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# VLab Status and New Strategy

*(Submitted by VLab co-chairs)*

## Summary and Purpose of Document

The paper reports on activities within the Virtual Laboratory for Education and Training in Satellite Meteorology (VLab) along with future plans and directions. Since January 2014, VLab Training Centres of Excellence offered a total of 66 courses and 41 Regional Focus Group sessions.

Furthermore, important developments have taken place since ET-SUP-8, including the change in VLab co-chairmanship, the Seventh Virtual Laboratory Management Group meeting (VLMG-7) in July 2014 in Saint Petersburg, Russian Federation and the elaboration of the new Five-year Strategy document for VLab activities 2015-2019.

The focus of the new VLab strategy continues to be on training on the use of satellite data and products, including from the new generation of meteorological satellites which pose particular challenges to users, but also offer great opportunities.

VLab will strive to deliver training in line with WMO and GFCS strategic priorities and GEO societal benefit areas, while also strongly engaging in the areas of climate monitoring; marine, ocean and coastal monitoring; dust, ash and smoke monitoring; and space weather.

## ACTION PROPOSED

The first session is invited to note the important achievements of the VLab, to provide comments, to consider the actions and recommendations below.

In particular, the session is invited to take note the Five-year Strategy document proposed by VLab, for endorsement.

**Appendices**: A. Five-year Strategy for the WMO-CGMS Virtual Laboratory for Education and Training in Satellite Meteorology – 2015-2019
B. Training Activities organized by VLab from January to December 2014
C. VLab Training Activities planned by VLab CoEs for 2015
D. WMO VLab Trust Fund, Status 6 March 2015

# VLab STATUS AND NEW STRATEGY

## 1 INTRODUCTION

This document reports on the activities and plans of the WMO-CGMS Virtual Laboratory (VLab). Since ET-SUP-8 the VLab management group (VLMG) has met twice in virtual meetings (March and November 2014) and had one face-to-face meeting in Saint Petersburg, Russian Federation (VLMG-7, July 2014). VLMG-7 was a successful event with representations from almost all VLab Centres of Excellence (CoEs) presenting achievements and planning future activities. Also during VLMG-7, the co-chairmanship of VLab was transferred from Volker Gärtner (EUMETSAT) to Prof. Grigory Chichasov (Director of the WMO Regional Training Centre in the Russian Federation), who is assisted by Mr Eduard Podgaiskii (Russian State Hydrometeorological University) in order to share chairing responsibilities with Kathy-Ann Caesar (CIMH). A new Five-year Strategy Document was drafted and discussed during VLMG-7. A final version of the document is available in **Appendix A**. Regarding the most recent activities of VLab (since April 2014), a short review of major achievements and plans is given below.

## 2 OUTLINE OF TRAINING EVENTS ORGANISED BY THE VLab IN 2014

The VLab Centres of Excellence (CoEs) have recently reported on their training activities for the period January to December 2014. A general outline of regional training activities organized by CoEs is presented below. Full reports can be downloaded from the VLab central website at http://www.wmo-sat.info/vlab/coe-reports/

CoEs, using both online and classroom resources, offered a total of 66 courses and 41 Regional Focus Group (RFG) sessions during this reporting period. Training was offered in all 6 WMO official languages plus Portuguese and had participants from all WMO Regional Associations. A full list of events organised in 2014 can be seen in **Appendix B**.

Regarding the total number of participants attending VLab training events, the numbers exceeded the 3000 figure. This number excludes the number of participants using the online resources that are accessible via VLab partner websites, such as the recorded lectures available from some VLab CoEs and Satellite Operator websites (e.g. Russian Federation, Brazil, Australia, EUMETSAT, JMA, and CIRA).

Fifty three classroom courses were offered, compared to only 13 online. Nevertheless, the number of participants in online courses was still slightly superior when compared to classroom events (about 1300 compared to 1000). This highlights the importance of online training activities as a way to reach a larger number of people from a wider area.

The number of RFG sessions organized by CoEs has increased, with three groups now offering sessions on a monthly basis (RFG Americas and Caribbean, Australia and South Africa) and an additional group (Caribbean Weather discussion) offering sessions on demand. Most importantly, participation in RFG sessions increased substantially, reaching more than 700* participants during 2014. Besides RFG sessions have been only offered in English and Spanish, participants on these sessions are from all WMO RA.

## 3 MAJOR ACTIVITIES OF THE VIRTUAL LABORATORY SINCE ET-SUP-8

Besides the various regional activities that took place in the VLab Centres of Excellence (CoEs), the major activities conduced by the VLab within the last 10 months can be summarised as follows:

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* This number excludes participants from the 12 sessions offered by the Americas and Caribbean Group, as these numbers are not yet available.

### 3.1 Satellite Direct Readout

Giving continuity to the series of online events about the direct readout capabilities of polar orbiting systems, two sessions were presented about the Suomi NPP. The sessions took place April 2014 as follows:

1) Suomi NPP - 8th of April by Mitch Goldberg (NOAA);

2) CSPP software supporting Suomi NPP –9th of April by Liam Gumley (University of Wisconsin, Madison, USA).

Eighty participants (from WMO RA I, II, III, IV and VI) attended the sessions live. Resources and links to the recorded sessions are available in the VLab central website at http://www.wmo-sat.info/vlab/satellite-direct-readout/

### 3.2 VLMG-7 Meeting 22-25 July 2014, Russian Federation

The VLMG-7 meeting took place at the Russian State Hydrometeorological University (RSHU) in Saint Petersburg, Russian Federation, 22-25 July 2014. The meeting, which counted on full support from Roshydromet, had a total of 30 participants. With the exception of CoE Brazil and JMA, which could only participate remotely, the meeting had representation from all VLab partners.

VLab CoEs, Satellite Operators and Agencies, and Partner Programmes presented their latest achievements and planned activities which, together with the discussions that took place, generated actions and recommendations that were captured in the VLMG-7 report (available at http://www.wmo-sat.info/vlab/meeting-reports/).

**Main issue of concern:**

During presentations, many CoEs had stressed that the number of personnel and support available at their VLab CoEs is often below the limits necessary to meet the agreed expectations for the various VLab activities. In some cases, support to CoEs by sponsoring satellite operators is insufficient. VLMG would like to highlight this fact as this is endangering the effectiveness and success of the VLab in several areas of the world. In many of the CoEs, the focal point is the only one person working or involved in the VLab.

**Important outcomes from VLMG-7:**

It was suggested that Satellite Operators should be reminded of their supporting role in the VLab. This is especially important at this moment, as VLab CoEs are preparing users for the upcoming new generation of satellites. The continuous funding of a Technical Support Officer (TSO), who coordinates the CoEs network, is critical. The status of the WMO VLab Trust Fund is provided in **Appendix D**.

CoEs need an effective counterpart in the Satellite Operators' organization. This focal point should help in addressing the CoE resource needs (these could include data, computer facilities, lecturers and other technical personnel). International desks and internships hosted by operators are examples of a way to achieve this objective.

Also during VLMG-7, Dr. Volker Gärtner, whose long-term contribution to VLab is highly commended by all partners, passed the co-chairmanship of VLab to Prof. Grigory Chichasov.

### 3.3 AOMSUC-5 Training Workshop

This training workshop was offered on the 17-18 November 2014, just before the Fifth Asia Oceania Meteorological Satellite Users Conference in Beijing.

The workshop was organised by VLab CoE China-Beijing, and was designed to inform participants about the next generation of meteorological satellites. Trainers from CMA, JMA, KMA EUMETSAT and NOAA contributed to the event, which had 81 participants from 9 countries (WMO RA II and V). This event was also broadcast for remote participation.

### 3.4 Conceptual Models for the Southern Hemisphere Project

Conceptual Models for Southern Hemisphere (CM4SH) was a joint project between four southern hemispheric Centres of Excellence: Argentina, Australia, Brazil and South Africa. The project was co-funded by WMO and EUMETSAT. The first CM4SH project was completed in March 2014 (full report available at http://www.wmo-sat.info/vlab/conceptual-models-southern-hemisphere/). Participants in the project were very positive about the outcomes and commented that the CM4SH connected different areas of the meteorological services, such as research and development, training, forecast, data processing and systems. The project was deemed successful and inspirational.

The new CM4SH project was launched in January 2015, this time reinforced with the expert group from The Agency for Meteorology, Climatology and Geophysics, Indonesia (BMKG). The main task of the project team is to prepare full Conceptual Model descriptions, and stepwise add more CMs into the online catalogue (also available at the link mentioned above). Along with this, the project team will record and update a literature list and inventory of existing CMs on Southern Hemisphere and collect interesting Cases.

## 4 COORDINATION WITH PARTNER PROGRAMMES:

### 4.1 Cooperation with COSPAR

The joint COSPAR and WMO Capacity Building Workshop on Satellite remote sensing, water cycle and climate change took place at Tver State University in Tver, Russian Federation, from 20th July to 1st August 2014. 40 MSc and PhD students, postdocs and young scientists attended the event. They were from Russia, Armenia, Azerbaijan, Bangladesh, China, Ethiopia, Iran, Malawi, Nepal, Pakistan and Uzbekistan. The objective of the Workshop was to provide the participants with basic knowledge on satellite remote sensing, satellites, satellite instruments, databases and formats, data access, processing software, methods of processing and analysis of satellite data. Taking the advantage of VLMG-7 scheduled in St Petersburg in parallel, VLab contributed to the workshop programme with 5 lecturers and used its information channels to promote the event.

### 4.2 WMO Train the Trainer Online Seminar for WMO RA VI

WMO Education and Training is offering a Train the Trainer Online Seminar for trainers from WMO RA VI in 2015. The seminar, which started in February and is taking place during 10 weeks, has participants from VLab CoE in RA VI (Russian Federation). Also participating in the seminar are trainers and training managers from CoEs Argentina and Barbados. The concession for participants from VLab CoEs in RA III and IV is based on the idea that these might help to facilitate the course in 2016, when the TtT online Seminar will be offered in their regions.

This year, VLab is collaborating in the event with one course facilitator (VLab Technical Support Officer), who was also responsible for the development of some training material and activities.

## 5 FUTURE ACTIVITIES PLANNED

### 5.1 Train the Trainer Workshop on GEONETCast Americas

VLab will again be conducting a NOAA/WMO sponsored Train the Trainer Workshop on GEONETCast Americas, on 25-26 April 2015. This will be prior to the NOAA Satellite Conference (27 April to 01 May). The TtT workshop is a follow up to the successful 2013 workshop at the same conference. The workshop will highlight resources for GEONETCast: the system, installation guidelines, what data the system has, and software to visualize the data. There will be an update on the progress of the Satellite Data Requirements group and how these efforts link in to preparations for GOES-R. Hands on software activities will highlight case examples that demonstrate RGB capabilities for GOES-R using VIIRS and MODIS imagery. The VLab participants will also take part in the WMO Satellite Data Requirements Coordination Group meeting at the beginning of the conference. As part of the Conference session is devoted to International training, a presentation about VLab will be made by the VLab co-chair to highlight its role in International Training in satellite meteorology.

### 5.2 Plans for regional training events

Based on the reports submitted by VLab CoEs, a list of planned courses for 2015 was drafted and is available in **Appendix C**. This list is by no means a final plan of events, as many CoEs are still adding events to the list as they become confirmed.

## 6 VLab NEW STRATEGY 2015-2019

The VLab Five-years Strategy document (2009-2014) was reviewed during the VLMG-7 meeting and a new strategy was drafted for the next period: 2015-2019. This document was circulated within members of the Coordinating Committee of Heads of Training Institutions of National Meteorological Services (CO-COM), receiving comments and suggestions that were considered in the final version.

The new document describing the VLab strategy for the period 2015-2019 was finalised in January 2015 and can be seen in **Appendix A** of this report.

The focus of the new strategy continues to be on supporting training on the use of satellite data and products as well as exploring capabilities to assist in related training areas.

VLab will strive to deliver training in line with WMO and GFCS strategic priorities and GEO societal benefit areas, while also strongly engaging in the areas of climate monitoring; marine, ocean and coastal monitoring; dust, ash and smoke monitoring; and space weather.

Collaboration with partner programmes will be continued and where possible, extended. VLab will also monitor the development of the WMO Global Campus initiative and explore ways to contribute and benefit from it.

The session is invited to take note of the proposed document for endorsement.

## 7 CONCLUSION

This document reports on the status of the WMO-CGMS VLab and presents some upcoming activities.

Two major challenges identified within the VLab during the period of this report are:

1) To ensure the funding of the VLab Technical Support Officer, in order to keep supporting VLab Centres of Excellence and the effort to enhance cooperation amongst all the VLab partners;

2) To aid the CoEs in achieving the agreed expectations, whilst the number of personnel available in their Centres is often not adequate to meet the scope of training activities required in their respective area of responsibility.

APPENDIX A

# FIVE-YEAR STRATEGY FOR THE WMO-CGMS VIRTUAL LABORATORY FOR EDUCATION AND TRAINING IN SATELLITE METEOROLOGY 2015-2019

## Scope and Definition

The WMO-CGMS Virtual Laboratory for Education and Training in Satellite Meteorology (VLab) is a global network of specialized training centres, named Centres of Excellence (CoEs), that are supported by one or more CGMS satellite operators (Ref: http://vlab.wmo.int). These CoEs, often co-located with WMO Regional Training Centres (RTCs), are established in the various WMO Regions to meet user needs for increased skills and knowledge in using satellite data within their Region.

## Mission of VLab

To improve weather, water, climate and related environmental services by enabling WMO Members to utilize satellite data.

## Objectives of VLab

1. To achieve better exploitation of data from the Space Based global observing system for services that are increasingly reliant on satellite data;
2. To globally share knowledge, experience, methods and tools related to satellite data, especially in support of WMO Members that have limited resources.

## Strategic Drivers

The strategic drivers of VLab have been and continue to be:

- the improvement of the quality of services offered by WMO Members with constrained resources;
- the introduction of and training to use the new generation of satellites, new data types, products and; dealing with the related scientific, technological and societal challenges;
- responding to new and emerging service demands, such as in support of marine, land , and Global Framework for Climate Services (GFCS) applications;
- promoting and achieving the new competence and quality control requirements, and professionalism within WMO Services.

## Current status and achievements of VLab

In its 15 years of existence, the VLab has demonstrated its capability to deliver global scale events on training and education in satellite meteorology. Each CoE is responsible for conducting training activities and normally supports one or more Regional Focus Groups involving NMHSs from its region.

The years 2010-2014 have seen more than 50 classroom and virtual training events organized on annual basis in all WMO regions and in all WMO languages. These included regular online weather briefings, Event Weeks, regional training events and Virtual Round Table events. There has been an increase in the organizing of online training activities, especially within the past two years, resulting in an increased number of participants from all over the world.

As a global virtual entity, the VLab has also provided education and training in other areas of relevance to WMO Members. As an example, the Virtual Round Table on the implementation of the aeronautical meteorological competencies was highly successful, with participants using 212 connections from 87 countries worldwide. The event was offered in 5 languages.

VLab has also seen the addition of two new Centres of Excellence since 2009. They are located in Casablanca (Morocco) and Gwanghyewon (Republic of Korea).

Strategy for the period 2015-2019

In the years 2015-2019, VLab intends to provide support to education and training in the use of satellite data and technology among WMO Members by developing and delivering training around the various competency frameworks through:

- the delivery of Regional Focus Group (RFG) sessions;
- the creation and maintenance of a central library/repository for recorded RFG sessions and other online events;
- the organization of Event Weeks on topics of particular interest (such as the new generation of satellites and the WMO priority areas);
- supporting online capability in classroom events;
- the assurance of high quality of training using state-of-the-art educational tools and methods;
- encouraging the increase of capabilities to translate training material.

Through the experience acquired in the coordination and delivery of online training, the VLab will strive to meet the increasing demands of WMO Members in the period 2015-2019. These will be in line with:

- WMO Strategic Priorities;
- GFCS Priority Areas;
- GEO Societal Benefit Areas.

While providing training for weather forecasting, the VLab will also engage strongly in the areas of:

- Support to Climate monitoring;
- Marine, Ocean and coastal monitoring;
- Dust, ash and smoke monitoring;
- Space weather.

Delivery of training will rely on:

- Online techniques;
- Investments in bandwidth;
- Offline delivery of training where appropriate;
- Collaboration among CoEs.

VLab has proved it can reach every WMO Region and will strive to increase its reach to all WMO Members, in line with the WMO Education and Training Programme. To ensure quality of services provided by VLab, continuous internal quality evaluations will be put in place. These include undertaking evaluations of the training impact of its activities, as well as establishing procedures to ensure the meeting of the VLab expectations from both partners: the CoEs and the Satellite Operators within CGMS. Annual reviews of achievements will also be carried out to ensure focus is kept in the provision of training in the main priority areas established in this document.

The VLab is an entity sustained by contributing CoEs and Satellite Operators. Technical support function is critical for the organization of online events and VLab coordination. Currently, VLab provides a broad support to CoEs activities with its central website (http://vlab.wmo.int) serving as a platform for collaboration and networking. The work of a dedicated Technical Support Officer (TSO), who also provides pedagogical advice to the VLab community, is mission-critical in this regard. VLab will seek to provide continuous instructional and technical support of its activities through the work of the TSO. However, this requires a long-term collaborative funding effort from CGMS Satellite Providers via the designated WMO VLab Trust Fund.

It is imperative that the strong collaboration between VLab CoEs and partner Satellite Operators is kept in order to maintain the development and delivery of training, with particular emphasis on national and regional specific demands and requirements. This will ensure the economic benefit of the large investments in the space based observing system.

The continuation of VLab collaboration with other training and education programmes in the subject of meteorology, such as EUMeTrain, EUMETCAL, CALMet, COMET and the WMO Training and Education Programme is essential for further success. VLab will further build on the partnership with the Committee on Space Research (COSPAR), and explore partnerships with the Working Group on Capacity Building and Data Democracy of the Committee on Earth Observation Satellites (CEOS WGCapD) and other programmes in areas of common or complementary interest. VLab will also monitor the development of the WMO Global Campus initiative and explore ways to contribute and benefit from it.

Appendix B

## Training Activities organized by VLab from January to December 2014

| Name of training event | Type | Language | CoE involved | Participants Number | WMO RA |
|---|---|---|---|---|---|
| Space meteorology forecast | Classroom | Spanish | Argentina | * | |
| Aeronautical Competency Workshop | Classroom | Spanish and English | Argentina | 32 | III and IV |
| Science Week 2014 - Advanced Forecaster Course | Event Week | English | Australia | 360** | I, II and V |
| Basic Satellite Meteorology | Classroom | English | Australia | 31 | II and V |
| Advanced Satellite Meteorology | Blended | English | Australia | 45 | II, IV and V |
| CMO AeroCPD – 03 | Online | English | Barbados | 14 | IV |
| CMO AeroCPD – 04 | Online | English | Barbados | 6 | IV |
| The course for the application of the satellite image in weather forecasting | Classroom | Chinese | Beijing | 47 | II |
| 28th Course for senior Forecaster | Classroom | Chinese | Beijing | 39 | II |
| 21st Course for Pre-post Forecaster | Classroom | Chinese | Beijing | 41 | II |
| 34th Course for senior Forecaster | Classroom | Chinese | Beijing | 37 | II |
| 25th Course for Pre-post Forecaster | Classroom | Chinese | Beijing | 43 | II |
| Pre-post Forecaster Training Course for WMO Fellowship Students | Classroom | English | Beijing | 2 | I |
| Seminar on Meteorological Disasters Risk Management for Officials from Developing Countries | Classroom | English | Beijing | 14 | II, III and V |
| 40th Course for senior Forecaster | Classroom | Chinese | Beijing | 42 | II |
| The 5th Asia/Oceania Meteorological Satellite Users Conference - Training Workshop | Classroom & broadcast | English | Beijing | 81 | II and V |
| CBMET Meteorologia por satélite: teoria e aplicações | Classroom | Portuguese | Brazil | 16 | III |
| Interpretação de Imagens de Satélite – SEVIRE/MSG | Classroom | Portuguese | Brazil | 6 | I and III |
| AMTC 14 | Classroom | English | Kenya | 7 | I |
| AMTC 15 | Classroom | English | Kenya | 6 | I |
| GIS and Remote Sensing | Classroom | English | Kenya | 5 | I |
| EISAC-XI-E | Online | English | Kenya | 24 | I |
| EISAC-XI-E | Classroom | English | Kenya | 15 | I |
| MMTC-10 | Classroom | English | Kenya | 3 | I |
| International Training Course on Weather Radar Operation | Classroom | English | Republlic of Korea | 18 | I and II |
| Information and Communication Technologies for Meteorological Services | Classroom | English | Republlic of Korea | 15 | I, II, IV and V |
| International Training Course on Weather Forecaster | Classroom | English | Republlic of Korea | 12 | I, II and V |
| Capacity Development of National Control System for Emergency and Disaster Risk Management - Fiji | Classroom | English | Republlic of Korea | 14 | V |
| Training Course for Aeronautic Meteorological Observers | Classroom | English | Nanjing | 6 | II |
| Seminar on Climate Change and Climate Information Service for English-Speaking African Countries | Classroom | English | Nanjing | 17 | I |
| International Training Course on Tropical Cyclone | Classroom | English | Nanjing | 12 | I, II and V |
| Seminar on Philippine Disaster Mitigation and Relief | Classroom | English | Nanjing | 12 | V |
| International Training Course on Use of Meteorological Instruments | Classroom | English | Nanjing | 21 | I, II, III and V |
| Training Workshop on Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System | Classroom | English | Nanjing | 47 | I, II and V |
| Seminar on Management for Meteorological Officials from English-Speaking African Countries | Classroom | English | Nanjing | 13 | I |
| Seminar on Meteorological Disaster Management and | Classroom | English | Nanjing | 18 | III, IV |

| Name of training event | Type | Language | CoE involved | Participants Number | WMO RA |
|---|---|---|---|---|---|
| Weather Information Service for Latin-America, the Caribbean and the South Pacific | | | | | and V |
| International Training Course on Agro meteorology | Classroom | English | Nanjing | 21 | I, II, III and V |
| Seminar on Pakistan Meteorological and Earthquake Forecast, Mitigation and relief | Classroom | English | Nanjing | 20 | II |
| The WCRP ESGF Training Workshop for CORDEX Asia | Classroom | English | Nanjing | 18 | II, V and VI |
| High Impact Weather in Arid and Semi-arid Regions: The Case of Dust Storms | Online | English | Niger | 32 | I, V and VI |
| ESAC-XIIF | Online | French | Niger | 20 | I and VI |
| ESAC-XIIF | Classroom | French | Niger | 13 | I |
| Introduction aux Prévisions harmonisées aux points de grille du givrage, de la turbulence et des Cb du Système Mondiale de Prévision de Zone (SMPZ) | Online | French | Niger | 9 | I |
| Satellite Application Course ESAC-ME-X | Classroom | English | Oman | * | II |
| Introduction to weather, climate and marine science | Classroom | Arabic and English | Oman | 9 | II |
| Satellite Application course | Classroom | English | Oman | 10 | II |
| Introduction to weather, climate and marine science | Classroom | Arabic and English | Oman | 9 | II |
| Introduction to weather, climate and marine science | Classroom | Arabic and English | Oman | 10 | II |
| NWP models - basics for operational forecasters - 08:00 UTC | Online | Arabic and English | Oman | 17 | II |
| Tropical Cyclones in the Arabian Sea - 08:00 UTC | Online | English | Oman | 25 | II |
| Weather Modification | Classroom | Arabic and English | Oman | * | II |
| Methods of hydrological forecasts. Provision of consumers with forecast-ting data. Generation of information resources of Roshydromet using the hydrologist-forecaster workstation | Classroom | Russian | Russian Federation | 5 | II and VI |
| Processing and use of the satellite data at drawing up the hydro-meteorological forecasts | Classroom | Russian | Russian Federation | 3 | II and VI |
| Methods of short-term, medium-term and long-term weather forecasting. Forecaster workstation | Classroom | Russian | Russian Federation | 4 | II and VI |
| Meteorological forecasting for aviation service | Classroom | Russian | Russian Federation | 11 | II and VI |
| Satellite remote sensing, water cycle and climate change | Blended | English | Russian Federation | 40 | I, II and VI |
| Methods of short-term, medium-term and long-term weather forecasting. Forecaster workstation | Classroom | Russian | Russian Federation | 11 | II and VI |
| Digital stations of reception and data processing of an artificial satellite of new generation: polarly - orbital series "METEOR -M", MetOp, geostationary "(ELEKTRO-L)" | Classroom | Russian | Russian Federation | 12 | II and VI |
| Meteorological forecasting for aviation service | Classroom | Russian | Russian Federation | 37 | II and VI |
| Application of satellite information in tasks of the analysis and a weather forecast (virtual satellite laboratory http://meteovlab.meteorf.ru) | Online | Russian | Russian Federation | 601 | II and VI |
| BSc Honours course (satellite Met) | Classroom | English | South Africa | 11 | I |
| National certificate Forecasting (Satellite Met) | Classroom | English | South Africa | 6 | I |
| ASMET 8 Meeting | Classroom | English | South Africa | 10 | I |
| Commercial Satellite course | Classroom | English | South Africa | 11 | I |
| EUMETSAT/SAWS "Satellite application workshop for SADC" Online Phase | Online | English | South Africa | * | I |
| Australian Regional Focus Group (12 sessions) | RFG | English | Australia | 499 | II, IV, V |

| Name of training event | Type | Language | CoE involved | Participants Number | WMO RA |
|---|---|---|---|---|---|
| | | | | | and VI |
| Caribbean Weather Discussion (6 sessions) | RFG | English | Barbados | 43 | IV |
| South African Regional Focus Group (11 sessions) | RFG | English | South Africa | 123 | I, V and VI |
| Americas and Caribbean Regional Focus Group (12 sessions) | RFG | English and Spanish | *** Costa Rica and Barbados | * | III and IV |

* No information available.
** Approximate figure calculated with basis on the average participation in the 18 online sessions.
*** Organised by CIRA/NOAA in collaboration with VLab CoEs.

Appendix C

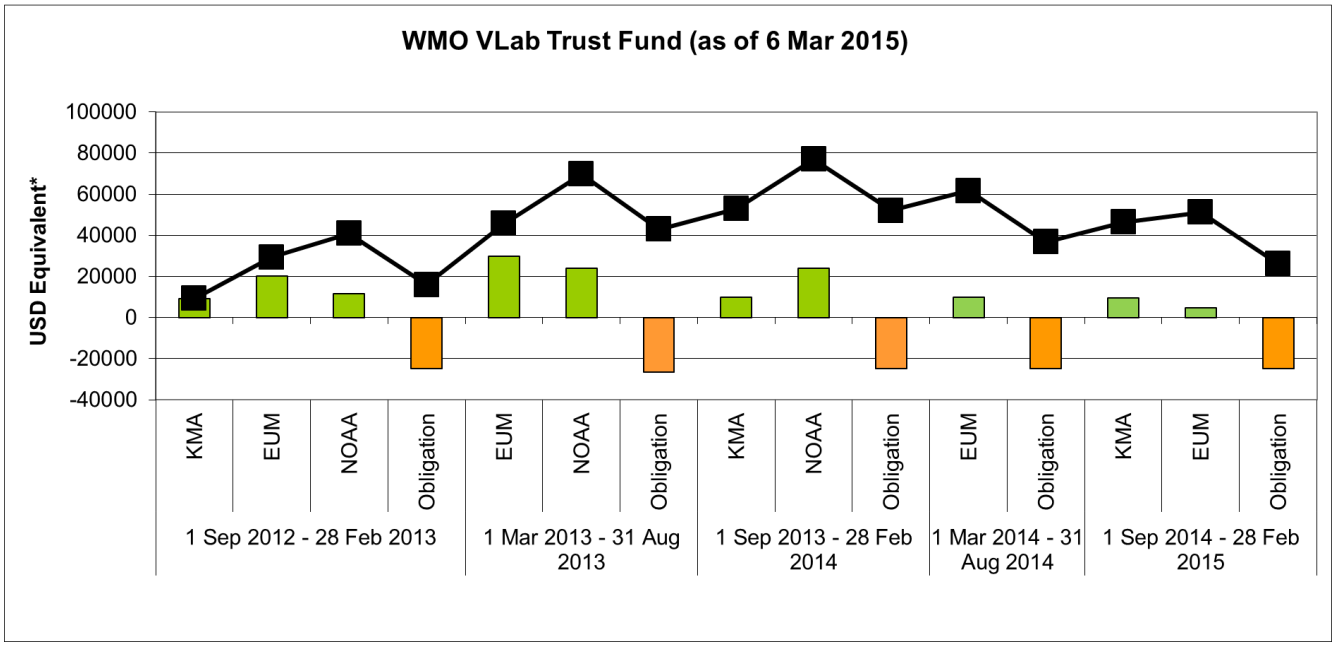
## Training Activities planned by VLab CoEs for 2015

| Name of training event | Type | Language | CoE involved |
|---|---|---|---|
| Clave Metar/Speci | Online | Spanish | Argentina |
| Cenizas Volcánicas | Online | Spanish | Argentina |
| Oms Regional | Blended | Spanish | Argentina |
| Geomagnetismo Y Relaciones Terrestres Solares | Classroom | Spanish | Argentina |
| Taller De Evaluación De Radiación Solar | Classroom | Spanish | Argentina |
| Procesamiento E Interpretacion De Imágenes Satelitales Para Meteorologia Y Medio Ambiente | Classroom | Spanish | Argentina |
| Calibracion De Instrumentos Meteorológicos | Classroom | Spanish | Argentina |
| National Himawari-8 Training Campaign tutorial sessions | Online | English | Australia |
| Basic Satellite Meteorology | Classroom | English | Australia |
| Advanced Satellite Meteorology | Blended | English | Australia |
| Science Week | Event Week | English | Australia |
| NOAA/ WMO Train the Trainers event on GEONetCast. | Blended | English | Barbados |
| Virtual Roundtable on Climate | Online | English | Barbados |
| Training Course For The Application Of The Satellite Image In Weather Forecaster | Classroom | Chinese | Beijing |
| Training Course For Pre-Post Forecaster | Classroom | Chinese | Beijing |
| Training Course For Senior Forecaster | Classroom | Chinese | Beijing |
| Seminar On Nwp | Classroom | Chinese | Beijing |
| The Training Course For The Application Of Ep In Forecasting | Classroom | Chinese | Beijing |
| 12th International Seminar On Climate System And Climate Change (Iscs) | Classroom | English | Beijing |
| Training Course For Pre-Post Forecaster | Classroom | Chinese | Beijing |
| Training Course For Pre-Post Forecaster For Wmo Fellowship Students | Classroom | English | Beijing |
| International Training Course On Meteorological Satellite | Classroom | English | Beijing |
| Seminar On Meteorological Disasters Risk Management For Officials From Developing Countries | Classroom | English | Beijing |
| Workshop For Chief Forecaster | Classroom | Chinese | Beijing |
| Meteorologia Por Satélite: Imagens, Produtos e Aplicações Meteosat Segunda Geração | Classroom | Portuguese | Brazil |
| Aplicações de Satélite para Análise Meteorológica | Online | Portuguese | Brazil |
| Satellite Meteorology Course - Fourth Edition | Online | Portuguese | Brazil |
| Aeronautical Continuous Professional Development | Online | Spanish | Costa Rica |
| Training Course for Aeronautical Meteorological Observers from Macao, China | Classroom | English | Nanjing |
| Training Course on Radar Meteorology for Developing Countries | Classroom | English | Nanjing |
| International Training Course on Numerical Weather Prediction | Classroom | English | Nanjing |
| Training Seminar on Climate Change and Climate Information Service for Developing Countries | Classroom | English | Nanjing |
| Training Seminar on Management for Meteorological Officials from the Asia-Pacific Countries | Classroom | English | Nanjing |
| International Training Course on Use of Meteorological Instruments | Classroom | English | Nanjing |
| Seminar on Meteorological Disaster Management and Weather Information Service for Developing Countries | Classroom | English | Nanjing |
| International Training Course on Agro meteorology | Classroom | English | Nanjing |
| Training Seminar on Meteorological and Earthquake Forecast, Mitigation and Relief for Developing Countries | Classroom | English | Nanjing |
| Applied Meteorology Course for Forecasters from Macao, China | Classroom | English | Nanjing |

| Name of training event | Type | Language | CoE involved |
|---|---|---|---|
| ESAC –XIIIF | Online | French | Niger |
| ESAC –XIIIF | Classroom | French | Niger |
| Methods of hydrological forecasts. Provision of consumers with forecasting data. Generation of information resources of Roshydromet using the hydrologist-forecaster workstation | Classroom | Russian | Russian Federation |
| Meteorological forecasting for aviation service | Classroom | Russian | Russian Federation |
| Processing and use of the satellite data for the hydrometeorological forecasts | Classroom | Russian | Russian Federation |
| Organization of the state observation network and its functioning in modern conditions | Classroom | Russian | Russian Federation |
| Modern methods and means of calibration. Regulatory base and documentation on metrology | Classroom | Russian | Russian Federation |
| Digital receiving stations and data processing of new generation satellites: polar-orbital series "METEOR -M", MetOp, geostationary "ELEKTRO-L" | Classroom | Russian | Russian Federation |
| Methods and means of data processing from the Russian hydrometeorological satellites | Classroom | Russian | Russian Federation |
| Space system of data collecting and transmission of Roshydromet via hydrometeorological satellites | Classroom | Russian | Russian Federation |
| Application of satellite information in tasks of the analysis and a weather forecast (virtual satellite laboratory http://meteovlab.meteorf.ru) | Online | Russian | Russian Federation |
| The normal training courses will be given as scheduled by University and CE@UP | Classroom | English | South Africa |
| MSG workshop | Classroom | English | South Africa |
| Climate workshop | Blended | English | South Africa |
| VLab Climate Trend Regional Focus Group (on demand) | RFG | Spanish | Argentina |
| Australian Regional Focus Group (monthly) | RFG | English | Australia |
| Caribbean Weather Discussion (on demand) | RFG | English | Barbados |
| South African Regional Focus Group (monthly) | RFG | English | South Africa |
| Americas and Caribbean Regional Focus Group (monthly) | RFG | English and Spanish | * Costa Rica and Barbados |

* Organised by CIRA/NOAA in collaboration with VLab CoEs.

Appendix D




*USD equivalent as per exchange rate on day of transaction; includes deduction of 1% WMO overhead on contributions

NOTE: CGMS Member contributions in green; VLab support obligations in orange; NOAA NWS contribution for 2015 pending; NOAA NESDIS contribute directly to CSU/CIRA