



WMO-CGMS Virtual Laboratory

for education and training in satellite meteorology

About VLab

Who Are We?



Satellite Agencies

Eight satellite operators sponsor VLab CoEs: CMA, CONAE, EUMETSAT, INPE, JMA, KMA, NOAA, and ROSHYDROMET.



Centres of Excellence

The 13 Centres of Excellence (CoEs) for training in Satellite Meteorology are sponsored by one or more Satellite Operator and/or Agency.

Established by the World Meteorological Organization (WMO) and the Coordination Group for Meteorological Satellites (CGMS), the Virtual Laboratory for Training and Education in Satellite Meteorology (VLab) is a global network of specialised training centres and meteorological satellite operators working together to improve the utilisation of data and products from meteorological and environmental satellites.

Our Mission

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



Objectives

1 To achieve better exploitation of data from the space-based component of the WMO Integrated Global Observing System (WIGOS) for services that are increasingly reliant on satellite data.

Objectives

2 To globally share knowledge, experience, methods, and tools related to access and usage of satellite data, especially in support of WMO Members that have limited resources.

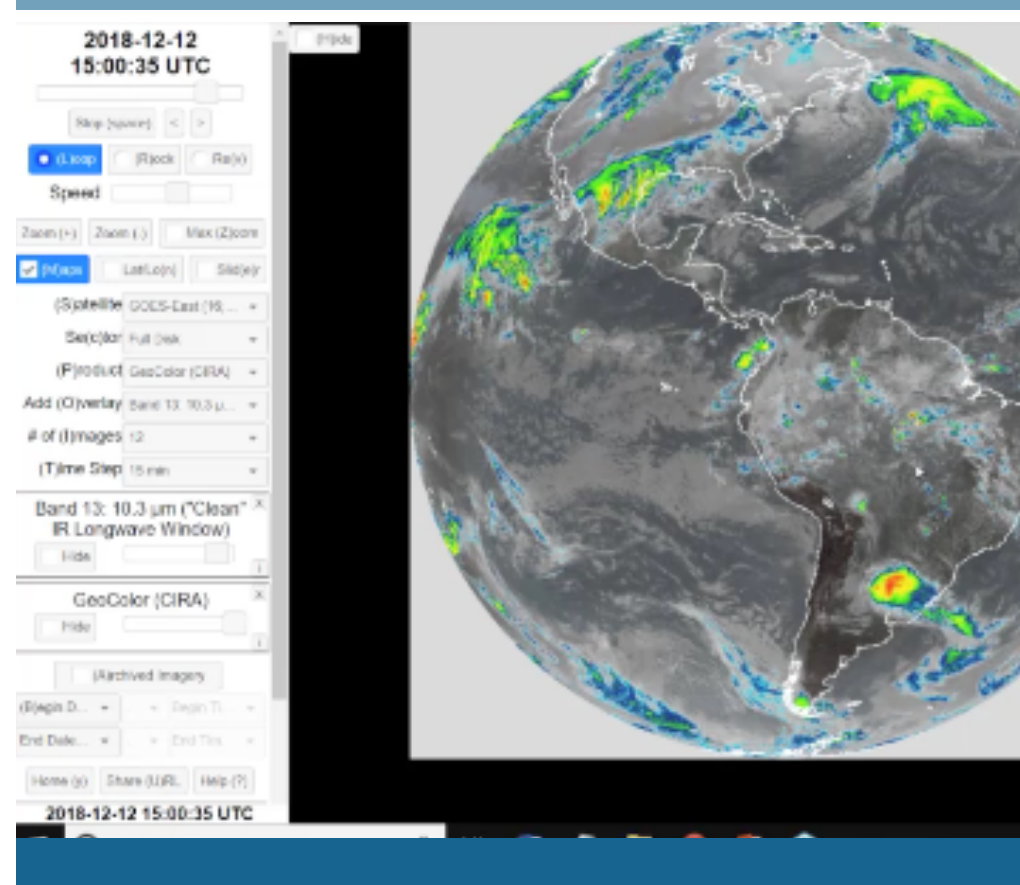
Audience

Mainly operational meteorologists, those performing the duties of analysis, diagnosis, prognosis and forecasting of the weather.

GOES

Major activities 2018

RFG Sessions



The Americas & Caribbean Focus Group had boosted interaction among meteorologists and forecasters in WMO RA III & IV (bilingual sessions). These sessions have been providing informal learning, promoting the new data types and products from GOES and JPSS satellites.

Training resources

GOES-16 and S-NPP/JPSS Case Exercise: Hurricane Harvey Surface Flooding



26 new training resources were developed by Meted and CIRA. CoE Brazil developed numerous resources on Goes-16 (videos, slides, and blogs).

Data access

Data Providers

The image below shows the current GEONETCast-Americas Data Providers, which in your station will be represented in **data channels**, or **folders in the ingestion directory**. The ingestion directory location may be configured by users.



Collaborations with CoEs Costa Rica and Brazil supported linkages in data access associated with the new satellites and in support of GEO via AmeriGEOSS.

Workshops



GOES-16 and GeonetCast Workshops were carried out in various countries. CoE Argentina delivered four short online courses in WMO RA III and IV, based on Conceptual Models developed in CM4SH project using updated GOES-16 imagery.

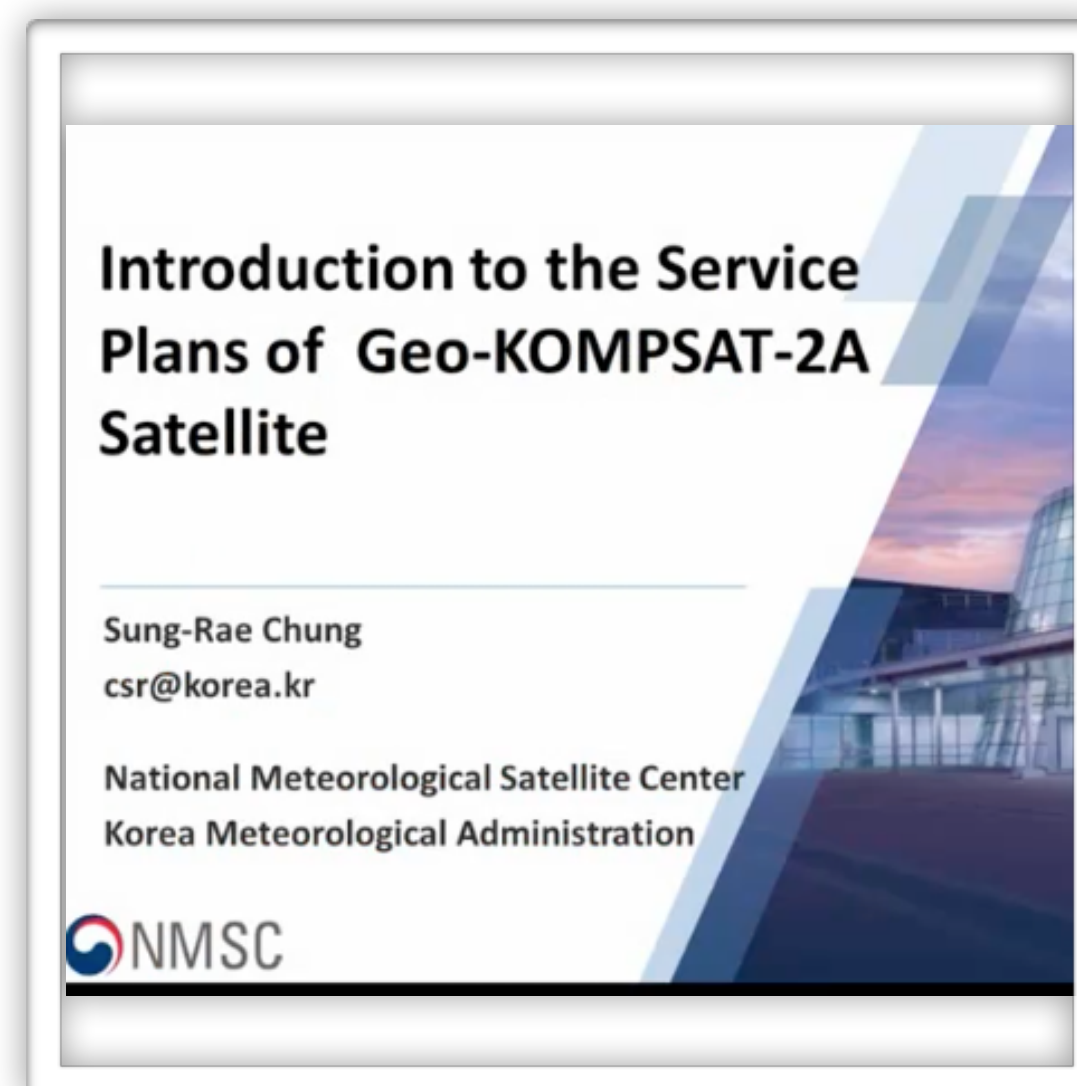
Himawari and Geo-KOMPSAT

Major activities 2018



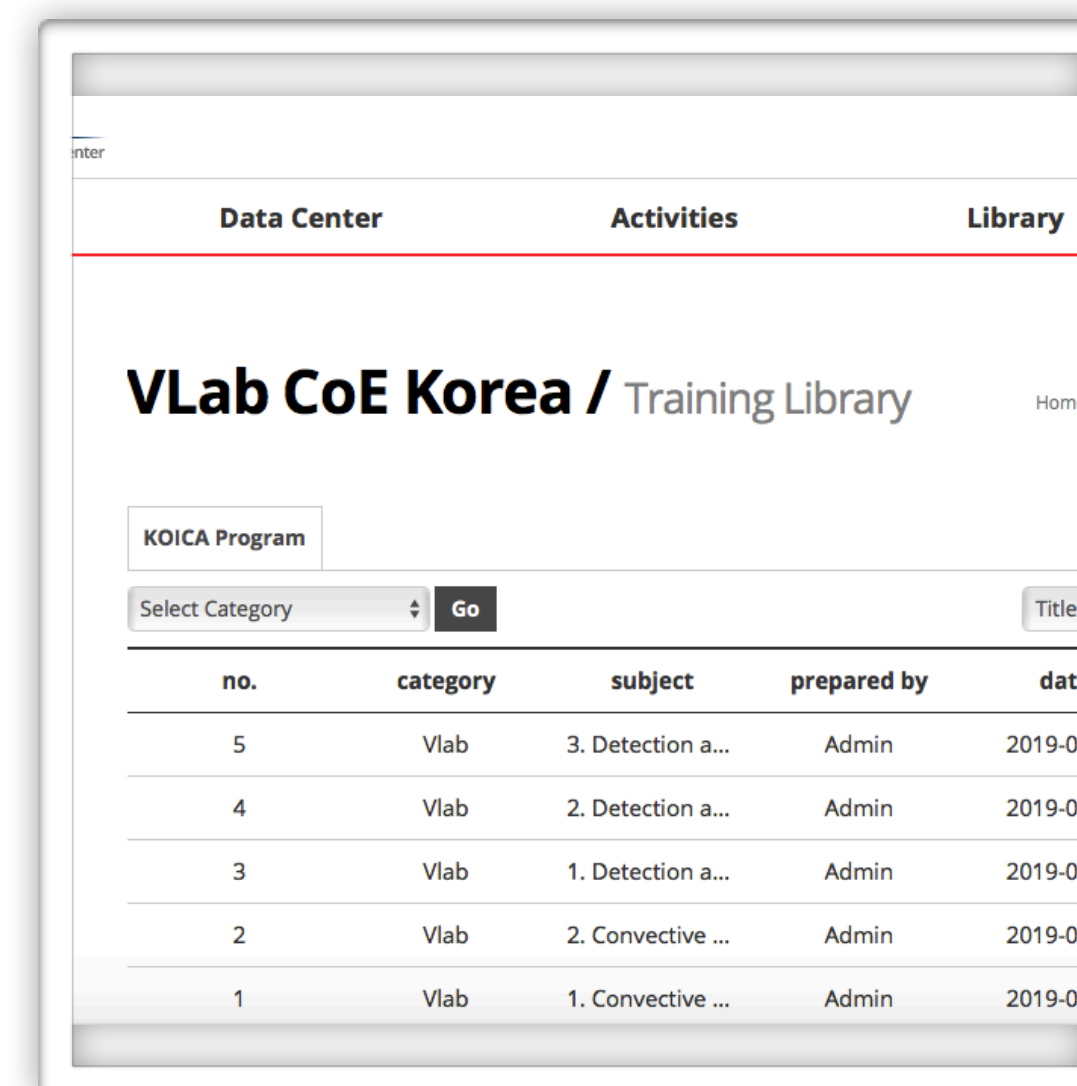
Himawari Request

JMA launched the Himawari Request service in January 2018 to provide NMHSs in WMO RA II and RA V with Himawari-8/9 on-demand TA-observation earth images taken every 2.5 minutes over an area of approximately 1,000 x 1,000 km within the Himawari observation domain.



RFG sessions

VLab CoE Australia continued organising monthly RFG meetings during 2018, with attendees from WMO RAV, RAI, RAIIV. This marks the 5th year of organising monthly RFG meetings in the Region.



Training resources

VLab CoE Republic of Korea created a central library/repository for recorded RFG sessions and other online training events. This adds to already existing repositories of training resources in CoE Australia and JMA.




AOMSUC-9

AOMSUC-9 (hosted by BMKG, Indonesia) had a pre-conference Workshop, counted on VLab CoEs Australia, Republic of Korea, and JMA offering 3 training sessions.


FY3 and FY4

Major activities 2018


Recommended




International Training Course on Nowcasting Techniques on Severe Convection Weather for ASEAN Countries



Distance Learning Course on the Maintenance of Meteorological Observation Instruments



气候变化问题

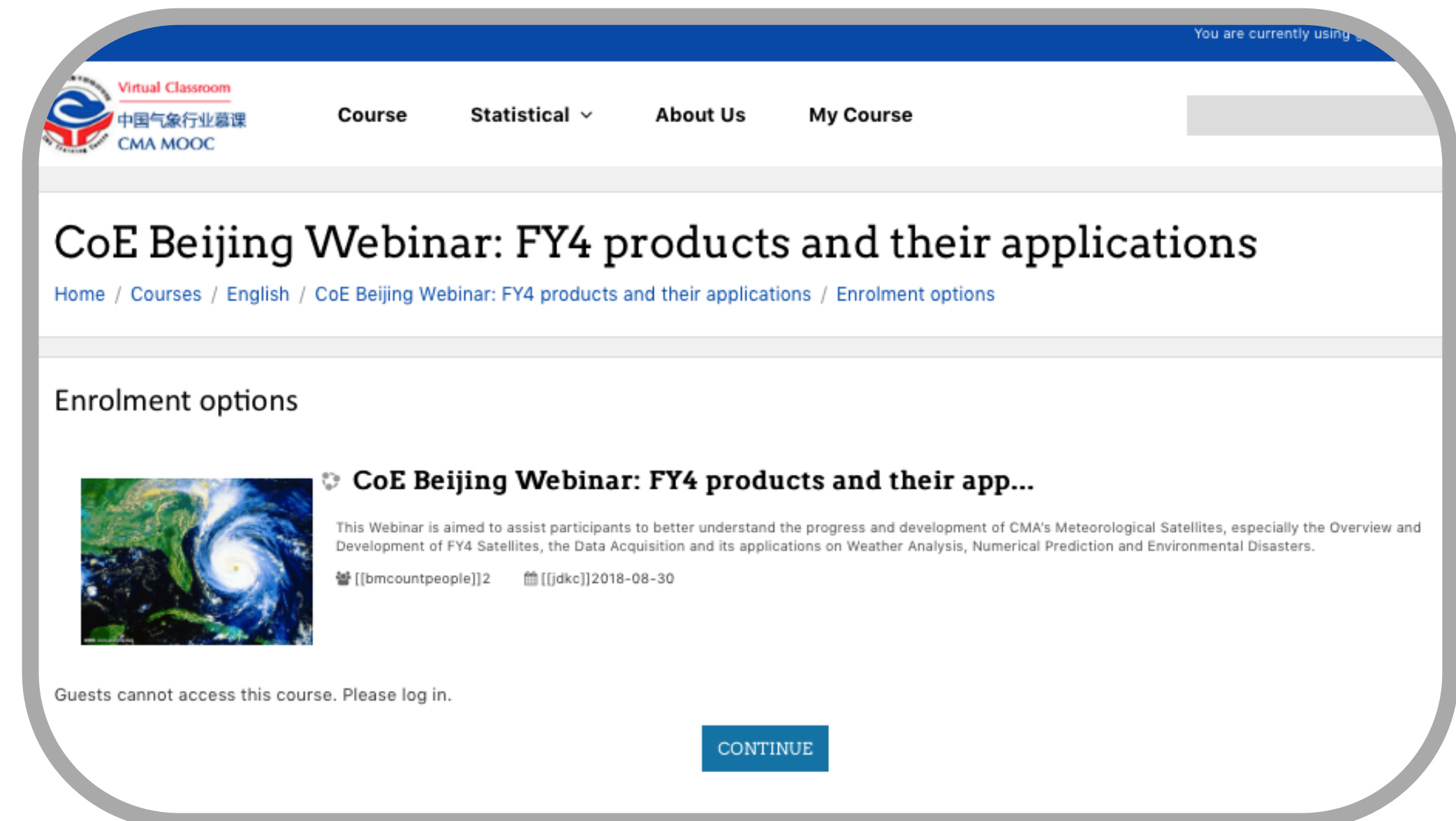


天气学原理

International training

CoEs in China (Beijing and Nanjing) have produced and shared various resources including disaster risk reduction and emergency management.

They offered online and classroom International courses.



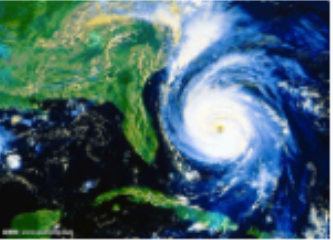
Virtual Classroom
中国气象行业慕课
CMA MOOC

Course Statistical About Us My Course

CoE Beijing Webinar: FY4 products and their applications

Home / Courses / English / CoE Beijing Webinar: FY4 products and their applications / Enrolment options

Enrolment options



CoE Beijing Webinar: FY4 products and their app...

This Webinar is aimed to assist participants to better understand the progress and development of CMA's Meteorological Satellites, especially the Overview and Development of FY4 Satellites, the Data Acquisition and its applications on Weather Analysis, Numerical Prediction and Environmental Disasters.

Guests cannot access this course. Please log in.

CONTINUE

FY4

Information on FY4 was presented in webinars (English). Plans for 2019 include training on application of FY4 in disaster risk reduction for WMO RA II and V.

Meteosat

Major activities 2018

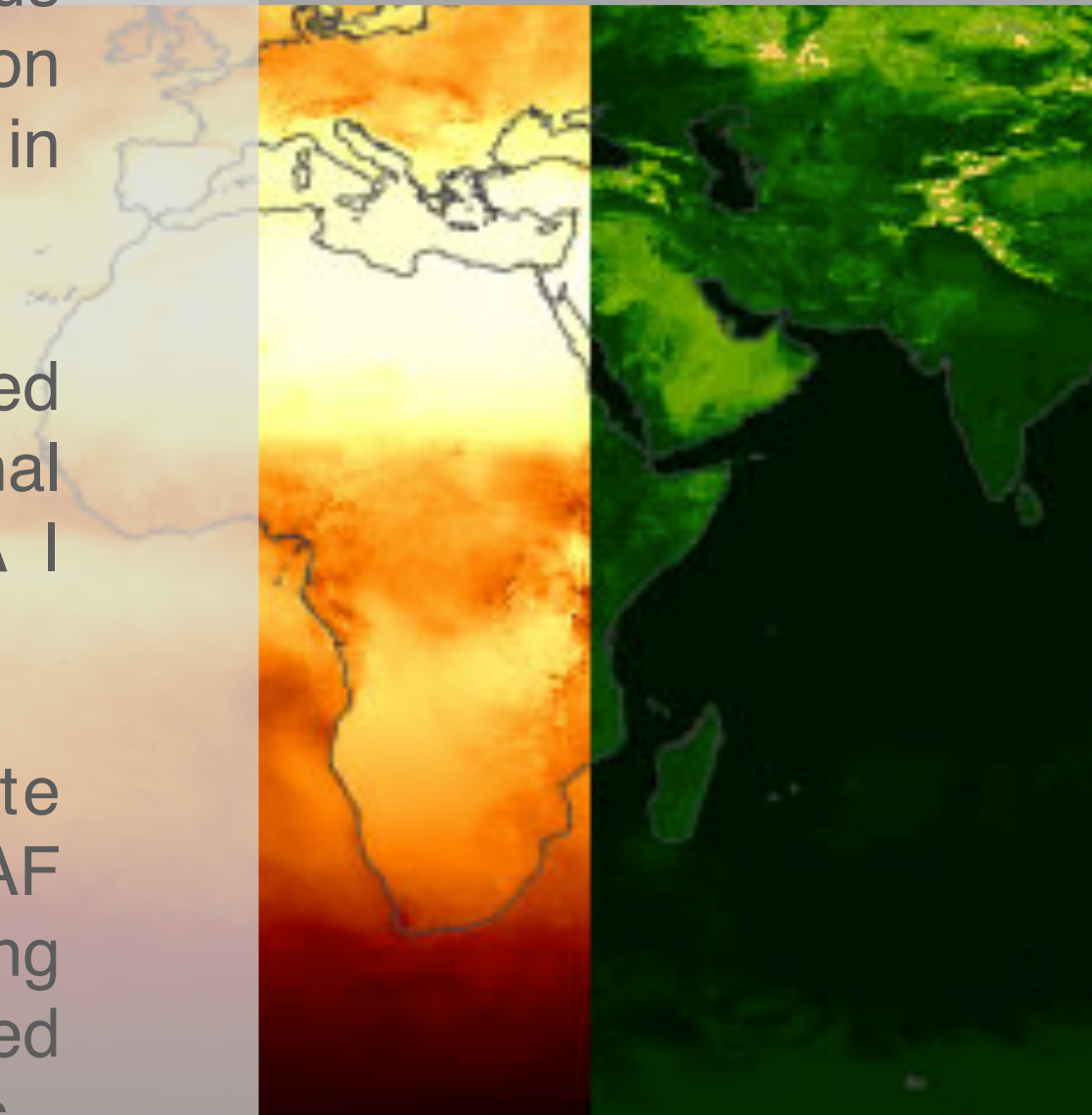
Training opportunities

EUMETSAT, in collaboration with various WMO Teams, has supported training on dust, land and agricultural applications in WMO RA I and VI.

Monthly Weather briefings were organised by EUMETSAT (EUMeTrain) and Regional Focus Group discussions for WMO RA I were organised by CoE South Africa.

CoE South Africa hosted a climate workshop to instruct on the use of CM SAF products for operational climate monitoring and climate research. The CoE continued working on the design of ASMET modules.

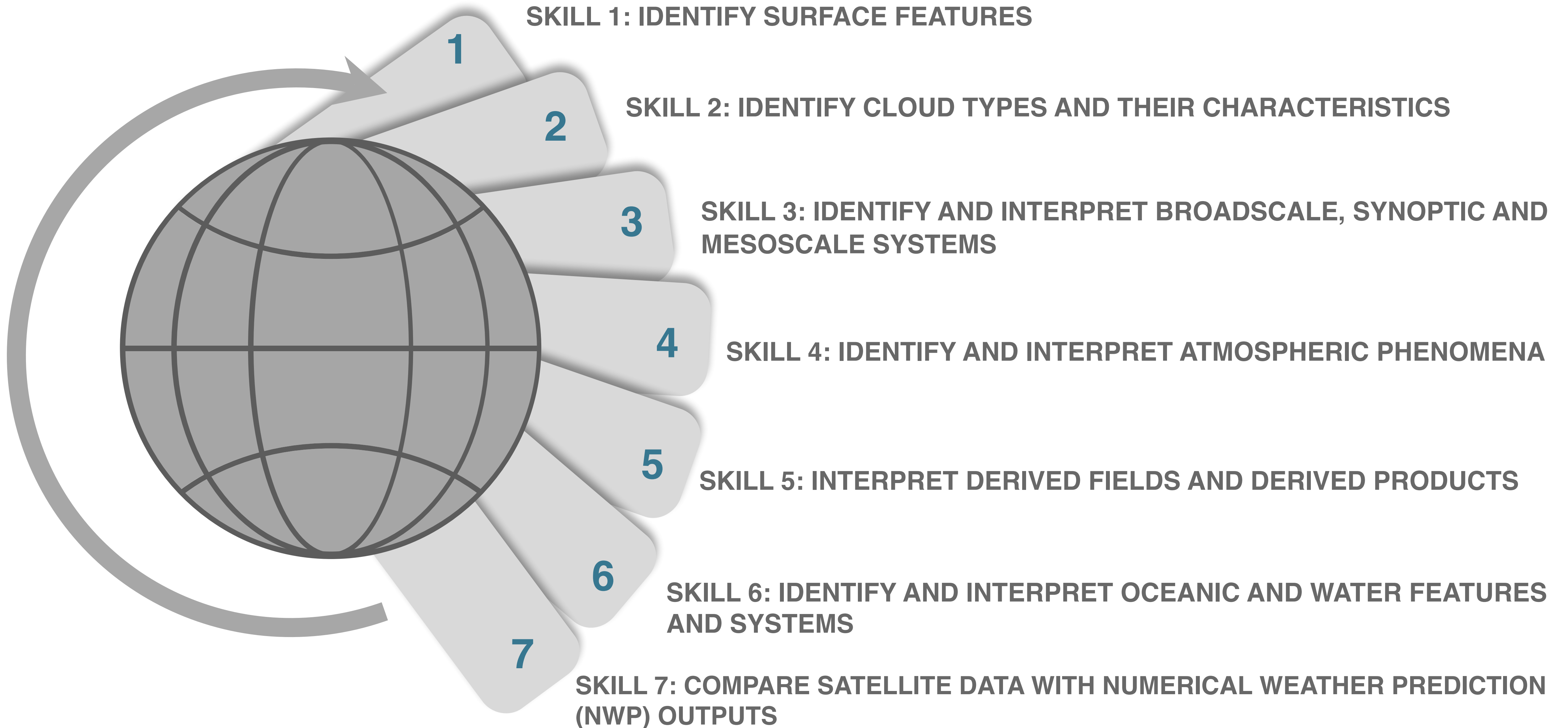
CoEs in Niger and Morocco offered courses on satellite application for French speaking countries in WMO RA I.



EUMETSAT / COMET PROJECT

Guidelines on Satellite Skills and Knowledge for Operational Meteorologists

2018 Edition



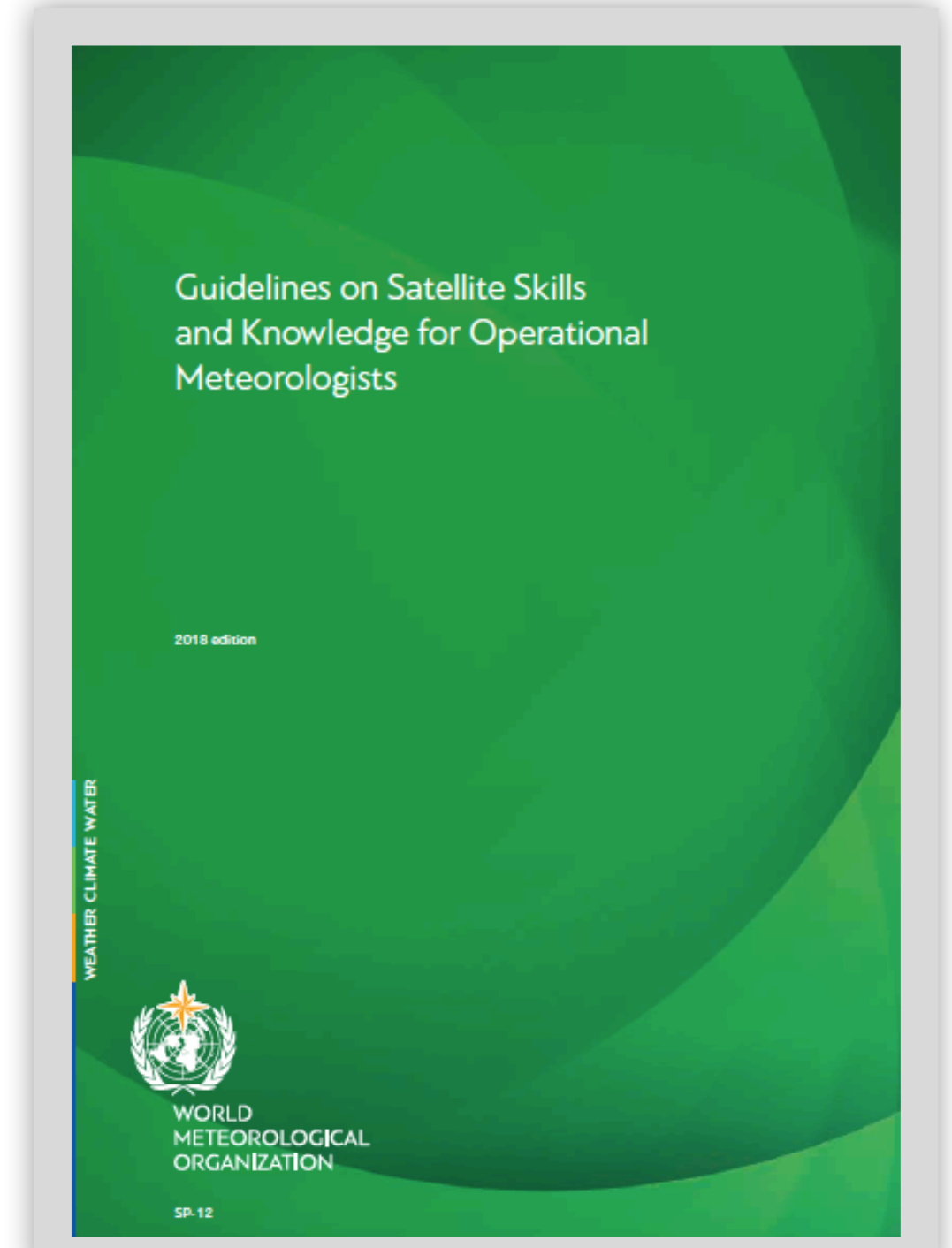
Guidelines on Satellite Skills and Knowledge for Operational Meteorologists

2018 Edition



LEVEL 1 - Skills	LEVEL 2 - Performance components	LEVEL 3 - Performance components detailed	SMB, techniques and knowledge requirements
1. Identify surface features	1.1. Identify terrain and geographical features.	1.1.1. Discriminate between land and water (oceans, seas, lakes, rivers, etc.) 1.1.2. Distinguish mountainous from low lying regions. 1.1.3. Differentiate natural vs human modified areas. 1.2.1. Identify vegetation free areas and vegetation types. Identify types of desert surface, for example, sand, desert pavement. 1.2.2. Identify areas of recent burning. 1.2.3. Identify hotspots (fires, volcanic activity, etc.). 1.2.4. Identify areas of recent volcanic ash cover. 1.2.5. Identify areas of flooding. 1.2.6. Identify areas of drought.	To be demonstrated depending on the local requirements: 1.a. Application of infrared (including water vapor (WV), visible, and microwave channels). 1.b. Application of Multi-channel (MW) and products. 1.c. Application of products and retrieval parameters (brightness, SWV and microwave products, land, etc.) particularly long-term monitoring such as drought. 1.d. Background interpretation of satellite imagery (clouds, rivers, oceans, deserts, etc.).
2. Identify cloud types and their characteristics	2.1. Identify stratiform, cumuliform and cirriform cloud regions and individual cloud types and their characteristics. 2.2. Identify Cumulonimbus clouds, their intensity, organisation and stage of development. 2.3. Identify fogs and discriminate between fog and low cloud. 2.4. Deduce cloud top heights based on brightness measurements, without the availability of sounding data (observed, satellite derived and conventional models). 2.5. Identify cloud tops of water droplets, ice particles or crystals. 2.6. Discriminate between clouds with satellite/large-scale systems.	2.1.1. Identify stratiform, cumuliform and cirriform cloud regions and individual cloud types and their characteristics. 2.1.2. Identify Cumulonimbus clouds, their intensity, organisation and stage of development. 2.1.3. Identify fogs and discriminate between fog and low cloud. 2.1.4. Deduce cloud top heights based on brightness measurements, without the availability of sounding data (observed, satellite derived and conventional models). 2.1.5. Identify cloud tops of water droplets, ice particles or crystals. 2.1.6. Discriminate between clouds with satellite/large-scale systems. 2.2.1. Identify stratiform, cumuliform and cirriform cloud regions and individual cloud types and their characteristics. 2.2.2. Identify Cumulonimbus clouds, their intensity, organisation and stage of development. 2.2.3. Identify fogs and discriminate between fog and low cloud. 2.2.4. Deduce cloud top heights based on brightness measurements, without the availability of sounding data (observed, satellite derived and conventional models). 2.2.5. Identify cloud tops of water droplets, ice particles or crystals. 2.2.6. Discriminate between clouds with satellite/large-scale systems. 2.3.1. Identify stratiform, cumuliform and cirriform cloud regions and individual cloud types and their characteristics. 2.3.2. Identify Cumulonimbus clouds, their intensity, organisation and stage of development. 2.3.3. Identify fogs and discriminate between fog and low cloud. 2.3.4. Deduce cloud top heights based on brightness measurements, without the availability of sounding data (observed, satellite derived and conventional models). 2.3.5. Identify cloud tops of water droplets, ice particles or crystals. 2.3.6. Discriminate between clouds with satellite/large-scale systems. 2.4.1. Identify stratiform, cumuliform and cirriform cloud regions and individual cloud types and their characteristics. 2.4.2. Identify Cumulonimbus clouds, their intensity, organisation and stage of development. 2.4.3. Identify fogs and discriminate between fog and low cloud. 2.4.4. Deduce cloud top heights based on brightness measurements, without the availability of sounding data (observed, satellite derived and conventional models). 2.4.5. Identify cloud tops of water droplets, ice particles or crystals. 2.4.6. Discriminate between clouds with satellite/large-scale systems. 2.5.1. Identify stratiform, cumuliform and cirriform cloud regions and individual cloud types and their characteristics. 2.5.2. Identify Cumulonimbus clouds, their intensity, organisation and stage of development. 2.5.3. Identify fogs and discriminate between fog and low cloud. 2.5.4. Deduce cloud top heights based on brightness measurements, without the availability of sounding data (observed, satellite derived and conventional models). 2.5.5. Identify cloud tops of water droplets, ice particles or crystals. 2.5.6. Discriminate between clouds with satellite/large-scale systems.	2.a. Distinguish cloud types and characteristics (MW, WV, visible channels), including: cloud-top, cloud-base and vertical extent. Infer from temperature gradient and moisture content. 2.b. Infer from brightness temperature and cloud-top detection. 2.c. Use the MW products including retrieval parameters, absorption and scattering coefficients to identify water droplets or ice particles. 2.d. Use MW products and/or retrieval parameters to identify clouds composed of different phase water droplets with small or large droplets. 2.e. Infer from cloud products. 2.f. Background interpretation of satellite imagery products (clouds, rivers, oceans, deserts, etc.).
3. Identify and interpret key features, synoptic and meso-scale systems	3.1. Identify and interpret key features, synoptic and meso-scale systems.	3.1.1. Identify and interpret key features, synoptic and meso-scale systems.	3.a. Use infrared, water vapor and MW (including high resolution visible channel and MW) products to identify key features and synoptic systems. 3.b. Infer from MW products including retrieval parameters and absorption and scattering coefficients to identify water droplets or ice particles. 3.c. Use the MW products (MW, WV, brightness temperature, etc.) to identify synoptic systems and key features and trends.
4. Identify and interpret atmospheric phenomena	4.1. Identify and interpret atmospheric phenomena.	4.1.1. Identify and interpret atmospheric phenomena.	4.a. Distinguish between desert, snow, and smoky sky and night overcast (partially clear) and other weather, using MW, WV, cloud, and MW images. 4.b. Use MW, WV, cloud, and MW images to identify key features and trends. 4.c. Infer from MW products including retrieval parameters and absorption and scattering coefficients to identify water droplets or ice particles. 4.d. Use MW products and/or retrieval parameters to identify clouds composed of different phase water droplets with small or large droplets.
5. Interpret derived fields and derived products	5.1. Interpret derived fields and derived products.	5.1.1. Interpret derived fields and derived products.	5.a. Infer from the atmospheric conditions of single channel, multi-channel, MW products and satellite retrieval parameters (MW and WV) to infer synoptic and meteorological information. 5.b. Describe the impact of satellite observations on operational weather forecast (MW) systems. This will include the use of water vapor (WV) and other MW products (water vapor, humidity (WV) fields) in the MW products.
6. Identify and interpret trends and water fluxes and systems	6.1. Identify and interpret trends and water fluxes and systems.	6.1.1. Identify and interpret trends and water fluxes and systems.	6.a. Use the MW products including retrieval parameters, absorption and scattering coefficients to identify water droplets or ice particles. 6.b. Infer from MW products including retrieval parameters, absorption and scattering coefficients to identify water droplets or ice particles. 6.c. Infer from MW products including retrieval parameters, absorption and scattering coefficients to identify water droplets or ice particles. 6.d. Infer from MW products including retrieval parameters, absorption and scattering coefficients to identify water droplets or ice particles. 6.e. Infer from MW products including retrieval parameters, absorption and scattering coefficients to identify water droplets or ice particles.
7. Compare the satellite data with conventional weather products (WRF, NWP, etc.)	7.1. Compare the satellite data with conventional weather products (WRF, NWP, etc.).	7.1.1. Compare the satellite data with conventional weather products (WRF, NWP, etc.).	7.a. Use the MW products including retrieval parameters, absorption and scattering coefficients to identify water droplets or ice particles. 7.b. Infer from MW products including retrieval parameters, absorption and scattering coefficients to identify water droplets or ice particles. 7.c. Infer from MW products including retrieval parameters, absorption and scattering coefficients to identify water droplets or ice particles. 7.d. Infer from MW products including retrieval parameters, absorption and scattering coefficients to identify water droplets or ice particles.

LEVEL 1 - Skills	LEVEL 2 - Performance components	LEVEL 3 - Performance components detailed
1. Identify surface features	1.1. Identify terrain and geographical features. 1.2. Identify surface characteristics and conditions, including dry/wet, different vegetation types and clear areas, sand and desert. 1.3. Identify snow/ice cover and analyse its extent.	1.1.1. Discriminate between land and water (oceans, seas, lakes, rivers, etc.) 1.1.2. Distinguish mountainous from low lying regions. 1.1.3. Differentiate natural vs human modified areas. 1.2.1. Identify vegetation free areas and vegetation types. Identify types of desert surface, for example, sand, desert pavement. 1.2.2. Identify areas of recent burning. 1.2.3. Identify hotspots (fires, volcanic activity, etc.). 1.2.4. Identify areas of recent volcanic ash cover. 1.2.5. Identify areas of flooding. 1.2.6. Identify areas of drought. 1.3.1. Discriminate between cloud and snow. 1.3.2. Identify frozen rivers and lakes. 1.3.3. Identify sea ice.
2. Identify cloud types and their characteristics	2.1. Identify stratiform, cumuliform and cirriform cloud regions and individual cloud types and their characteristics. 2.2. Identify Cumulonimbus clouds, their intensity, organisation and stage of development. 2.3. Identify fogs and discriminate between fog and low cloud. 2.4. Identify contrails and ship trails. 2.5. Deduce cloud top heights based on brightness	



<https://www.wmo-sat.info/vlab/satellite-skills/>

VLab Recommendations

for Satellite Training Providers

WMO Guidelines



VLMG recommends all training organisers to:

- 1) Design courses following the WMO Guidelines for Trainers in Meteorological, Hydrological and Climate Services (WMO-No. 1114), available at http://www.wmo.int/pages/prog/dra/documents/wmo_1114_en.pdf
- 2) Link courses to the relevant WMO skills / competencies frameworks (see WMO Guide to Competency - WMO-No 1205 at https://library.wmo.int/doc_num.php?explnum_id=4237 and more information on the Competency Frameworks at <http://www.wmo.int/pages/prog/dra/etrp/competencies.php>).



Satellite Skills

Whenever appropriate, the satellite skills and knowledge addressed in a training event should be identified in the training description and certificate of participation.

<https://www.wmo-sat.info/vlab/satellite-skills/>



Creative Commons License

VLMG and Partners recommend that satellite training providers use Creative Commons License by attribution (CC BY) to provide clear identification of copyrights license in their training resources (see <https://creativecommons.org/licenses/by/4.0/>). This is an effort to improve sharing of resources, and is also part of adapting to the standards for submission of resources to the Global Campus Library. NOTE: VLMG Partners attending VLMG-9 will further discuss this recommendation within their members for ratification).



Making Training Information Easier to Find

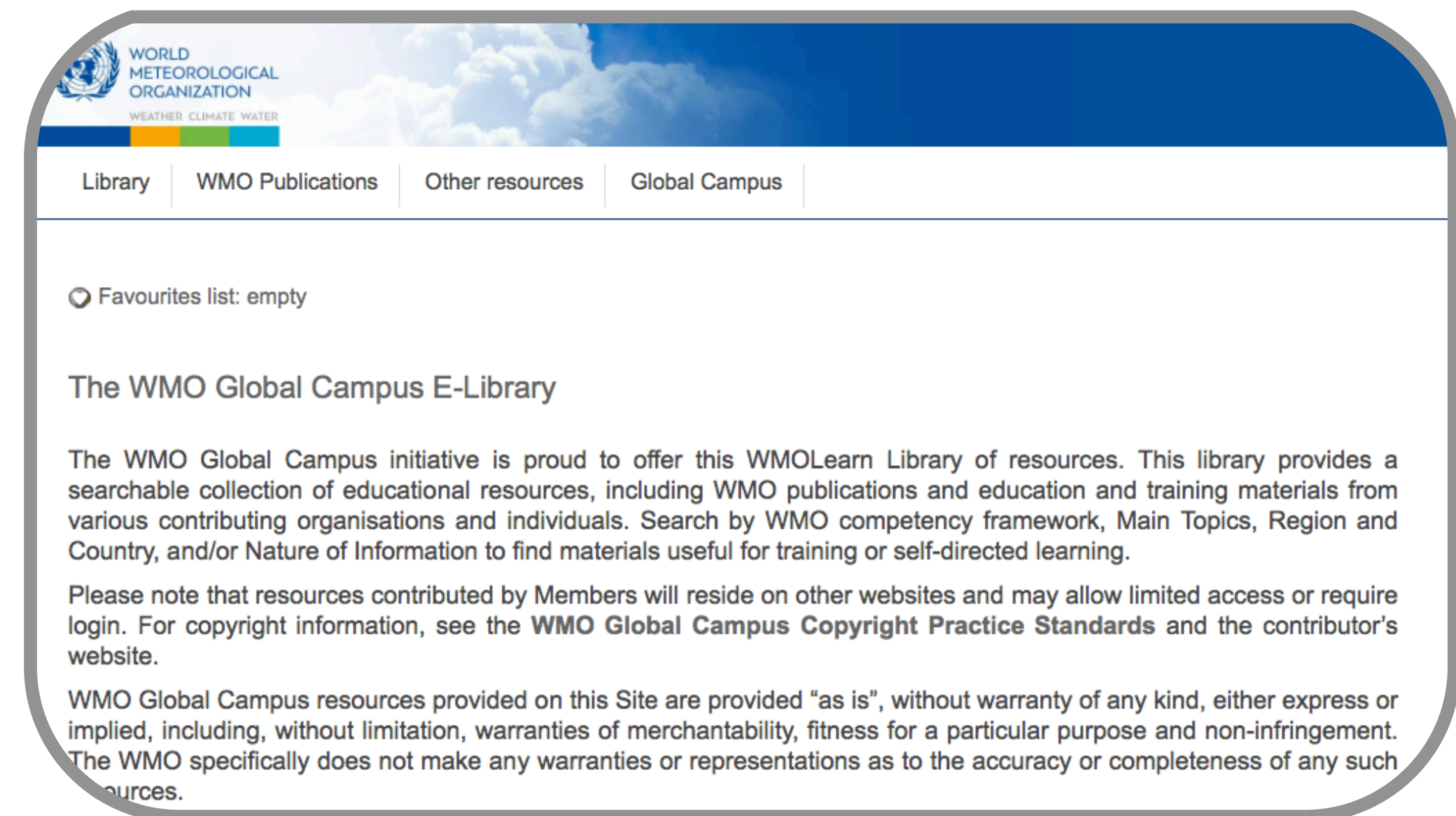
Training Events and Resources



Calendar(s) of Training Events

Satellite training only:

<http://trainingevents.eumetsat.int>
Wider WMO related training topics:
<http://learningevents.wmo.int>



Global Campus E-Library

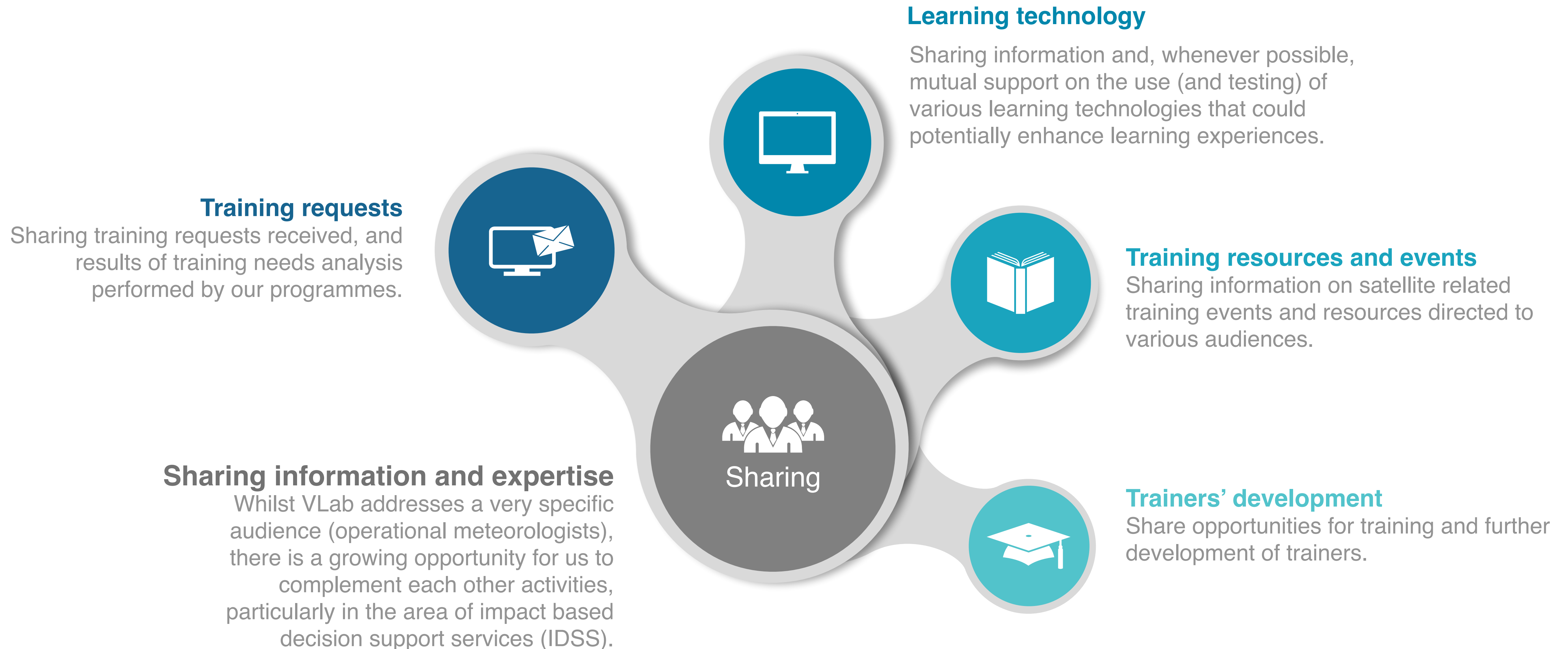
<https://library.wmo.int>
Choose Global Campus to see resources organised by WMO Competency Frameworks

Searching for Training Events and Resources is getting easier

Online Calendars and Global Campus Library



Potential Areas for Collaboration



Lets start sharing

These are some opportunities that might be of your interest



WMO Advanced Online Course for Trainers 2019

This year VLab is co-sponsoring the course, so Members and Partners have the opportunity to nominate one participant to attend. The focus of the course will be on the use of blended learning. Interested? Please email Lu Veeck at luveeck@gmail.com for more information. Applications will be accepted until the 18th of March, but the sooner the better.



TSO Meeting

This meeting is organised by a small group of Training Support Officers of various Programmes/ Agencies. It addresses major topics of common interest and challenges faced by these professionals. In 2019, the meeting will be hosted by WMO (Geneva). If you have interest on learning more about this **informal Group** or consider attending the meeting, please email Lu Veeck at luveeck@gmail.com



Joint Eumetcal-CALMet Conference

This conference brings together educators, trainers and managers from universities, research institutions and NMHSs. It provides an opportunity for a community from around the world to collaborate and network on workforce development in support of the global weather, water and climate industry. <https://www.eventsforce.net/eumetsat/5/home>

Trainer resources portal

This portal was developed to support the WMO Competency Requirements for Education and Training Providers. The portal contains resources used in the WMO Online Course for Trainers, including downloadable readings, templates and examples.

<https://etrp.wmo.int/course/view.php?id=30>





A Final Note

As part of our effort to improve communication and engagement with our audience, the VLab website is in the process of being redesigned. The new website is planned to be operational in the second semester of 2019. Meanwhile, we will do our best to keep the actual site as updated as possible.

- ✓ **Calendar of Training Events**
- ✓ **Links to VLab Members and Partners**
- ✓ **Satellite related News**
- ✓ **VLab Reports and publications**

<https://www.wmo-sat.info/vlab/>