



WMO Integrated Global Observing System WIGOS NEWSLETTER

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1. From the President of the WMO Regional Association V (RA V), Andi Eka Sakya

ACTIVITIES RELATED TO PREPARATION FOR WIGOS READINESS IN RA V

The WMO Regional Association V (RA V) covers a vast geographic area of the globe ranging from Southeast Asia (in the northwest corner) down to 60° latitude South and extends towards the east covering most of the Pacific ocean. With the lines separating RA V from RA II running along the Malaysia-Thailand boundary, the Membership of RA V includes many countries of the Association of Southeast Asian Nations (ASEAN) such as Brunei Darussalam, Indonesia, Malaysia, Philippines and Singapore; It also includes Australia, Papua New Guinea, New Zealand as well as most of the Small Island Pacific States. These unique geographic features present additional challenges for the implementation of WIGOS in the Region, both due to the very high vulnerability to natural disasters – many of which are related to meteorology – of the countries in the ASEAN region and to the difficulty of maintaining and operating adequate observing networks of the vast oceanic areas of the region. In order to efficiently address the unique challenges facing the ASEAN region, it was decided to work on the implementation of WIGOS jointly with Southeast and East Asian Members of RA II.

Accordingly, the first Joint RA II/RA V Workshop on WIGOS for Disaster Risk Reduction (DRR) was held in Jakarta, Indonesia from 12 – 14 October 2015, hosted by the Agency for Meteorology, Climatology and Geophysics (BMKG). The workshop recognized the need for a joint RA II/RA V mechanism to improve the observational capabilities of WMO Members, particularly of the developing countries. Following the outcomes of the workshop a joint RA II/RA V Coordinating Group (CG) was established to promote the progress and alignment of the existing activities and projects and liaise amongst all partners of the Region. It had adopted Jakarta Recommendation that covers the following:

- a) to seek for the optimization of financial and human resources of participating Members, and should build on the draft plans proposed by the workshop;
- b) to promote the adjustment/update of the Regional WIPs, specially taking into account the five priorities of the WIGOS Pre-operational Phase;
- c) have a major focus on capacity development needs of the Members in RA II and RA V and promote the planning and the actions, regarding the improvement of their remote sensing surface networks;
- d) the duration of its mandate should coincide approximately with the WMO financial period 2016-19.

Accordingly, the implementation of the recommendation, within RA V, is through the TT-WIGOS that aims at contributing to the development of WMO Regulatory Material and its implementation in the Region. Furthermore, it also contributed to the preparation of Guidance material on WIGOS on behalf of RA V and is serving as capacity development opportunities for WIGOS activities. Furthermore, the TT-WIGOS at RA V will:

- 1) Organize regional workshops for managers of weather and climate observations to discuss WIGOS;
- 2) Assess and provide profiles of national observing systems and networks against WIGOS requirements / standards;
- 3) The national WIP for Australia is being drafted to serve as an example for other members;
- 4) Facilitate that each NMHS within RA V can become WIGOS ready by 2019.

This year two WIGOS events are scheduled for the Region: a meeting of the RA V Working Group on Infrastructures (WG-INFR) from 5-7 October at Singapore, during which general progress and plans for both WIS and WIGOS will be reviewed and assessed. The second event, the Joint RA V GCOS-WIGOS Workshop for the Pacific, planned to be held from 9-12 October in Fiji is aimed at strengthening and further developing the observational networks over the Pacific. This is critical not only for the adaptation and mitigation efforts of the Pacific islands themselves, but for NWP users around the world, and hence for all WMO Members. The workshop is jointly funded by GCOS and WIGOS, and we look forward to seeing hopefully a positive outcome of this important event.

2. Outcomes of EC-69, Geneva, Switzerland, 10-17 May 2017

The sixty-nineth session of the WMO Executive Council (EC-69) took place at the WMO Secretariat in Geneva, Switzerland, from 10 to 17 May 2017. The Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS) was well-represented at the meetings through by both Co-Chairs, Sue Barrell, Australia, and Bertrand Calpini, Switzerland, as well as the majority of the Presidents of the WMO regional associations and technical commission and the designated EC Focal Points.

Under the WIGOS item on the EC agenda, six resolutions and thirteen decisions were approved by the Council. WIGOS was also featured during four EC Side Events:

- the Observing System Capability Analysis and Review for the Surface-based observing systems (OSCAR/Surface),
- the WIGOS Data Quality Monitoring System (WDQMS),
- Highlights of User Readiness to New-Generation Satellites and
- Tropical Pacific Observing System and the JCOMM in situ Observations Programme Support Centre

Regarding regulatory material, a new version of the Manual on WIGOS (WMO 1160) was approved. The most significant changes with respect to the previous version approved by Congress-17 in 2015 were an updated version of the WIGOS Metadata Standard, now extracted from the main body of the manual and given the status as a self-standing document (just published as WMO-No.1192), and a substantial rewrite of the section on the Global Cryosphere Watch (GCW).

Concerning the future of WIGOS, the Council tasked ICG-WIGOS to develop a proposal for the future placement of WIGOS in the WMO programmatic structure, to take effect once WIGOS transitions out of its current project phase by the end of 2019. The proposal must take into account also the expected changes in the WMO governance structure that are likely to be proposed at the same time, and ICG-WIGOS will therefore be working closely with the EC Working Group on Strategic and Operational Planning (EC-SOP) on preparing for this transition.

Regarding the much longer-term future of WIGOS, the Council endorsed the work undertaken to prepare the draft "Vision for WIGOS in 2040", also with the aim of submission to Congress-18 in 2019. The document is structured in three parts: An overarching "Vision" providing purpose, context and scope, and two Annexes describing the space-based and surface-based components of WIGOS, respectively. Once the initial drafts of the three parts have been finalized by late summer, they will be sent to all technical commissions and relevant program areas for review before being integrated into a single document that will be discussed during ICG-WIGOS-7 in early 2018.

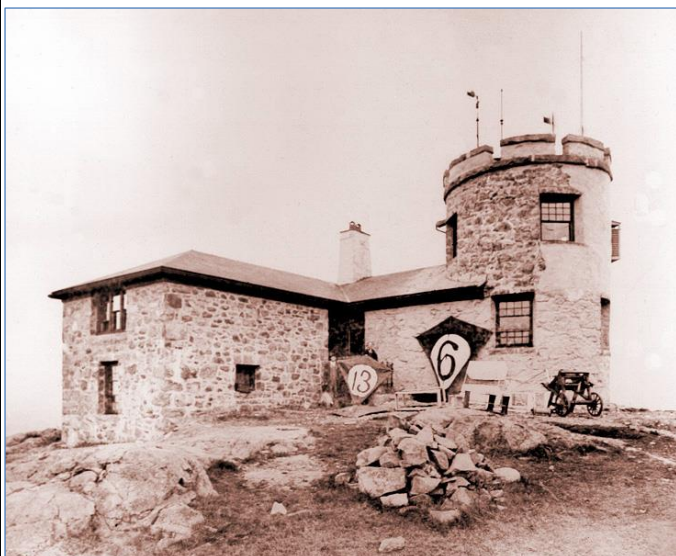
Outside the WIGOS item itself, the main EC agenda topics of relevance to WIGOS were the reform of the WMO governance structure as mentioned above, and the discussion around a policy framework for Public-private sector engagement in meteorology. The latter is particularly relevant partly due to the general intention behind WIGOS to develop and exploit partnerships with entities external to the NMHSs, and partly due to the potential implications for the long-standing practice of international exchange of meteorological observations upon which our current collective prediction capabilities for weather and climate are founded. No decision on a WMO position was made during EC-69. However, a roadmap was agreed on for the work toward developing a WMO policy framework to be submitted to Congress-18 in 2019.

3. WMO Recognition of Long-Term Observing Stations

Long-term meteorological observations are part of the irreplaceable cultural and scientific heritage of mankind that serve the needs of current and future generations for long-term high quality climate records. They are unique sources of past information about atmospheric parameters, thus are references for climate variability and change assessments. To highlight this importance, WMO has a mechanism to recognize long-term observing stations. By so doing, the Organization promotes sustainable observational standards and best practices that facilitate the generation of high-quality time series data.

The initiative is envisaged to maintaining long-term observing stations, including in particular stations with more than 100 years observations – Centennial Stations in support of climate applications (DRR, GFCS, etc.) and research (climate assessment, climate adaptation, etc.). While acknowledging the efforts by Members to run and maintain appropriate observing systems including long-term observing stations, existing and potential difficulties which Members' NMHSs are facing, due to their overall resource constraints and competing societal interests at national level, are observed by the same time.

The mechanism involves close collaboration between the Commission for Climatology (CCI), the Commission for Basic Systems (CBS), the Commission for Instruments and Methods of Observations (CIMO), the Global Climate Observing System (GCOS) through an ad-hoc advisory board, as well as the WMO Members and the Secretariat. The 69th Session of WMO Executive Council (May 2017) recognized a first set of 60 long-term observing stations following an invitation letter from WMO Secretariat to Members to submit no more than three candidate stations. Further invitation letters will be released every second year to extend the list of WMO recognized long-term observing stations – The next call for the nomination of candidate stations will be issued in early 2018.



Blue Hill Observatory (USA) – Past and present

The recognition mechanism is based on recognition criteria that address the length, completeness and consistency of observations at a station, the availability of minimum station metadata, data rescue, WMO observing standards including siting classification, observational data quality control and the future of the observing station. A self-assessment template for recognition criteria compliance of individual observing stations has been developed for Members to submit candidate stations, which has to be filled in for each candidate station. After review by the abovementioned advisory board, a list of stations is tabled at Executive Council sessions for final decision. It is envisaged to renew the recognition of observing stations every ten years to ensure criteria compliance.

A special WMO Website has been implemented that provides information on the mechanism and lists candidate and recognized stations:

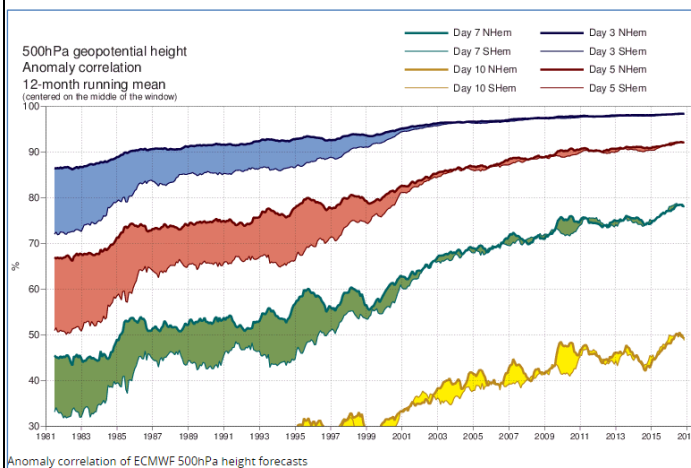
<https://public.wmo.int/en/our-mandate/what-we-do/observations/long-term-observing-stations> .

Furthermore, the recognition will be reflected in the WIGOS station catalogues. It is also planned to design a certificate per recognized station as well as a metal plate for installation at the station site.

4. Critical Role of Radio Frequency Spectrum in Meteorology, Climate and Water

Many people appreciate the improvement of today's NWP and climate models, but few think about the critical role of radio frequency spectrum, in particular through remote sensing as well as collection and distribution of information.

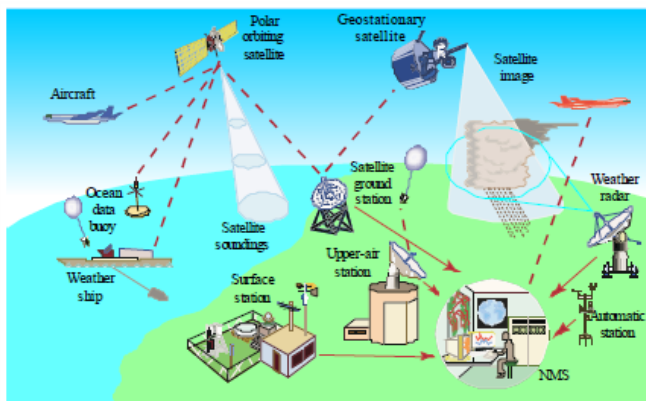
The Figure below shows the improvement in NWP skill over the last several years. Of note is the coming together of the skill in the ocean dominated southern hemisphere now showing the same skill as the northern hemisphere. This reflects the benefits of remote sensing which utilizes the natural vibration frequencies of various atmospheric and earth components to determine their current state of temperature and other parameters, either by passive measurement, or by transmitting radio waves at set frequencies and measuring absorption and reflection measurements. As seen in the classic Global Observing System diagram (Figure), these observing systems cover a wide range of platforms, both surface and space based. This Handbook was prepared and maintained by the CBS Steering Group on Radio Frequency Coordination (SG-RFC) and ITU Radio Communication Sector Study Group 7 which focuses on scientific use of radio frequency spectrum. It is available freely online from the WMO and ITU book stores or from the SG-RFC wiki page <https://wiswiki.wmo.int/SG-RFC>.



Evolution of NWP skill at ECMWF

(https://www.ecmwf.int/en/forecasts/charts/catalogue/plwww_m_hr_ccaf_adri_an_ts?time=2017061100)

Radio frequencies used by national and international entities, particularly by the NMHSs to measure and collect the observation data upon which analyses and predictions, including warnings, are based are managed internationally by the International Telecommunications Union (ITU). How radio frequencies are used by the different observing systems are described in detail in the joint WMO/ITU "Handbook on the Use of Radio Spectrum for Meteorology: Weather, Water and Climate Monitoring and Prediction" first published in 2002, updated in 2008 and most recently in 2017.



The Global Observing System of WIGOS

Radio frequency spectrum is a limited resource and in order to ensure the continued availability and usability of those frequencies needed by NMHS and other environmental monitoring agencies, it is essential that NMHS work with National radio frequency managers and regulators in the national, regional and global ITU processes to incorporate our present and future requirements. WMO has produced a special guide for NMHS on how to achieve this - it is called the "Guide to participation in Radio Frequency Coordination" (WMO No 1159). This is available online from the WMO book store or from the above SG-RFC wiki page.

In order to help NMHS and Radio Regulators better understand WMO's needs and ITU's processes, WMO and ITU are holding a Joint Seminar on Radio Spectrum from 23-24 October, 2017, at Geneva. Details of the seminar and how to join are online at <https://wiswiki.wmo.int/ITU-WMO2017>.

All NMHS are encouraged to register experts that would benefit from this experience and be able to improve the effectiveness of collaboration at the national level between WMO and ITU processes.

5. Training Activities on OSCAR / Surface - The training course for RA VI at Offenbach, Germany May 2017

The training on the Observing Systems Capability Analysis and Review tool for Surface-based observing Systems (OSCAR/Surface) has been mentioned by several WMO constituent bodies as a critical and urgent activity. The WIGOS Project Office in cooperation with MeteoSwiss, have organized with the support of the Education and Training Office and the European Virtual Organization for Meteorological Training Programme (EUMETCAL), a training course for RA VI. It targeted the National Focal Points of RA VI, who have been explicitly nominated for OSCAR / Surface, and was delivered as a combination of an online preparatory session, held on 9 May 2017 using the EUMETCAL's online platform, followed by a two days classroom session, held at the facilities of the German Weather Service (DWD) in Offenbach, from 23-24 May 2017.

The WMO Regional Training Centres (RTC) were also invited to participate. The course was attended by 19 participants, 16 from 14 RA VI Member countries and 3 from RTCs (Italy, India and Barbados). The trainers were from MeteoSwiss (Switzerland) and from WMO Secretariat.

The main conclusions can be highlighted as follows:

- Participants very interested and engaged with the training, especially with the practical exercises and interacting with each other; They are willing to continue working together;
- Questions were raised regarding the implementation of the WIGOS IDs, and its operational use and impacts;
- The WIGOS Metadata Representation model and the XML schema were mentioned as very challenging;
- User registration in OSCAR/Surface Website was very challenging and most required assistance from trainers;
- Intensive discussion about concept of "multipurpose station";
- Suggestions were provided on how to improve OSCAR/Surface and on how to improve the training.



Participants at the OSCAR/Surface training course for RA VI

As a follow-up action an online course has been created in the WMO Moodle platform to make all materials (videos, presentations) available for the participants of this course, which can be used to share experiences, challenges. Additionally, another area was created in the WMO Moodle platform to make the same learning materials freely available to all, i.e. no need for "username/password" that is accessible at the link: <http://etrp.wmo.int/moodle/course/view.php?id=129>

It was agreed to create also a webspace to share information and expertise on the XML schema for metadata exchange.

It was recognized that the evolving status of both the WMDS and OSCAR/Surface creates uncertainty in learners and also that the availability of the machine-to-machine application is a priority to allow NFPs to better understand it and test it.

The next scheduled training event on OSCAR/Surface will target the OSCAR/Surface NFPs from RA III Members.

It will be a joint event organized by WMO, Switzerland and Peru, under the scope of both WIGOS and the CLIMANDES-2 project (“Servicios climáticos con énfasis en los Andes en apoyo a las decisiones”) - a project of the Global Framework for Climate Services (GFCS). It will be hosted by the Peruvian NMHS (SENAMHI) and it will take place at Lima, Peru, from 4-6 September 2017.

6. Progress and Development of the WMO Aircraft-Based Observations Programme

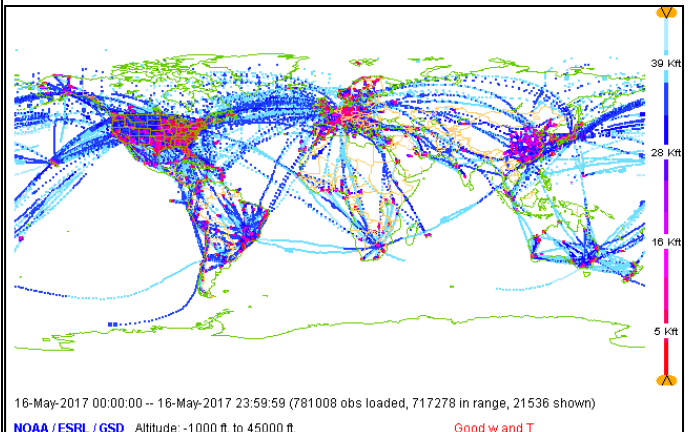
Over the past 12 months, there has been a lot of progress and new developments unfolding associated with the WMO Aircraft-Based Observations Programme (ABOP) and the Aircraft Meteorological Data Relay (AMDAR) observing system. At the recent WMO Executive Council 69th Session (EC-69, May 2017), several decisions by the council related to various important aspects of the ABOP and AMDAR: http://www.wmo.int/pages/prog/www/GOS/ABO/AMDA R/index_en.html.

Firstly, the EC approved Decision 12.2(2)/1, endorsed the recommendation of WMO technical commissions for WMO to establish a Working Arrangement with the International Air Transport Association (IATA) towards the development of a joint collaboration on AMDAR. This is a very important and positive step forward for the programme, given that IATA has a membership of around 217 airlines in 117 countries, carrying nearly 90% of the world’s air traffic. The arrangement has come about as a result of a study undertaken by IATA at the behest of its member airlines, which recognized the benefits of the AMDAR programme to the airlines and the aviation industry and the need to support its global expansion, while at the same time recommending improvements to the way in which the data are managed to better serve the interests of both data users and airline partners. The Working Arrangement, which has been implemented in July 2017, provides a basis for the two organizations to work together towards developing a collaborative framework upon which the future AMDAR programme operation and expansion might be managed and resourced.

Secondly, the EC approved a recommendation of the WMO Commission for Basic Systems (CBS) to delegate the USA, National Oceanic and Atmospheric Administration (NOAA), Meteorological Assimilation Data Ingest System (MADIS: <https://madis.ncep.noaa.gov/>) as the WMO Global Data Centre for Aircraft-Based Observations (GDC-ABO). This brings to fruition a development that has been an aim of the ABOP that was established in 2012 as an outcome of the WMO AMDAR Panel and Expert Team on Aircraft-based Observations Workshop on Aircraft Observing System Data Management (Geneva, Switzerland, June 2012).

When the GDC-ABO becomes operational as a function of MADIS, as expected later in 2017, it will provide WMO Members and data users with access to both near real-time and historical, quality controlled, global AMDAR and aircraft-based observations from a single access point through a convenient user interface. It is expected that this will prove to be a step forward in further establishing aircraft-based observations as a source of high quality upper-air data for meteorological, climate and other research applications.

And finally, the EC also approved a resolution to publish a new WMO Guide to Aircraft-Based Observations, which will update and replace the WMO AMDAR Reference Manual (WMO-No. 958, 2003). In addition to providing the latest technical information and guidance on the AMDAR observing system and its operation, the document also provides members with information and guidance on the operation of other aircraft-based observing systems, the management of aircraft-based observational data and metadata and on the operation and functionality of the WIGOS Data Quality Monitoring System for aircraft-based observations. The guide is expected to be published as later in 2017.



Global aircraft-based observations 24-hour coverage, 16 May 2017 showing improved coverage over South America and Africa

Meanwhile, the number of aircraft-based observations on the WMO Information System / Global Telecommunications System continues to grow, with around 800,000 observations per day, contributed to mostly by more than 4000 AMDAR-equipped aircraft from 42 airlines and 12 national and regional programmes. Over the past 12 months, the programme has expanded greatly over South America with the advent of the AMDAR programme with the multi-national airline, LATAM and a new programme with Aerolíneas Argentinas. AMDAR observations have also increased over Africa through a joint project between WMO, EUMETNET and Météo-France to derive data from European Boeing B777 aircraft. And with several new programmes in the pipeline in various WMO regions, coupled with the future collaborative endeavor by IATA and WMO, it is expected that the coverage and volume of aircraft-based observations will continue to grow well into the future. For more information, see the WMO Aircraft-Based Observations Website: http://www.wmo.int/pages/prog/www/GOS/ABO/index_en.html and also the News and Events site: <https://sites.google.com/a/wmo.int/amdar-news-and-events/>

7. WIGOS Related Events/Meetings

7.1 Recent Events/Meetings

- ☞ Third meeting of the Inter-Programme Expert Team on Satellite Utilization and Products (IPET-SUP-3), 2-5 May 2017, Geneva, Switzerland
- ☞ Sixty Ninth Session of the WMO Executive Council (EC-69), 10-17 May 2017, Geneva, Switzerland
- ☞ Eighth session of the JCOMM Observations Coordination Group (OCG-8), 22-25 May 2017, Qingdao, China
- ☞ OSCAR/Surface training course in RA VI, 23-24 May 2017, Offenbach, Germany
- ☞ Volatile Organic Compounds (VOC) expert meeting and NOAA annual conference, 23-26 May 2017, Boulder, USA
- ☞ Forty Fifth Plenary Session of the Coordination Group for Meteorological Satellites (CGMS-45), 11-16 June 2017, Jeju-Island, Republic of Korea
- ☞ Weather radar metadata Workshop, 19-21 June 2017, Locarno, Switzerland
- ☞ CBS Expert Team on Surface-based Observations (ET-SBO), 20-23 June 2017, Geneva, Switzerland
- ☞ Joint meeting of CIMO Expert Team on Operational In-Situ Technologies (A1) and CIMO Expert Team on Developments in In-Situ Technologies (A2), 21-23 June 2017, Geneva, Switzerland
- ☞ WIGOS Data Quality Monitoring System Workshop for the integration of WIGOS Component and Co-sponsored Observing Systems, 26-29 June 2017, Geneva, Switzerland

7.2 Coming Events/Meetings

- ☞ WIGOS Workshop for RA IV (Spanish), 22-24 August 2017, Panama City, Panama
- ☞ Nineteenth WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2017), 27-31 August 2017, Dübendorf, Switzerland
- ☞ OSCAR/Surface training course for RA III - A joint Climandes (SENAMHI, MeteoSwiss) & WMO/WIGOS event, 4-6 September 2017, Lima, Peru
- ☞ WIGOS Workshop for RA II/VI (Russian), 12-14 September (TBC)

- ☞ CBS-Led Review of Emerging Data Issues, 18-19 September 2017, Geneva, Switzerland (TBC)
- ☞ Second Session of the ICG-WIGOS Task Team on WIGOS Data and Partnerships (TT-WDP-2), 20-22 September 2017, Geneva, Switzerland
- ☞ WMO Workshop on Information Management, 2-4 October and WIS Task Team on Information Management, 5-6 October 2017, Geneva, Switzerland
- ☞ RA V Working Group on Infrastructures (WG-INF-1) meeting, 5-7 October 2017, Singapore (TBC)
- ☞ Joint GCOS-WIGOS Workshop for RA V, 9-12 October 2017, Fiji (TBC)
- ☞ RA III Working Group on Infrastructures (WG-INF-2), 4-6 October 2017, Asunción, Paraguay
- ☞ Eighth Asia/Oceania Meteorological Satellite Users' Conference (AOMSUC-8) and Fifth meeting of the Coordination Group of the RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training, 16-21 October 2017, Vladivostok City, Russian Federation
- ☞ CAS Technical Conference (TECO-CAS-17 Science Summit on seamless research for weather, climate, water and environment), 20-22 October and Seventeenth Session of Commission for Atmospheric Sciences (CAS-17), 23-24 October 2017, Denpasar, Bali, Indonesia
- ☞ JCOMM Technical Conference (TECO-JCOMM-5 "Toward an Integrated Met-ocean Monitoring, Forecasting and Services System"), 23-24 October and Fifth session of the WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM-5), 25 October-1 November 2017, Bali, Indonesia
- ☞ ITU/WMO Joint Seminar on the use of radio spectrum in meteorology, climate and water, 23-24 October, 2017, Geneva, Switzerland
- ☞ Surface Ozone Analyser Comparison (RA III), 23-27 October 2017, Buenos Aires, Argentina
- ☞ The WMO International Conference on Automatic Weather Stations - "Automatic weather stations for environmental intelligence – the AWS in the 21st Century", 24-26 October 2017, Offenbach am Main, Germany
- ☞ RA-I WIGOS Workshop on Automatic Weather Station networks; strengthening and modernizing observing systems in Africa, 14-16 November 2017, Windhoek, Namibia

Thanks to:

Dr Andi Eka Sakya

for his contribution to this issue of the Newsletter