that produce data and products most relevant for emergency management, such as surface-based remote sensing (Weather Radars, Wind Profilers, Lightning Detection systems), and integrated satellite systems, considering the data sparse areas of both Regions.

The exchange of experiences and the joint efforts between RA II and RA V Members should create synergies for the increase of data availability, geographic coverage, timeliness and quality of observations in the

region, primarily those relevant for weather watch and nowcasting activities.

The main outcomes of the workshop is to initiate two sub-regional projects be developed under the WIGOS umbrella, involving the following Members: Australia, Bangladesh, Brunei, Cambodia, China, Hong Kong China, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Republic of Korea, Singapore, Thailand, Vietnam. The followings are the two joint RA-II/RA-V WIGOS project on radar/satellite data.

Joint RA-II/RA-V WIGOS project on Radar data

There are recent developments to improve radar coverage in many of the participating Members and existing the "RA II WIGOS Project for Observing systems integration for supporting Disaster Risk Reduction - Capacity Building in Radar Techniques in the Southeast Asia". It needs to improve the quality of radar data and to further improve the coverage and availability of weather radar data in the South East Asia region. The following is the overall goals of the proposed project.

Overall goals of radar data project:

- Improvement of data quality of existing radars
- Development and expansion of national radar network;
- Near real time International exchange of radar data
- Development of «sub-regional» radar data centre(s)

Joint RA-II/RA-V WIGOS project on Satellite data

There is excellent coverage of this sub-region with satellite imagery obtained from geostationary platforms operated by three WMO Members, namely China, Japan and the Republic of Korea.

Overall goals of satellite data project:

- All Members in the target region to receive and be able to interpret and use geostationary satellite data as full spatial, spectral and temporal resolution subsets for their national region of interest, including the ability to generate key products
- To develop a protocol for countries in target area to request and receive and ingest event-driven rapid-scan geostationary satellite data in support of Disaster Risk Reduction

It is noted that it is proposed to establish a close coordination between this project and the ongoing “RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training” led by two Co-Coordinators representing Japan and the Republic of Korea, and with the RA-V Task Team on Satellite Utilization. The Management Groups of WMO Regions II and V to review and approve this project, and to support its further development once approved.

The WMO Secretary General will support this project with technical assistance within available resources, and to recommend to CGMS that the satellite operators provide the necessary support to it.

(Dohyeong KIM, NMSC/KMA)

Himawari-8 and its products to support severe weather monitoring in Southeast Asia

JMA started Himawari-8 operation at 02:00 UTC on 7 July 2015, and Himawari-9 will also be launched in 2016 as a backup and successor satellite. Both satellites are located around 140.7 degrees east, and observe the East Asia and Western Pacific regions for a period of 15 years. Himawari-8 and -9 have 16 bands, which is more than three times the 5 bands of the previous MTSAT series. Full-disk imagery is obtained every 10 minutes, and the target area observation at 2.5-minute intervals is conducted. Furthermore, the horizontal resolution is double that of the MTSAT series.

These significant improvements opened the door to the new generation of satellite meteorology.

Products for SWFDP in Southeast Asia

Himawari-8 observes the earth with 16 bands. Each band has its own radiative characteristics. By allocating 3 bands to red, green and blue, then compositing the bands, RGB composite products are produced. RGB composite products are very useful to extract specific phenomena such as volcanic ash. In addition, 3 of 16 bands are visible bands corresponding to red, green and blue to enable the creation of true-color images. JMA provides these products derived from Himawari-8 on JMA's SWFDP website at http://www.wis-jma.go.jp/swfdp/ra2_swfdp_sea_sat.html. These products are updated every 10 minutes, which is quite high-frequency compared to 30/60 minutes of the previous MTSAT-2 satellite. Details of products are described below.

Traditional-band imagery (B03, B07, B08 and B13)

JMA provides 4 bands imagery out of 16 observation bands on the website: visible imagery (B03), infrared imagery (B13), water vapor imagery (B08) and short-wave infrared imagery (B07). These 4 bands are traditional bands which general geostationary meteorological satellites such as JMA's previous MTSAT-2 satellite carry.

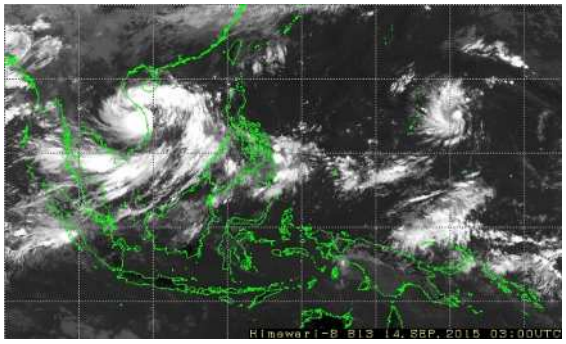

Figure 1: Infrared imagery (B13)

True-color composite imagery

True-color composite imagery is created with three visible bands corresponding to red, green and blue. This imagery looks as if human sees the earth from the space. This imagery is only available in the daytime.

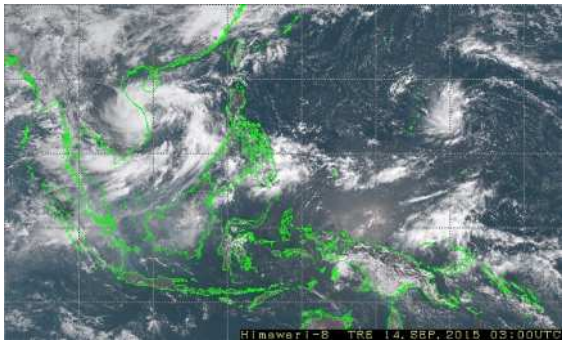

Figure 2: True-color composite imagery

Imagery with heavy rainfall potential areas

Imagery with heavy rainfall potential areas provides information about the possibility of rainfall associated with deep convective clouds. Convective clouds detected from Himawari-8 data are colored in magenta and superimposed on infrared imagery. JMA has provided this product derived from MTSAT-2 data since 2012. The Himawari-8 based product has the approximately-same property as the MTSAT-2 based product because the Himawari-8 observation bands used to detect convective clouds are similar to the MTSAT-2 bands.

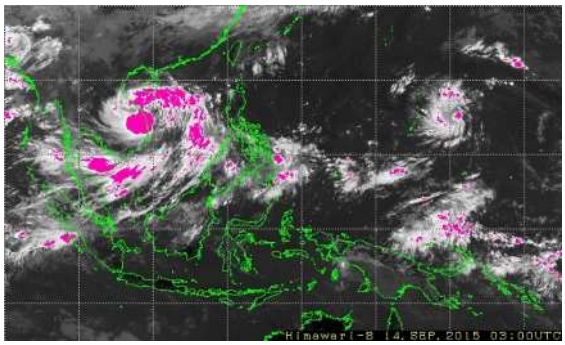

Figure 3: Imagery with heavy rainfall potential areas

RGB composite products

Utilizing Himawari-8 multi-band observation, JMA generates various RGB composite products in accordance with WMO standard procedure. The website provides 7 RGB composite products: Air mass, Day natural color, Day microphysics, Convective storms, Night microphysics, Desert dust and Day solar. For example, Day natural color product makes easy to distinguish between

high-level ice clouds and low-level water clouds since the former are colored in cyan and the latter in white.

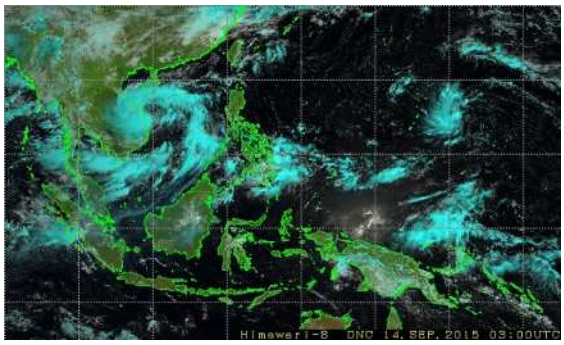

Figure 4: Day natural color product

Future work

RGB composite products are currently created using WMO standard procedure. JMA and leading countries have a plan to collaborate in finding the optimized algorithms of RGB composition for Asia and Pacific regions. Feedbacks from users are absolutely welcome. JMA expects that Himawari-8 imagery including RGB composite products improves the monitoring and analysis techniques, and contributes to the prevention and mitigation of weather-related disasters in Southeast Asia.

(Takeshi Otomo, JMA)

Himawari-8 Atmospheric Motion Vector

Atmospheric Motion Vectors (AMVs) are satellite-derived wind products created by analyzing cloud motion and height from satellite imagery animation. AMVs are indispensable wind observation data to be assimilated into NWP models especially over data sparse ocean area. The Meteorological Satellite Center of the Japan Meteorological Agency (JMA/MSC) has developed tracking and height assignment algorithm for Himawari-8 AMVs. The new algorithm is designed for effective utilization of high spatial, temporal and spectral resolution of the Advanced Himawari Imager (AHI) on-board Himawari-8. In the tracking process in the new algorithm, large-scale cloud feature and cloud motion are used as a first guess for determining small-scale cloud motion vectors. This method significantly decreased errors of AMVs. In addition, the height assignment is based on optimal estimation to minimize the difference between observed radiance values and theoretical ones determined from a radiative transfer model using three or more bands from AHI. Spatial coverage and number of valid AMVs are improved by introduction of this new algorithm.

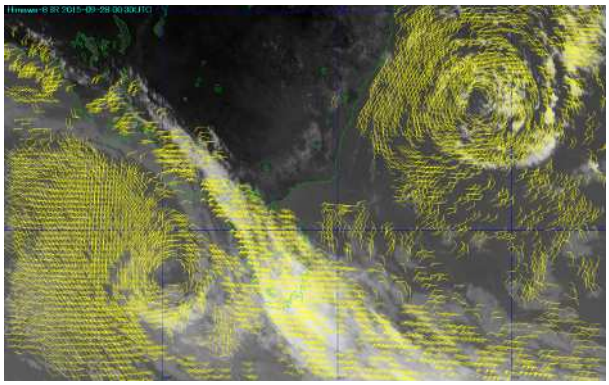

Figure 5: Himawari-8 IR (10.4 μm) AMVs over southeast of Australia derived by the new algorithm (00 UTC, 28 September 2015)

(Kazuki Shimoji, JMA/MSC)

Satellite Rainfall at Realtime -- GSMaP_NOW

Japan Aerospace Exploration Agency (JAXA) will start to distribute the “realtime” version of the Global Satellite Mapping of Precipitation (GSMaP_NOW) over the JMA’s geostationary satellite “Himawari-8” region through the “JAXA Realtime Rainfall Watch” website from autumn 2015 (Figure 6).

“Realtime availability” of satellite rainfall data is one of major requirements from users. Since November 2008, JAXA has provided the “near-real-time” GSMaP (GSMaP_NRT) product, which is hourly and 0.1-degree grid box global rainfall product combining observation data from microwave and infrared radiometers aboard multiple satellites, four hours after observation through the “JAXA Global Rainfall Watch” website (http://sharaku.eorc.jaxa.jp/GSMaP/).

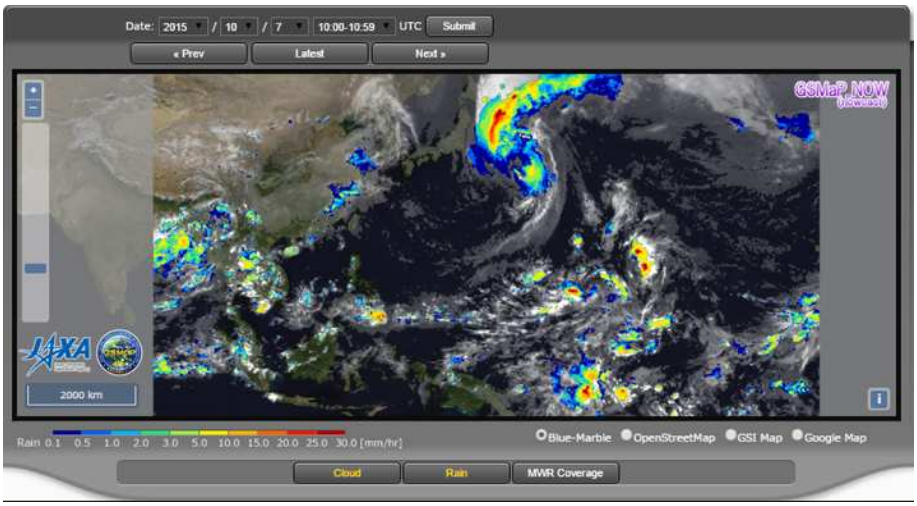

Figure 6: Sample image of the GSMaP_NOW web site. Image and data of 1000-1059Z is available at the web site at 1100Z. Available from http://sharaku.eorc.jaxa.jp/GSMaP

Data latency of "four hours" for GSMaP_NRT product was chosen considering balance of satellite data availability and user requirements. To produce GSMaP_NRT, we allocated three hours to collect satellite data and one hour to process data. Users and purposes of GSMaP_NRT data have been increased in number and variety since its release. It is used in, for example, rainfall monitoring, flood alert and warning, drought monitoring, crop yield forecast, and agricultural insurance.

Building on its experience in the GSMaP production, JAXA has developed the GSMaP realtime version (GSMaP_NOW) product to respond user requirements to shorten data latency of "four hour," and achieved this by providing current rainfall over the geostationary satellite Himawari-8 region. The GSMaP_NOW product uses passive microwave radiometer and geostationary satellite data that is available only within 0.5-hour after observation. At present, we uses data from GPM/GMI, GCOM-W/AMSR2 direct broadcasting near Japan, NOAA and MetOp's AMSU/MHS direct broadcasting, and Himawari-8/AHI to produce GSMaP at 0.5-hour before. In addition, extrapolation of rainfall area with 0.5-hour forward (toward future) by using cloud moving vector calculated from AHI enables us to produce "quasi-realtime" rainfall map over Asian regions. All processing are completed within 0.5-hour, and updated half-hourly: For example, GSMaP_NOW provides hourly rainfall from 1000Z to 1059Z at 1100Z.

Early evaluation of GSMaP_NOW with JMA's gauge-calibrated radar analysis (Radar-AMeDAS) in daily and 0.25-degree grid basis shows result that RMSE and correlation coefficient are 0.56 mm/hr and 0.76, respectively, for the period from June 11 to July 3, 2015. For the same period, those of GSMaP_NRT are 0.52 mm/hr and 0.79, and accuracy of GSMaP_NOW is almost comparable to that of GSMaP_NRT.

This quasi-realtime capability will provide possibility to operational users to apply the GSMaP_NOW data in their rainfall monitoring more rapidly, flood alert in smaller basins. Extension of GSMaP_NOW from "Himawari" area to the other geostationary satellites' observation areas is also under consideration for future improvements.

(Misako Kachi, EORC/JAXA)

Members of the Coordinating Group

JAPAN (Co-coordinator)
Mr Takeshi OTOMO
Senior Coordinator for Satellite Systems
Satellite Program Division
Japan Meteorological Agency

REPUBLIC OF KOREA (Co-coordinator)
Dr Dohyeong KIM
Senior Researcher
Satellite Planning Division,
National Meteorological Satellite Center
Korea Meteorological Administration

BAHRAIN
Mr Adel Tarrar Mohammed DAHAM
Acting Director
Ministry of Transportation

CHINA
Mr Xiang FANG
Director, Remote Sensing Data Application
National Satellite Meteorological Center
China Meteorological Administration

HONG KONG, CHINA
Mr Lap-shun LEE
Senior Scientific Officer
Hong Kong Observatory

INDIA
Mr A. K. SHARMA
Deputy Director General of Meteorology
India Meteorological Department

KYRGYZSTAN
Ms Mahkbuba KASYMOVA
Head, Department of Weather Forecasting
Kyrgyzhydromet

MALDIVES
Mr Ali SHAREEF
Deputy Director General
Maldives Meteorological Service

OMAN
Mr Humaid AL-BADI
Chief, Remote Sensing and Studies Section
Oman Department of Meteorology

PAKISTAN
Mr Muhammad ASLAM
Senior Meteorologist
Allama Iqbal International Airport
Pakistan Meteorological Department

Mr Zubair Ahmad SIDDIQUI
Deputy Director/Senior Meteorologist
Institute of Meteorology & Geophysics
Pakistan Meteorological Department

RUSSIAN FEDERATION
Ms Tatiana BOURTSEVA
Chief, Information Department
ROSHYDROMET

Dr Oleg POKROVSKIY
Principal Scientist, Main Geophysical Observatory
ROSHYDROMET

UZBEKISTAN
Mr Sergey Klimov
Acting Chief, Hydrometeorological Service
UZHYDROMET

VIET NAM
Ms Thi Phuong Thao NGUYEN
Researcher, Research & Development Division
National Center for Hydrometeorological Forecasting
Ministry of Natural Resources and Environment of Viet Nam

EUMETSAT (OBSERVER)
Dr Volker GAERTNER
Head of User Services Division
EUMETSAT

Dr Kenneth HOLMLUND
Head of Remote Sensing and Products Division
EUMETSAT

From the Co-editors

The co-editors invite contributions to the newsletter. Although it is assumed that the major contributors for the time being will be satellite operators, we also welcome articles (short contributions of less than a page are fine) from all RA II Members, regardless of whether they are registered with the WMO Secretariat as members of the WIGOS Project Coordinating Group. We look forward to receiving your contributions to the newsletter.
(*Dohyeong KIM, KMA, and Takeshi OTOMO, JMA*)

RA II WIGOS Project Home Page

http://www.jma.go.jp/jma/jma-eng/satellite/ra2wigosproject/ra2wigosproject-intro_en_jma.html

Editorials and Inquiries

Takeshi OTOMO (Mr.)
Senior Coordinator for Satellite Systems
Satellite Program Division
Observation Department
Japan Meteorological Agency
1-3-4 Otemachi, Chiyoda-ku
Tokyo 100-8122, Japan

Tel: +81-3-3201-8677
Fax: +81-3-3217-1036
Email: ootomo@met.kishou.go.jp

Dohyeong KIM (Dr.)
Senior Researcher
Satellite Planning Division,
National Meteorological Satellite Center
Korea Meteorological Administration
64-18 Guam-gil, Gwanghyewon, Jincheon,
Chungbuk, 365-830, Republic of Korea

Tel: +82-70-7850-5705
Fax: +82-43-717-0210
Email: dkim@kma.go.kr

(Editor-in-chief of this issue: Takeshi Otomo)