



WORLD METEOROLOGICAL ORGANIZATION

**Report of the Twenty-eighth Session of the
EC Panel of Experts on Education and Training**

**Kenya Meteorological Department
Nairobi, Kenya
17–19 APRIL 2018**

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Meeting Outcomes and Actions of the Twenty-eighth Session of the EC Panel of Experts on Education and Training (Nairobi, Kenya 17-19 April 2018)

Opening

The meeting opened in the morning of the 17th of April 2018 with a welcome note by the Permanent Representative (PR) of Kenya with WMO, Mr Peter Ambenje, who on behalf of the Government of Kenya, expressed appreciation to WMO for the opportunity to hold the meeting in Nairobi. He assured participants of his full support and that of his staff, towards making the meeting a success. The Chairperson, Dr Agnes Kijazi, standing in for Mr David Grimes, the President of WMO who in that capacity chairs the Panel, expressed appreciation to the PR of Kenya for the preparation made towards the Panel Session, which was last held in Africa in February 1989, when it was hosted by the Regional Training Centre (RTC) Egypt, the Egyptian Meteorological Authority, in Cairo, Egypt. She went further to draw the attention of the meeting to the information note circulated by the host country, with a view of ensuring that all participants are well orientated to situations in and around the meeting venue. The Chair explained the rationale behind the organization of the agenda and also made comments on what was expected at the end of the Session. Comments were invited on the agenda, including clarifications on the working hours during the three-day schedule. The Director of WMO Education and Training Office, Dr Yinka Adebayo, gave supplementary information on the agenda and organization of the document. The Panel agreed to the agenda (Annex 1), taking into account Annex 2, and also agreed on the format of the report to be prepared by the Secretariat.

Agenda No	Doc	Title	Purpose & Expected Outcomes
1. Opening and organization of the session	1	Agenda and Work plan	(a) Discuss and approve the agenda item and work plan (b) Decide on format of report to be prepared by the Secretariat

Issues and Recommended Actions	Responsible
1.1 The agenda was adopted as proposed.	Secretariat
1.2 The report format will be decided by the Secretariat.	Secretariat

Agenda No	Doc	Title	Purpose & Expected Outcomes
2. Discussions on Education and Training Programme	2	Discussions on Education and Training Programme Priorities and Changing Organizational	(a) Review the actions from the 27th Session of the Panel (b) Propose any further follow-up actions as appropriate (c) Take the major outcomes from Congress and Executive Council into consideration in course of discussions and when making recommendations during this session

		Context	<p>(d) Brainstorm on education and training priorities as identified by Congress and EC, as well as in the light of new and emerging issues</p> <p>(e) Make recommendations on regional and global priorities on education and training in the light of new and emerging socio-economic, technological, scientific and other societal issues</p> <p>(f) Brainstorm on the ongoing reform of WMO</p> <p>(g) Make recommendations on governance of education and training programme within the framework of overall capacity development activities of the Organization</p>
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Issues and Recommended Actions	Responsible
2.1 The Panel agreed to discontinue the incomplete Action Item 03 (b) from EC-PAN 27 on the collection of capability frameworks, due to higher priorities (see Annex 3).	Secretariat
2.2 The Panel recommended that the EC provides adequate resources to the Secretariat to translate documents identified as essential by RTCs for education and training. Priorities should be identified, and the quality requirements of translations taken into consideration, particularly when volunteers engage in translation efforts. The WMOLearn website provides a link to the Translations Resource Center, a WMO Global Campus project, which is designed to facilitate translations.	EC and Secretariat
2.3 The Panel recommended that the RTCs be encouraged to consider conducting training in multiple WMO languages, as appropriate and depending on available resources, especially in WMO priority areas.	Secretariat and WMO RTCs
2.4 The Panel expressed its appreciation to AEMET, Spain for dedicating resources to support translations as well as Spanish language education and training activities.	Secretariat
2.5 The Panel recommended that the ETR Office help RTCs to map RMDP goals and projects into their ETR plans.	Secretariat
2.6 The Panel recommended that EC reinforce the need for resources for education and training activities to enhance capacities of NMHSs.	EC
2.7 The Panel requested the ETR Office to revise its programme priority areas to identify fewer key priorities and identify others as activities associated with the key priorities. (See Annex 6)	Panel and Secretariat
2.8 The ETR Programme priorities should be reviewed for alignment with the recommendations of Presidents of Regional Association (PRA), Presidents of Technical Commission (PTC), Technical Commission (TC) and Regional Association (RA) meetings.	Secretariat
2.9 Request experts within WMO Technical Commissions, RTCs and partner universities to provide in-kind contributions in the form of short, specific competency-based educational materials, suitable to be offered as WMOLearn resources. Provide general recommendations on how to package the material to be compatible with WMOLearn and to be used either as part of a course or as a self-training material.	Secretariat and Global Campus Working Group
2.10 The Panel recommended that the EC encourages RTCs to provide tailored service delivery education and training in WMO priority areas.	EC and Secretariat

2.11 The Panel recognized the need to increase support to develop research capacity in Members, but noted that development of basic qualifications and competencies remain critical for many Members.	EC and Secretariat
2.12 The Panel recommended that the ETR Office encourages the RTCs and training partners to increase the application of new technologies and training modalities in their training delivery.	Secretariat and RTCs
2.13 The Panel recommended that the Secretariat promote the development of resources for education and training, especially through extra-budgetary projects, in priority areas to support capacity development of NMHSs.	Secretariat
2.14 The Panel recommended stronger encouragement for embedding education and training as critical elements in all WMO capacity development projects through production and dissemination of a position paper.	Panel and Secretariat
2.15 The Panel noted the proposed WMO reforms and considered them positive for the Organization, and recognized the cross-cutting nature of the Education and Training Programme and the EC Panel of Experts on Education and Training.	EC and Secretariat
2.16 The Panel recommended that, within proposed WMO reforms, the EC establishes an appropriate governance structural location for education and training to allow it to best conduct its cross-cutting activities. In keeping with these changes, the Terms of Reference of the Panel should be revised, and the representativeness of the membership of the Panel should include some PRs and others to ensure that policy, strategic, and regional issues are addressed.	EC and Secretariat
2.17 The Panel noted the recommendations of EC WG-SOP on Public and Private Partnership issues. The Panel agreed that the private and public sector have common interests in education and training, as noted from interactions in professional associations and cooperative projects such as HydroHub, which could inform WMO in this area. The Panel recommended that the Panel meetings should include representation from the private sector as appropriate.	EC and Secretariat
2.18 The Panel recommended the development of a prioritized list of focus areas for weather, climate and water training, and recommendations on training experts to assist in meeting training requirements originating in the services and applications commissions.	Secretariat and Commissions

Agenda No	Doc	Title	Purpose & Expected Outcomes
3. WMO Global Campus	3	WMO Global Campus	<p>(a) Discuss and advise upon the WMO Global Campus Working Group methods, the WMO Global Campus Roadmap, and the remaining work plan for the feasibility study leading up to Cg-18.</p> <p>(b) Discuss progress and advise on aeronautical and climate services priority areas for WMO Global Campus.</p> <p>(c) Discuss progress and advise on WMO Global Campus tools and the WMO Learn portal</p> <p>(d) Brainstorm on how to bring universities closer to the fold of WMO training activities, particularly with respect to operational training, climate services,</p>

			human resource development, and research. (e) Make recommendations on options for facilitating increased cooperation between training institutions and universities
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Issues and Recommended Actions	Responsible
3.1 The Panel noted progress so far on the Global Campus Feasibility Study and recommended the continued implementation of the WMO Global Campus, noting that it significantly furthers the capabilities of the Education and Training Programme.	EC
3.2 The Panel recommended that the WMO Global Campus should be promoted as an approach to reduce the cost of providing education and training while increasing opportunities.	Panel and Secretariat
3.3 The Panel noted the completed draft of the WMO Global Campus Road Map, but also agreed to review it closely with special attention to Section 5 on implementation and oversight.	Panel and Secretariat
3.4 The Panel recommended informing interested parties, including the private sector, of the WMO Global Campus initiative.	Panel and Secretariat
3.5 The Panel recommended the use of a circular letter to inform Permanent Representatives, with copy to RTC Directors and hydrological advisors, of the WMO Global Campus progress prior to EC-70.	Panel and Secretariat
3.6 The Panel recommended that all Panel members promote the WMO Global Campus Road Map and the WMO Learn website as sources of information about the initiative to ensure their PRs and other regional contacts have full awareness prior to EC-70. Presentation and promotional materials would be useful to share.	Panel and Secretariat
3.7 The Panel recommended that a circular letter be sent to other WMO constituent bodies and focal points to promote utilization of WMO Global Campus tools.	Panel and Secretariat
3.8 The Panel recommended that the development of any new online tools for use in the Global Campus takes into account the existing tools in use by RTCs and other training providers.	Panel and Secretariat
3.9 The Panel recommended that the EC encourages the RTCs and other training providers to develop and share existing and future education and training opportunities and resources.	EC and Secretariat
3.10 The Panel noted the ongoing need to attract more contributors to the WMO Global Campus calendar, and eventually, catalogue, especially in priority areas of aeronautical meteorology and climate services, but also hydrology, management training, impacts-based forecasting and warnings, and other areas of critical need.	Panel and Secretariat
3.11 The Panel recommended connecting to universities to facilitate networking to create new higher education programmes that meet WMO priorities.	Panel and Secretariat
3.12 The Panel recommended resource mobilization to produce open educational materials that can be shared through WMO Global Campus mechanisms.	Secretariat
3.13 The Panel recommended provision of guidelines and standards for resource formats and designs to facilitate sharing. The CALMet community should be approached for input into these guidelines.	Panel and Secretariat

3.14 The Panel recommended explicitly tying WMO Global Campus activities into capacity development projects, including the development of openly shared learning resources.	Panel and Secretariat
3.15 The Panel recommended that EC ask that all training coordinated by the Secretariat be promoted through the WMO Global Campus calendar and/or catalogue.	EC and Secretariat
3.16 The Panel recommended that a prominent webpage promoting the WMO Global Campus should be placed on the WMO Public website as soon as it is considered appropriate.	Secretariat
3.17 The Panel recommended that the WMO Learn website more prominently advertise the Collaborative Projects component.	Secretariat
3.18 The Panel recommended the development of frameworks for sharing resources across institutions to encourage more open education practices.	Panel and Secretariat

Agenda No	Doc	Title	Purpose & Expected Outcomes
4. Overall Support to Capacity Development in WMO	4	Overall Support to Capacity Development in WMO	<p>(a) Make recommendations on how to enhance delivery of education and training in priority subject areas, taking into account the need to involve WMO Regional Training Centres and other training partners</p> <p>(b) Discuss the need for training resources to support priority areas and make recommendations on specific programme activities that the Panel Members may wish to get involved in. This could be by way of contributing to the development of training resources for specific subject matter.</p> <p>(c) Discuss the training needs in the overall context of education and training activities (see Annex 4 and Annex 9, sections 2.3 and 4), and how to get the RTCs more involved</p> <p>(d) Make recommendations on how to strengthen the hydrology and water resources related training activities in NMHSs, taking into account the need to coordinate with respective national institutions responsible for hydrology and water resources, where necessary.</p> <p>(e) Make recommendations on how to promote management training in NMHSs institutions through the WMO Regional Training Centre</p> <p>(f) Make recommendations on development of training materials</p> <p>(g) Make recommendation on how to promote WMO volunteers initiative from education and training perspective</p> <p>(h) Make recommendation on how the Regional Training Centres and other related institutions could benefit</p>

			<p>from the initiative</p> <p>(i) Review options for cooperating with professional societies from education and training perspective</p> <p>(j) Make recommendations on how to promote cooperate with meteorological societies</p>
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Issues and Recommended Actions	Responsible
<p>4.1 The Panel recommended that EC encourages that more resources be sought to support training in hydrology, focusing on the initiatives identified by the CHy-15, namely :</p> <p>a) The Global Hydrometry Support facility (HydroHub)</p> <p>b) The WMO Flood Forecasting Initiative (FFI)</p> <p>c) The Global Hydrological Status and Outlook System (HydroSos)</p>	EC
<p>4.2 The Panel noted that skills in management are essential for the success of every organization, including NMHSs. The meeting also noted that CMA and other NHMSs have already integrated management training in their training programmes. Therefore, the Panel recommended that EC encourages RTCs and other training institutions to integrate management development into their training activities.</p>	EC and Secretariat
<p>4.3 The Panel commends the work of Dr Bob Riddaway in developing the Compendium of Topics on Management Development for NMHSs, and compliments the Secretariat for placing emphasis on management development.</p>	Panel
<p>4.4 The Panel recommends that the Secretariat support the development of additional enhanced curriculum materials and management development models for adaptation by NMHSs and RTCs, including recommended learning methods and cases that highlight applications in NMHSs.</p>	Secretariat
<p>4.5 The Panel recommended that the Secretariat take advantage of every opportunity to conduct management development, for example, through short events attached to other meetings and promoting mentoring activities.</p>	Secretariat
<p>4.6 The Panel endorsed the creation of a WMO Volunteers network, and commended the Secretary General for this initiative.</p>	Secretariat
<p>4.7 The Panel noted that national and regional meteorological societies and academies of sciences are important sources of expertise, particularly experts who have retired. The Panel recommends working through these societies to identify experts who are willing to volunteer to contribute to education and training activities.</p>	Secretariat
<p>4.8 The Panel recommended development of a clearinghouse of volunteers available through sabbatical or retired status, as well as opportunities for volunteer consultations with NMHSs or training institutions, and that this clearinghouse be firmly integrated within the Secretariat structure.</p>	Secretariat
<p>4.9 The Panel recommended that CHy identify regional centers to ensure capacity to develop and sustain Hydrological Forecast and Warning Capabilities within each region.</p>	CHy

4.10 The Panel recommended consideration of the broad impacts of the use of new educational technologies for meteorology, hydrology, and climate services expected over the next ten years within higher education, such as 3D images, animations, and virtual reality.	Panel and Secretariat
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Agenda No	Doc	Title	Purpose & Expected Outcomes
5. Review of Basic Instructional Packages and WMO Competency Frameworks	5	Review of Basic Instructional Packages and WMO Competency Frameworks	<p>(a) Review current status and advise on development and implementation of WMO Competency Frameworks.</p> <p>(b) Make recommendation on whether or not it is necessary to review BIP- M frameworks, and if yes, propose on how such review should take into account changing forecaster roles, and consider whether to factor in management training, knowledge of socio-economic benefits and working with the private sector</p> <p>(c) Propose a plan for revising the BIP- M</p> <p>(d) Because uptake of the BIPs is not yet universal, discuss a plan for promotion of the BIPs and providing guidance on their use.</p> <p>(e) The Panel is requested to continue supporting the Task Team on BIP- H in its work, by providing advice based on its experience with similar processes already completed</p> <p>(f) With respect to Climate Services, provide advice based on its experience with similar processes already completed</p>

Issues and Recommended Actions	Responsible
5.1 The Panel endorsed the efforts of Secretariat and Technical Commissions to develop competency frameworks and requested this practice to continue, commended the development of the Guide to Competency, and recommends that the Secretariat work to ensure consistency of the frameworks.	Secretariat
5.2 The Panel recommended that the Secretariat continue its work to facilitate implementation of the WMO competency frameworks.	Secretariat
5.3 The Panel recommended that the Basic Instructional Packages for Meteorologists (BIP-M, and BIP-MT) be reviewed and updated as necessary to reflect changes in the science and applications of meteorology. They requested consideration of the benefits of incorporating elements on management and communication skills, through curricula or teaching methods, as well as the limited number of credit hours available in university programmes.	Panel and Secretariat

5.4 The Panel recommended EC to bring attention to universities the benefits of providing training in meteorology using the BIP-M as a basis for their curricula.	EC
5.5 The Panel agreed to establish a Task Team of approximately 6 experts to update the Basic Instructional Packages for Meteorologists (BIP-M and MT) within a period not exceeding two years. The ideal make-up of the Task Team would include at least 3 Panel Members and 3 external experts identified by the Secretariat. The Panel noted that the role of Task Team leader was crucial to the success of the effort. The Task Team should be open to additional volunteers.	Panel and Secretariat
5.6 The Panel appreciated the decision of the WMO and UNESCO, in conjunction with IAHS and IAHR, to revise the Basic Instructional Package-Hydrology (BIP-H).	Panel
5.7 The Panel noted with appreciation the decision of the CCI to develop a Basic Instructional Package for Climate Services (BIP-CS) and encouraged the Commission to continue with the process.	Panel
5.8 The Panel encouraged all Task Teams working on BIP development to consult one another during the process, and to consult the Panel as needed.	Panel and Task Teams
5.9 Several Panel members volunteered to participate in the Task Team on BIP-M and MT review, at various levels of commitment. These include Stella Aura, Winifred Jordaan, Chris Webster, Jennifer Milton (as backup), and associate Bob Riddaway. A suggestion was made to invite other members to the Task Team. Several nominations were noted.	Panel

Agenda No	Doc	Title	Purpose & Expected Outcomes
6. WMO Fellowships Programme, Training Activities and Regional Training Centres	6	WMO Fellowships Programme, Training Activities and Regional Training Centres	<ul style="list-style-type: none"> (a) Review implementation of education and training activities (b) Make recommendations on how to enhance future implementation with special focus on resource mobilization and partnerships (c) Review the report on impact assessment of WMO fellowships (d) Make recommendations on how to strengthen the fellowships programme (e) Review the report and advise on any suggested actions or observations. (f) Review and comment on the status of the WMO Regional Training Centers (g) Designate the "Agencia Estatal de Meteorología" (AEMET) of Spain as a WMO RTC in Spain; (h) Designate the "Facultad de Ingeniería y Ciencias Hídricas" (FICH) of the "Universidad Nacional del Litoral" (UNL) of Argentina as the third component of

			<p>the WMO RTC in Argentina;</p> <p>(i) Designate the “Servicio Nacional de Meteorología e Hidrología” (SENAMHI) of Peru as the second component of the WMO RTCs in Peru;</p> <p>(j) Extend the reconfirmation of the WMO RTCs in Algeria, Indonesia, Israel, Kenya, Madagascar, Nigeria, Peru, Philippines, Russian Federation, South Africa, and Turkey, until subsequent EC decisions following the conclusions of ongoing and the next external reviews by the EC Panel.</p> <p>(k) Discuss options for follow up on progress on RTC recommendations outside of the normal External Assessment processes.</p> <p>(l) Review the external assessment programme and volunteer services to convene one or more external assessment process.</p> <p>(m) Propose new publications and reports</p> <p>(n) Make proposal on how to assist Regional Training Centres with publications</p>
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Issues and Recommended Actions	Responsible
6.1 The Panel expressed appreciation for the Fellowships Impacts Evaluation and noted the quality of the report. The Panel also recommended that the report should be published and disseminated for transparency.	Panel and Secretariat
6.2 The Panel recommended that Fellowships Impacts Evaluations be repeated periodically, such as once each financial period.	Secretariat
6.3 The Panel strongly recommended to EC that the Fellowships programme be continued at a robust level for the benefit of Members.	EC
6.4 The Panel acknowledged the support provided by the ETR Office for short course training opportunities and encouraged ongoing funding for critical continuing professional development needs.	EC and Secretariat
6.5 The Panel expressed disappointment that some RTCs continue to fail submitting annual reports or engage in other interactions with the Secretariat to allow optimum benefit of Members. The Panel recommended that the ETR Office continue its process of contacting RTC Directors on this and other matters related to RTC performance.	Panel and Secretariat
6.6 The Panel noted the increased involvement of Regional Associations in supporting the RTCs and encouraged continued promotion of RA involvement by the Secretariat.	Panel and Secretariat
6.7 The Panel recommended that the Secretariat engage the respective Regional Associations on performance their RTCs.	
6.8 The Panel recommended that EC endorses the request of Spain and RA-VI to designate the “Agencia Estatal de Meteorología” (AEMET) as a WMO RTC in Spain (Annex 5).	EC

6.9 The Panel recommended that the EC endorses the request of Argentina and RA-III to designate “Facultad de Ingeniería y Ciencias Hídricas” (FICH) of the “Universidad Nacional del Litoral” (UNL) of Argentina as the third component of the WMO RTC in Argentina (Annex 5).	EC
6.10 The Panel recommended that the EC endorses the request of Peru and RA-III to designate “Servicio Nacional de Meteorología e Hidrología” (SENAMHI) as the second component of the WMO RTC in Peru (Annex 5).	
6.11 The Panel recommended that the EC extends the reconfirmation of the WMO RTCs in Algeria, Indonesia, Israel, Italy, Kenya, Madagascar, Nigeria, Peru, Philippines, Russian Federation, South Africa, and Turkey as RTCs until the next opportunity for external review by the EC ETR Panel (Annex 5).	EC
6.12 Several Panel Members and invited experts expressed interest in supporting External Assessments of RTCs. The Panel noted the potential use of associates as conveners of RTC assessments.	Panel
6.13 The Panel endorsed the recent and ongoing publications coordination by the ETR Office and reiterates the importance of translation of publications critical for members, even if this only includes important portions of those publications. The Panel expressed interest in assisting in quality assurance of these translations by identifying experts able to do so.	Panel and Secretariat

Agenda No	Doc	Title	Purpose & Expected Outcomes
7. Review of Actions, Briefings on Plan and Document for the Seventieth Session of the WMO Executive Council and Closure of the Meeting	7	Review of Actions, Briefings on Plan and Document for the Seventieth Session of the WMO Executive Council and Closure of the Meeting	(a) Review key outcomes of the Session (b) Review of plan and document for Seventieth Session of the WMO Executive Council (EC-70)

Issues and Recommended Actions	Responsible
7.1 The Panel endorsed the revised Priorities of the WMO Education and Training Programme. (See Annex 6)	Panel
7.2 The Panel endorsed the Actions for the EC Panel on Education and Training. (See Annex 7)	Panel

Closure

The meeting ended in the afternoon of the 19th of April 2018 with the Panel commending WMO for the attention which the Education and Training Office has been given to development and publication of important materials. The Panel also expressed

words of appreciation to KMD for hosting the 28th Session of the Panel and the WMO Secretariat for a well-organized meeting, in particular for making many useful documents available to participants prior to the Session. Finally, the Panel also expressed appreciation to Dr Agnes Kijazi, Permanent Representative of Tanzania with WMO, for chairing the meeting on behalf of the Panel Chair, WMO President David Grimes. The Permanent Representative of Kenya with WMO, Mr. Peter Ambenje expressed delight of the Kenya Meteorological Department in hosting the meeting and assured WMO that Kenya would always do its best to support the activities of the Organization. On behalf of the Panel, Dr Agnes Kijazi thanked the PR of Kenya and his staff for their support in making the Session a success all through from the planning stage until the end.

Note: All meeting documents are archived on the meeting site and linked from relevant agenda items in the **EC Panel 28 Preparatory Documents** (Annex 9).

Annex 1: Agenda of the Session

Tuesday, 17 April	Agenda Item
AM	1 : Opening and Organization of the Session 2 : Discussions on Education and Training Programme
PM	3 : WMO Global Campus
Wednesday, 18 April	Agenda Item
AM	4 : Overall Support to Capacity Development in WMO
PM	5 : Review of Basic Instructional Packages and WMO Competency Frameworks
Thursday, 19 April	Agenda Item
AM	6 : WMO Fellowship Programme, Training Activities and Regional Training Centres
PM	7 : Review of Actions, Briefing on Plan and Document for the Seventieth Session of the WMO Executive Council, and Closure of the Meeting

Annex 2: Terms of Reference of the Panel

Resolution 17 (EC-66)

TERMS OF REFERENCE OF THE EXECUTIVE COUNCIL PANEL OF EXPERTS ON EDUCATION AND TRAINING

THE EXECUTIVE COUNCIL,

Noting:

- (1) Resolution 19 (EC-LXII) – Terms of Reference of the Executive Council Panel of Experts on Education and Training,
- (2) Resolution 31 (Cg-XVI) – Education and Training Programme,
- (3) The *Abridged Final Report with Resolutions of the Sixty-third Session of the Executive Council* (WMO-No. 1078), general summary, paragraph 3.9 (a),

Considering that education and training in meteorology, hydrology and related disciplines is a major cross-cutting activity of WMO that has a large impact on enhancing the knowledge and expertise available to National Meteorological and Hydrological Services and improving the quality of products and services delivered to the users,

Considering further that the scope and demand for education and training is expanding with initiatives such as the Global Framework for Climate Services, disaster risk reduction and increasing compliance requirements,

Decides to adopt the terms of reference for the Executive Council Panel of Experts on Education and Training as follows:

- (1) To provide the Executive Council with input into the WMO strategic planning process by making recommendations on the future direction and activities of the WMO Education and Training Programme;
- (2) To establish and maintain information sharing arrangements with the regional associations, technical commissions and other relevant bodies in order to determine the prioritized education and training needs of Members;
- (3) To provide the Executive Council with advice on the standards for education and training of personnel of Members;
- (4) To provide the Executive Council with advice on the standards and recommended practices for the education and training of personnel of

Members;

- (5) To provide the Executive Council with advice on actions for monitoring, strengthening and enhancing the Education and Training Programme, including the designation of suitable training institutions such as WMO Regional Training Centres;
- (6) To provide the Executive Council with advice on actions to improve the effectiveness of the Fellowship programme based on an ongoing review and evaluation of the programme;
- (7) To support other initiatives of the Education and Training Programme, including the development and review of activities and guidance material as required;
- (8) To select the Panel members and the number of terms to be undertaken in accordance with the annex to the present resolution.

Note: This resolution replaces Resolution 19 (EC-LXII), which is no longer in force.

Annex to Resolution 17 (EC-66)

TERMS OF REFERENCE OF THE EXECUTIVE COUNCIL PANEL OF EXPERTS ON EDUCATION AND TRAINING

Membership:

- (i) The Panel will be chaired either by the President of the Organization or a designated member of the Executive Council. If the Chair cannot attend a session of the Panel, she/he will appoint a Panel member to chair the session in her/his absence;
- (ii) In addition to the Chair, the Panel shall consist of a maximum of twelve members, each of whom will sit in a personal capacity;
- (iii) The members shall be appointed by the Executive Council on the basis of their extensive professional expertise in education and training matters, particularly in the fields of meteorology, climatology or hydrology and take into account the need for the Panel to have an appropriate technical, geographical and gender balance in considering the most highly qualified candidates;
- (iv) In addition to acting in a personal capacity Panel members will be expected to maintain regular contact with regional association ETR Focal Points and technical commissions to promote cross-cutting coordination and information exchange;
- (v) Members shall serve for a period of four years and may be re-appointed for one further period of four years. No individual may serve for more than eight years in total.

Appointment of Members:

The Panel members shall be appointed by the Executive Council through a transparent process as follows:

- (i) The Secretary-General will write to all Members, with copy to the presidents of regional associations and technical commissions, advising them of the opportunity to nominate one person with appropriate skills for consideration by EC for the EC Panel of Experts on Education and Training. The letter will be sent at least six months prior to the EC immediately following Congress. Written nominations endorsed by the PR of the country concerned, or president of the appropriate regional association or technical commission, to reach the Secretary-General no later than 3 months before Congress;
- (ii) The Secretary-General will review the qualifications, determine whether they meet the minimum requirements needed to serve, and submit a prioritized list of candidates to the Executive Council immediately following Congress;
- (iii) The Council will appoint members of the Panel from the list of candidates compiled by the Secretary-General. The Council may choose to create a selection committee to review the list prepared by the Secretary-General. The Council will authorize the President to fill any positions that fall vacant during the intersessional period using the list approved by EC;
- (iv) In accordance with General Regulation 35 (2012 Edition) the Chair of the Panel can invite experts to assist the Panel in its deliberations.

Administrative matters:

Financial support for participation by Panel members in meetings shall be provided by the Organization in accordance with General Regulation 37 (2012 Edition).

Annex 3: Status on Actions Resulting from EC Panel 27

Invited to	Decision	Progress
03 (b) (26 th Panel meeting) Recommend next steps (who, what and when) with incomplete items;	Compendium of capability frameworks to be put together as web based resource. Rich Jeffries to work with ETRO and Bob Riddaway. Aiming for first draft by the end of the year	None. Suggest this activity be removed. No clear needs or outcomes are described.
04 (b) Make recommendations to Council for changes / adjustments to the ETRP particularly taking into account the available financial and human resources for this financial period.	Need further work at next Panel session look at emerging ETR issues from PRA/PTC	ETCOM formed, more collaboration with Technical Department directors, gathering of ETR needs from TDs to be reported during EC Panel 27
05 (b) Consider the information the Panel would like to see in future reports.	Modify to get more impact based assessment on the ETR carried out by RTCs	RTC reports revised to include more on additional activities and future plans. No significant work done on impacts assessment. Brief guidance on Impacts Assessment created (see Annex I)
06 (c) Review and comment upon the draft guidelines for Designation and Reconfirmation of WMO Regional Training Centres	Recommend that EC agree for delegation of authority to Panel Chair to make decision regarding on or offsite visit. ETRO office to update the procedures accordingly. The RTC should provide input into the decision, not be the sole arbiter. Panel Chair to have discussion with the PR of host country if required, bring decision to EC.	EC-69 decision supported this decision (Resolution 9).
06 (d) Advise the ETR Office on the development of guidance and a reporting template for RTC external review teams.	Progress made but guidance needs further development. Goal to be completed end of 2016	Guidance fully revised. Available at ETR website RTC Page
08 (b) Agree the proposed future work plan for the WMO Global Campus feasibility study	See 8c, discussed and to be further revised by the WG and provided to the Chair	WMO Global Campus Road Map developed and published as draft, latest draft available at http://learn.wmo.int
08 (e) Agree and promote the "Guiding Principles for Collaboration" for collaborative working under the WMO Global Campus	To be revised (e) and finalised by end of April	Revised principles are included in the WMO Global Campus Roadmap
08 (f) Contribute to resource mobilization efforts aimed at furthering the WMO Global Campus feasibility work	Promote the WMO Global Campus in the ETR and other networks	All SSAs related to Global Campus activities are now closed, one of which relied on USA VCP Trust Fund. Currently rely on in-kind contributions, extra-budgetary resources would be useful.
09 (a) Recommend which calendar prototype/s should be further developed to become operational by end of 2016	Agreed on Moodle as operational prototype to be hosted by CIMH, further explore WIS as long term option. Request EC to task CBS to initiate integration of the calendar into WIS to be completed by the end of 2019 -	Moodle platform proved to be limiting for hosting. Events Calendar and Resource Catalogue now separated. Using WMO VLab/EUMETSAT calendar database, now operational since November,

		2017. WIS integration still to be considered, data export volunteer needed.
09 (b) Recommend to EC-68 that all institutions providing events for the WMO Global Campus calendar follow the metadata requirements outlined in this document	Too early for EC-68, consider for EC-69 in 2017 or 2018 if need to socialise with the ETR community	Metadata requirements are now standardized for the calendar. View and check off required.
09 (c) Recommend to EC-68 that all institutions offering learning events to the calendar agree to a disclaimer that would allow the event entry to be modified or removed by the WMO Education and Training Office following consultation with the offering institution.	Too early for EC-68, consider for EC in 2017 or 2018 if need to socialise with the ETR community	Not considered required for Calendar because institutions must be approved, still to be considered for catalogue processes once ready for implementation. Need to clarify if this requires an EC decision.
10 (b) (Aviation) ASSIST with the compilation of all the offerings.	Ongoing	Will now proceed with calendar in place, and catalogue foreseen for 2018
10 (c) (Aviation) IDENTIFY potential new partners or options for increasing support.	Ongoing	Ongoing, Singapore is one example of new partner.
10 (d) (Aviation) Offer RECOMMENDATIONS for future progress	Ongoing	Ongoing
11 (a) Recommend additional steps forward for accomplishment of goals in this Global Campus Demonstration activity;	Need to focus on the three key demo projects from Cg-17. Additional activities possible with additional resources but focus must remain on the three priorities	Focus on three key demon projects continues, additional items include a (voluntary) common credentialing system (Open Badges), cooperation and partnership models, translations, trainer resources and training. (more complete list to be developed)
11 (b) Suggest contributions for the catalogue of ETR resources and activities for Climate Services;	Ongoing	Ongoing now that calendar is in place and catalogue will be available in 2018
12 (a) Note that the WMO Global Campus feasibility work is further highlighting and raising the importance of quality assurance for education and training offerings	Agreed that ETR Office is to promote in community and in EC side event	All contributors to the Calendar and Catalogue will have to review quality guidelines and sign off on them. Catalogue items may be reviewed for quality and fit.
12 (d) Recommend to EC-68 that institutions offering learning events to the WMO Global Campus are able to show and share the Quality Assurance items recommended in this paper	To be considered for EC-69 in 2017 or EC in 2018 if need to consult with community and socialise the outcomes	All contributors to the Calendar and Catalogue will have to review quality guidelines and sign off on them. Catalogue items may be reviewed for quality and fit.
12 (e) Further progress work on Quality Assurance either via the Panel's proposed WMO Global	Further development on quality assurance process and including considerations for the establishment and functioning of	Quality assurance for the Events Calendar is addressed by including a checkoff of review of quality guidelines to

Campus Working Group or via a separate Team that would coordinate with the WMO Global Campus Working Group	an editorial board mechanism	Register as a New Contributor. For resources, this checkoff will be done for each submission.
13 (a) REVIEW activities and ENCOURAGE Members to consider what further collaborative efforts and resources can assist the WMO Global Campus feasibility study	Ongoing	The new portal, WMOLearn, highlights collaborative projects. New collaborative projects have been supported by the ETR Office. New collaboration guidelines will be an effort COCOM and thereafter the Global Campus Working Group.
13 (b) RECOMMEND that and EC Panel Working Group consider further credit transfer and how to encourage increasing OER	To be further considered	1) An Erasmus+ proposal was revised for submission in 2018, for developing a blended learning BIP-M with a distributed option for the online portion. 2) Encouraging use of open educational resources will be a parallel effort with the introduction of the WMOLearn Resource Catalogue.
14 (a) Note progress in the implementation of fellowships programme.;	Recommend to EC that the Panel undertake impact evaluation with ToRs. Didier, David F and Stella to form nucleus of working group. Interim report to EC -69 in 2017	Fellowships Impacts Evaluation is complete and report to be distributed.
14 (b) Make suggestions on resource mobilization opportunities;	Ongoing	Ongoing
14 (c) Make suggestions on additional placement options;	Ongoing	Ongoing
14 (d) Make suggestions on how to keep former fellows together as Alumni of WMO Fellowships	To be part of the Review	See report
15 (a) Nominate Panel members as contact points with the various Commissions and other bodies to enhance liaison between the Panel and the various bodies;	WMO President to write to PRA / PTC requesting them to bring to the January 2017 PRA / PTC meeting their views on emerging needs in ETR in their areas. D/ETR to draft letter for Chair by early May	Some training needs were discussed at 2017 and 2018 PRA/PTC. ETCOM actions include gathering training needs from technical programmes. See Doc. 9.1 Also: 2017 PRA Meeting Report 2017 PRA-PTC Conclusions and Recommendations 2017 PTC Meeting Report
16 (a) Comment upon the statuses of specific frameworks, and the progress in competency framework implementation in general, providing any recommendations for improvements in their development and implementation	Done	Aeronautical Personnel competencies updated, revised PWS competencies in review, Guide on Competency published. See Doc. 10.

16 (b) Review the draft outline of the requested Guide on Competency Frameworks for Personnel and approve or suggest additional content to be covered	Started, small steering committee, Chris, Enric, Jennifer and Claudia, Bob and Andrea Henderson to assist ETRO with this	Review input received and included in the final draft. Published in Jan 2018 as WMO-No.1205.
16 (c) Make a recommendation on whether the enabling skills frameworks in development, as well as future additions, should be included in the Guide, and following approval by the relevant technical commission or oversight body, other WMO guidance material.	Agreed but keep small	"Skills and Knowledge" frameworks will be included in the compendium of competency frameworks. Satellite Skills and Knowledge is complete, Radar and NWP are fully drafted with ETR input and under review by CBS.
17 (a) Consider whether WMO-No.1083 should be reviewed;	Agreed, technical / editorial update only. Draft to be presented to EC-68	Technical revision agreed by EC and published. New discussion on substantive review to be discussed in Panel 28. (Doc 11.2)
17 (b) Make recommendations to the Executive Council on a technical update to the RTC section of Vol 1 of WMO-No.49;	Agreed	Technical revision agreed by EC and published. (Resolution 8, EC-68)
18 (a) Recommend to EC-68 whether to hold SYMET-13 in 2017	Steering committee put together to develop the business case to be presented to EC-68	Business case made, EC approved, SYMET held in Oct 2017
18 (b) Recommend a theme and overall outcomes for SYMET-13	Established steering committee for preparation of SYMET, subject to EC decision	Done
18 (c) Recommend TOR for an international organizing committee for SYMET-13	Discussed if 18 a agreed	Done
19 (a) Provide feedback on the draft RTC Directors' Guide with emphasis on the extent to which It satisfies its intended purpose in terms of scope and content.	Done and support group identified. Aiming for publication in Sept 2016	Published as WMO-No. 1169 in 2017.
19 (b) Recommend to EC to endorse, subject to any further review, the draft for publication in English, French, Russian and Spanish.	Agreed, prepare and publish it for Sept. And brought to the attention of EC for approval	Published in English only so far due to budget constraints
19 (c) Identify two or three Panel members to work with the ETR Office and author for final review.	Agreed	Done
19 (d) Request the ETR Office to proceed with publication subject to the agreement of the Panel Chair following advice from the small working group.	Agreed	Done

Annex 4: List of Relevant Congress and EC Resolutions and Decisions

2014	EC-66	Resolution 14	Guidance for ETRP for 2016-2019
	EC-66	Resolution 15	EC Criteria for RTCs
	EC-66	Resolution 16	Feasibility Study for Establishing a WMO Global Campus
	EC-66	Resolution 17	ToR of EC Panel of Experts on ETR
	EC-66	Resolution 18	Status of RTC in Israel
	EC-66	Resolution 19	Status of RTC in Italy
	EC-66	Resolution 20	EC Criteria for the Award of WMO Fellowships
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2015	Cg-17	Resolution 51	ETRP
	Cg-17	Resolution 52	Status of RTCs
	Cg-17	Resolution 53	WMO Global Campus Feasibility Study
	EC-67	Members of EC Panel of Experts on ETR	Approval of Members of EC Panel of Experts in ETR
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2016	EC-68	Resolution 8	EC Criteria for RTCs
	EC-68	Resolution 9	Update of the ToR of EC Panel of Experts on ETR
	EC-68	Decision 63	Capacity Development priorities (2016-2019)
	EC-68	Decision 64	Reconfirmation of RTC in Italy
	EC-68	Decision 65	Extension of the WMO Information System metadata profile for education and training
	EC-68	Decision 66	SYMET
	EC-68	Decision 67	Impact Evaluation of the WMO Fellowship Programme
<hr/>			
2017	EC-69	Decision 54	Identification of Priorities for ETR
	EC-69	Decision 55	Enhancing Bilateral and Multilateral Assistance to Support ETRP Initiatives
	EC-69	Decision 56	Status of RTCs
	EC-69	Decision 57	Criteria on Award of Fellowships and Training Sponsorships
	EC-69	Decision 58	WMO Voluntreers

Annex 5: Draft Resolutions and Decisions for EC-70 (as of 4 May 2018)

AGENDA ITEM 11: CAPACITY DEVELOPMENT

AGENDA ITEM 11.1: EDUCATION AND TRAINING

Education and Training

DRAFT RESOLUTIONS

Draft Resolution 11.1/1 (EC-70)

RESOLUTION TITLE

THE EXECUTIVE COUNCIL,

Recalling Resolutions 51 (Cg-17) on guiding principles for the Education and Training Programme; and Resolution 52 (Cg-17), Resolution 8 (EC-68), Decision 64 (EC-68) and Decision 56 (EC-69);

Taking note of the request of the Permanent Representative (PR) of Spain on designation of the “Agencia Estatal de Meteorología” (AEMET) of Spain as a WMO RTC in Spain;

Having considered the recommendations of the EC Panel of Experts on Education and Training to designate AEMET as a Regional Training Centre (See [EC-70-INF11-1](#));

Taking also note of the request of PR of Argentina on the designation of the “Facultad de Ingeniería y Ciencias Hídricas” (FICH) of the “Universidad Nacional del Litoral” (UNL) of Argentina as a component of the WMO RTC in Argentina; and that of PR of Peru on the designation of the “Servicio Nacional de Meteorología e Hidrología” (SENAMHI) of Peru as a component of the WMO RTCs in Peru;

Having also considered the recommendations of the President of Regional Association III, and the EC Panel of Experts on Education and Training;

Decides to;

- (1) Designate the “Agencia Estatal de Meteorología” (AEMET) of Spain as a WMO RTC in Spain;
- (2) Designate the “Facultad de Ingeniería y Ciencias Hídricas” (FICH) of the “Universidad Nacional del Litoral” (UNL) of Argentina as the third component of the WMO RTC in Argentina;
- (3) Designate the “Servicio Nacional de Meteorología e Hidrología” (SENAMHI) of Peru as the second component of the WMO RTCs in Peru;

- (4) Reconfirm the WMO RTC in Algeria based on the recommendation made by the EC Panel of Experts on Education and Training;
- (5) Extend the reconfirmation of the WMO RTCs in Indonesia, Israel, Italy, Kenya, Madagascar, Nigeria, Peru, Philippines, Russian Federation, South Africa, and Turkey as RTCs until subsequent EC decisions following the conclusions of ongoing or next external reviews by the EC Panel of Experts on Education and Training.

Annex to draft Resolution 11.1/1 (EC-70)

RTC DESIGNATIONS AND RECONFIRMATIONS

1. Justifications

Designation of AEMET as a new WMO RTC

The request of the Permanent Representative (PR) of Spain requested the designation of the “Agencia Estatal de Meteorología” (AEMET) of Spain as a WMO RTC in Spain, was endorsed by Regional Association VI, Presidents of Regional Associations III and IV, Conference of Directors of Ibero-American Meteorological and Hydrological Services (CIMHET), and the EC Panel of Experts on Education and Training.

Designation of FICH as a new component of the WMO RTC in Argentina and Designation of SENAMHI as a new component of the WMO RTC in Peru

The requests were endorsed by the President of Regional Association III and the EC Panel of Experts on Education and Training.

Extension of Reconfirmations of RTCs

Resolution 52 (Cg-17) and Decision 64 (EC-68), which now requires extension to allow time for the completion of the next external reviews and subsequent EC decisions.

Draft Resolution 11.1/2 (EC-70)

REVIEW PLAN FOR THE BASIC INSTRUCTIONAL PACKAGE FOR METEOROLOGISTS (BIP-M) AND BASIC INSTRUCTIONAL PACKAGE FOR METEOROLOGICAL TECHNICIANS (BIP-MT)

THE EXECUTIVE COUNCIL,

Recalling Resolution 32 (CG-16) calling for a replacement of WMO-No.258, and subsequent publication of WMO-No.1083 in 2012;

Noting the recommendations from the 2017 Symposium on Education and Training (SYMET-13) and the recommendation of the EC Panel of Experts on Education and Training to begin a review process of the current BIP-M and BIP-MT (See [EC-70-INF11-1](#));

Decides to:

Request the Secretary General, working with the EC Panel on Education and Training, to review the Basic Instructional Package for Meteorologists (BIP-M) and Basic Instructional Package for Meteorological Technicians (BIP-MT), with particular attention to scientific advancements, skills required for identifying and communicating user impacts, utilization of upstream seamless data and products, management development, socio-economic and other relevant societal issues.

Annex to draft Resolution 11.1/2 (EC-70)

REVIEW PLAN FOR BIP-M AND BIP-MT

1. Justification

Needs for a Review Plan for BIP-M and BIP-MT

The BIP-M and BIP-MT were last revised in 2012 and presented in WMO-No.1083. The 2017 Symposium on Education and Training (SYMET-13) and EC Panel of Experts on Education and Training recommended a review of the document (See [EC-70-INF11-1](#)).

DRAFT DECISIONS

Draft Decision EC-70/11.1/1

The Executive Council decides to endorse the WMO Global Campus initiative for developing a coordinated and collaborative network of institutions that work together to meet the growing education and training needs of WMO Members, building upon the existing network of WMO Regional Training Centres (RTCs) and other WMO training partners.

Decision justification:

Given significant progress demonstrated by the feasibility study as reported in INF. 11.1/2, the strong endorsement of the 2017 Symposium on Education and Training (SYMET-13), and the recommendation of the EC Panel of Experts on Education and Training.

See [EC-70-INF11-1/1](#) for the Report of the 28th Meeting of the EC Panel of Experts on Education and Training.

See [EC-70-INF11-1/2](#) for the Status Report on the WMO Global Campus Feasibility Study, as well as the WMO Learn portal (<http://learn.wmo.int>).

Draft Decision EC-70/11.1/2

The Executive Council decides to recommend to Congress that the governance of capacity development including education and training is given adequate consideration in the context of the WMO reform process taking into consideration previous work and Terms of Reference of the EC Panels on Education and Training and Capacity Development.

In this regard, EC also requests the Secretary-General to strengthen the Organization's support to fellowships and continuing education and to capacity development overall, so as to provide a strong basis for strengthening the capacity of Members.

Decision justification:

The WMO Regional Associations have responded by noting a large number of capacity development priorities,. See also recommendations within [EC-70-INF11-1](#), the Report of the 28th Meeting of the EC Panel of Experts on Education and Training.

Annex 6: Revised Priorities for the WMO Education and Training Programme

(based on Decision 54, EC-69, Identification of Priorities for Education and Training)

1. Foster collaborations for enhancement of Education and training initiatives by:

- (a) Broadening of partnerships with other organizations and agencies, including public/private partnerships, for both Fellowships and continuing professional development;
- (b) Developing experience and competencies through exchange of human resources, sharing learning resources, and dissemination of good practices;
- (c) Demonstrating the value of meteorological services and the need for a well-trained workforce to gain the support of government decision makers;
- (d) Promoting Members' contributions to the WMO Global Campus initiative to further cooperation, collaboration and sharing.

2. Develop the workforce for the future by:

- (a) Embedding education and training as critical elements in the management and modernization of all NMHSs;
- (b) Promoting research and operational capacity through stronger connections to WMO technical programmes, and offering graduate level fellowships and personnel exchanges;
- (c) Continuing to place emphasis on the WMO Global Campus feasibility study as a mechanism to aid in meeting WMO priorities;
- (d) Including continuous professional development and enhancement of research and management capabilities among support priorities;
- (e) Providing support to developing and least developed countries and small island developing states;
- (f) Engaging in stronger outreach programmes to bring people into the profession.

3. Develop and implement the WMO competency frameworks aligned with science and technology developments by:

- a) Augmenting existing curricula, including learning outcomes, with advances in science, technology and operational practices;
- (b) Regularly updating frameworks and actions to address associated learning needs at national and regional levels;
- (c) Support the implementation of WMO competency frameworks, including competency assessment and training activities.

4. Mobilize resources for the enhancement of education, training and succession planning by:

- (a) Enhancing Fellowships opportunities through increase cooperation with development partners.;
- (b) Embedding education and training as critical elements in all extra-budgetary funded projects of WMO;
- (c) Enhancing the capacity of RTCs to deliver training in multiple formats and teaching modalities to meet the global community needs, including by engaging PRs to provide support.

Annex 7: Actions for the EC Panel of Experts on Education and Training

Note: The Panel recommends that the Education and Training office facilitate the following actions:

1. Panel to promote partnerships and collaboration within the Training, Academic and Professional Communities (inclusive of public and private sectors, universities, meteorological societies and academies of sciences)
2. Panel to promote the use of new technologies to support the development and delivery of training.
3. Panel to review and give input to the WMO Global Campus Road Map by 16 May, 2018.
4. Panel to promote the WMO Global Campus initiatives and Road Map to ensure their PRs and other regional contacts have full awareness prior to EC-70.
5. Panel to promote activities and opportunities provided by the WMO Global Campus, including the sharing of events and learning resources, as well as successful practices, through Global Campus mechanisms, and to promote existing and encourage new collaborative projects in education and training.
6. Panel to support the implementation of a WMO volunteer programme and experts pool.
7. Panel to nominate 2 to 3 members of the panel to assist with the review of the BIP-M
8. The Panel to encourage universities providing training in meteorology to use the BIP-M as a basis for their curricula, particular for those students who may enter service as aeronautical meteorologists, for which the BIP-M is a required qualification.
9. Panel to convene External Reviews of Regional Training Centres.
10. Panel to develop a position paper recommending the embedding of education and training as critical elements in all WMO capacity development projects.

Annex 8: List of Participants



GROUP PHOTOGRAPH OF WMO EC PANEL OF EXPERTS MEETING ON EDUCATION AND TRAINING
17TH- 19TH APRIL 2018 AT IMTR-WMO/RTC- NAIROBI KENYA

EC Panel Members	
<p>Dr Agnes L. KIJAZI (Ms) Permanent Representative of the United Republic of Tanzania with WMO Tanzania</p>	<p>Chairperson (Representing the President of WMO)</p>
<p>Dr Enric AGUILAR ANFRONS Professor, Center for Climate Change (C3), Geography Department, Universitat Rovira i Virgili, Tarragona Spain</p>	<p>EC Panel Member</p>
<p>Ms Stella AURA Deputy Director Education, Training Research and Development/Principal-IMTR, Kenya Meteorological Department Kenya</p>	<p>EC Panel Member</p>

<p>Ms Claudia CAMPETELLA Departamento de Ciencias de la Atmósfera y los Océanos, Ciudad Autónoma de Buenos Aires Argentina</p>	<p>EC Panel Member</p>
<p>Zhanghang Dong China</p>	<p>EC Panel Member (Absent)</p>
<p>Dr David FARRELL Caribbean Institute for Meteorology and Hydrology, Bridgetown Barbados</p>	<p>EC Panel Member</p>
<p>Dr Richard JEFFRIES University Corporation for Atmospheric Research, Boulder USA</p>	<p>EC Panel Member (Attended online remotely)</p>
<p>Ms Winifred JORDAAN Manager, Meteorological Training Centre, Meteorological Training Institute, South African Weather Service, Pretoria South Africa</p>	<p>EC Panel Member</p>
<p>Mr Zhiyu Liu China</p>	<p>EC Panel Member (Absent)</p>
<p>Dr Maria MAMAEVA Deputy Director, State Hydrological Institute, Roshydromet, St. Petersburg, Vasilyevsky Island, Russian Federation</p>	<p>EC Panel Member</p>
<p>Ms Jennifer MILTON Director, Training and Career Development Division, Meteorological Service of Canada Canada</p>	<p>EC Panel Member</p>

Mr Didier REBOUX Ecole nationale de la météorologie (ENM), Toulouse France	EC Panel Member
Mr Christopher WEBSTER Meteorological Service of New Zealand Limited, Wellington New Zealand	EC Panel Member (Absent)
Invited Experts	
Prof Christophe CUDENNEC Secretary General, IAHS-AISH, International Association of Hydrological Sciences, Rennes Cedex France	Invited Expert for Hydrology
Dr Elizabeth PAGE Director, The COMET Program, University Corporation for Atmospheric Research, Boulder, CO USA	Invited Expert
Dr Robert William RIDDAWAY Bracknell, Reading UK	Invited Expert
Ms Meihua WANG Deputy Director General, China Meteorological Administration, Training Centre, Beijing China	Invited Expert
Observers	
Mr Peter AMBENJE Permanent Representative of Kenya with WMO, Kenya Meteorological Department Kenya	Observer

<p>Mrs Scholastica MALOBA Institute for Meteorological Training and Research, WMO Regional Training Centre, Nairobi, Kenya Meteorological Department Kenya</p>	<p>Observer</p>
<p>Mr David NJIRU Institute for Meteorological Training and Research, WMO Regional Training Centre, Nairobi, Kenya Meteorological Department, Nairobi Kenya</p>	<p>Observer</p>
<p>WMO Secretariat</p>	
<p>Dr Yinka ADEBAYO Director, Education and Training Office, Geneva Switzerland</p>	<p>WMO Secretariat</p>
<p>Mr Mark MAJODINA Director, WMO Office for Eastern and Southern Africa, Nairobi Kenya</p>	<p>WMO Secretariat</p>
<p>Mr William NYAKWADA WMO Office for Eastern and Southern Africa, Nairobi Kenya</p>	<p>WMO Secretariat</p>
<p>Dr Patrick PARRISH Chief, Training Activities Division, Education and Training Office, Geneva Switzerland</p>	<p>WMO Secretariat</p>

Annex 9: Compilation of Preparatory Documents

Preparatory Documents for the Twenty-eighth Session of the EC Panel of Experts on Education and Training

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1. Opening and organization of the session

Under this Agenda Item, the Chairman will draw the attention of meeting to the information note circulated by the host country, with a view of ensuring that all participants are well orientated to situations in and around the meeting venue. D/ETR and a representative of the host country may give supplementary information. The Chairman will proceed to explain the rationale behind the organization of the agenda and make comment on what is expected at the end of the Session. Comments will be invited on the agenda and the Chairman will decide on adoption after reviewing all comments. Clarification will be made on the working hours during the three days schedule. The Panel may wish to decide on the format of the report to be prepared by the Secretariat.

Tuesday, 17 April

AM	Agenda Item 1 : Opening and Organization of the Session Agenda Item 2 : Discussions on Education and Training Programme
PM	Agenda Item 3 : WMO Global Campus

Wednesday, 18 April

AM	Agenda Item 4 : Overall Support to Capacity Development in WMO
PM	Agenda Item 5 : Review of Basic Instructional Packages and WMO Competency Frameworks

Thursday, 19 April

AM	Agenda Item 6 : WMO Fellowship Programme, Training Activities and Regional Training Centres
PM	Agenda Item 7 : Review of Actions, Briefing on Plan and Document for the Seventieth Session of the WMO Executive Council, and Closure of the Meeting

2. Discussions on Education and Training Programme

2.1 Status of Panel-27 Actions¹

Under this agenda item, action items from the last session of the Panel, status and any follow-up actions required will be discussed. Some issues are expected to arise which may be deferred for discussion under relevant, subsequent agenda items, during the Session. The status of the actions are contained in the summary of the table attached to this document.

¹ **Reference:**
[Status on Actions resulting from EC Panel 27](#)

2.2 Major Outcomes of Executive Council and Congress²

The Panel will consider the outcomes of Cg and EC in the context of programme activities since the last session of the Panel. The relevant aspects will be highlighted in preparation for future programme development. The attached table of Resolutions and Decisions with the actions taken and pending elucidates this agenda item.

2.3 Education and Training Programme Priorities ³

The 2017 WMO Education and Training survey on human resources requirements of NMHSs reveals a growing deficit in the capability and numbers of adequately educated and trained staff required to provide meteorological, climatological and hydrological services in many countries and territories. Recommendations from the Thirteenth WMO Symposium on Education and Training and the meeting of Directors of WMO Regional Training Centres also identified key issues that are pertinent to development of human resources in NMHSs. It is also important to note that the rapid advances in scientific innovation and technological developments require corresponding continuous training of NMHS personnel. Furthermore, the research capability of the current and future generations needs to be developed as a critical part of a robust training programme. Contemporary issues driving change within the wider education and training sector of society include various international and national initiatives and commitments to address global issues related to natural disasters and environmental including the Paris Agreement, the 2030 Agenda for Sustainable Development, the SIDS Accelerated Modality for Action (SAMOA) Pathway and the Sendai Framework for Disaster Risk Reduction. WMO needs to support NMHSs to provide the range of services required to address these issues through appropriate education and training programmes. These issues should be addressed through the ETRP by cooperating with the NMHSs of Member States in developing staff with the qualifications and competencies (knowledge, skills and behaviours) required by the WMO Technical Regulations to deliver the meteorological, hydrological and related services mandated by their Governments; this can also help the NMHSs meet their international obligations. The cooperation with Members to address these issues will also facilitate the process of reducing the gap that exists between developed and developing countries, particularly from education and training perspective.

Based on the above narrative, which guides the input to 2020 – 2023 programme narrative, and Decision 54 (EC-69), the Panel may wish to discuss how education and training will key into the WMO future programme priorities and ensuring activities.

² **References:**

[Table](#) of ETR Related EC and Congress Resolutions and Decisions (2104-2017)
[Compilation](#) of ETR Related EC and Congress Resolutions and Decisions (2014-2017)
[PowerPoint Presentation](#) of EC and Cg Decisions and Resolutions

³ **Reference:**

Decision 54 (EC-69) on "[Identification of Priorities for Education and Training](#)"

2.4 Outcomes of the Thirteenth WMO Symposium on Education and Training and Meeting of Directors of WMO Regional Training Centres⁴

The Thirteenth WMO Symposium on Education and Training (SYMET-13) was held from Monday, 30 October to 1 November 2017 followed by the meeting of the Directors of WMO Regional Training Centres (RTCs) on 2 November in Bridgetown, Barbados.

In line with its general goal which was to stimulate and facilitate the development of a vibrant and robust education and training capacity within the worldwide meteorological and hydrological community and to recommend possible new avenues for development, the Symposium focused on the Education and Training for Human Resource Development in Meteorological and Hydrological Services. SYMET-13 participants inter alia called for support and action at national, regional and global levels to support WMO and its National Meteorological and Hydrological Services develop and deliver improved services to the Member States by the provision of adequate facilities and resources for education and training in weather, water and climate related fields.

The one-day WMO RTC Directors Meeting, was designed to build upon the results of SYMET-13, consider the business of RTCs, development goals specific to the WMO RTC network, and other work and decisions for increasing the visibility and capacity of this network. Holding SYMET-13 back-to-back with this meeting also provided added advantage of increased input from a larger group more experts who are not Directors or Heads of Regional Training Centres.

More details are contained in the reference documents

2.5 Changing Organizational Context and Implications for Education and Training⁵

Under this agenda item we will discuss the proposed reform in WMO, which is expected to affect the structure of the Organization and consider ongoing changes as regards increasing emphasis on regionalization of programmes, particularly in the context of how it may affect the role and functions of the RTCs and other training partners. Issues such as the future role of the EC Panel on ETR and the EC WG on Capacity Development in future capacity development strategies, and eventually in the emerging structure will be considered. Programmatic matters such as training collaboration with the private sector and training of NMHSs on private sector issues, identification of new training approaches and products, and identification of key directions for ETRP in the context of all these developments should also be taken into consideration. The present edition of the WMO Strategic Plan could assist in the discussion.

⁴ Reference:

Outcomes of the SYMET-XIII and Meeting of Directors of WMO RTCs, Bridgetown, Barbados, 30 October-2 November 2017 ([Ar](#), [En](#), [Es](#), [Fr](#), [Ru](#), [Zh](#))
[An International Agenda](#) for Education and Training in Meteorology and Hydrology

⁵ Reference

DRAFT [Strategic Plan 2020-2023](#)
[WMO Reform](#)
[EC WG-SOP 2018-1 - Decisions & Recommendations FULL](#)

3. WMO Global Campus

3.1 WMO Global Campus Feasibility Study - Overview⁶

Following the EC Panel 27 decision to form a WMO Global Campus Working Group composed of members of the EC Panel of Experts on Education and Training, Panel 27 Action 08 (b) saw the Panel agree on the proposed future work plan for the feasibility study.

The WMO Global Campus Working Group, chaired by Dr David Farrell and Dr Rich Jeffries, has been meeting monthly over the past two years for planning and documenting progress on this work plan. They are supported by a technical task team, led by the WMO ETR Office, a task team on QA processes which combines the technical task team and some Panel members, and by Dr Enric Aguilar and Ms. Winifred Jordaan of the Working Group who are dedicated to addressing the priority areas in Climate Services and Aviation. Additional activities and task teams are under consideration.

The Working Group wishes to acknowledge the strong work and support contributed by many institutions that are making WMO Global Campus feasibility study possible. The Caribbean Institute of Meteorology and Hydrology has adapted and implemented the WMOLearn Events Calendar, as well as providing ongoing maintenance, which has been a substantial effort. EUMETSAT has graciously provided its newly revised learning events calendar system and offered much advice and coordination in the implementation. The technical task team also included representatives from VLab, the COMET Programme, and the Russian State Hydrometeorological University, as well as the Secretariat. Other groups have provided substantial input, including the Met Office, the COCOM committee, the CALMet community, EUMETSAT, EUMETCAL, the Meteorological Service of Canada, and many other WMO Members who have been providers, testers, users and reviewers.

The Working Group guides the activities of the feasibility study and has led the development of the WMO Global Campus Roadmap, which expands upon and replaces the previous work plan. The WMO Global Campus Roadmap is now in its final drafting stage and is available on the WMOLearn portal on the WMO public website. Updates will be made in the coming year as new activities are initiated or completed.

3.2 WMO Global Campus Contributions to Aeronautical Meteorology and Climate Services Training

Aeronautical Meteorology training

Early in the feasibility study, the task team led by Winifred Jordaan developed a table of BIP-M and BIP-MT education and training opportunities. The responses received from their call did not represent a comprehensive list, but did form a solid basis on moving forward.

Because the WMOLearn Events Calendar became fully live in September of 2017, it has been in use for aeronautical met training only a short time. Ms Jordaan has contacted community members to call their use of the calendar, and the CAeM also advertised the calendar in their most recent newsletter. SAWS has been the most active

⁶ **Reference:**

[WMO Global Campus Roadmap \(v.3\)](#)

contributor, but it is hoped that the events calendar will become a primary mechanism for advertising training for the community.

Because the WMO Learn Resources Catalogue is still in development, the CAeM AMP Competency Training Mapping Database made available on their Moodle site, <http://www.caem.wmo.int/moodle/course/view.php?id=7>, remains the most up-to-date source for training. When the catalogue is operation, one priority will be to migrate those training resources to it, given available human resources.

Climate Services training

Since EC-Panel 27, the Competencies for the provision of Climate Services (CCS) have been developed, approved by EC-68 and included in the WMO Technical Regulations, WMO-No49. A document providing guidance on Competency Assessment is expected to be available before EC-Panel 29. This document will help Members identify training gaps, especially in the approximately 70 NMHSs which are at the Basic Capacity Level, according to GFCS. They are spread over all RAs, but Africa, Central and South America and SE Asia are the primary targets.

In this regard, the WMO Global Campus should enhance access to Climate Services E&T by:

1. **Encouraging new institutions to engage in the Global Campus initiative.**
There are many institutions which offer specific training in Climate Services, including RTCs, national training centers, and international organizations.
2. **Supporting and further developing successful ideas by adapting them or replicating them in different languages,** such as the Climate Services Tool Kit, the Météo France Course on Climate Services or the CCI workshops, which have trained large numbers of NMHSs
3. **Useiing the WMO Global Campus to promote and disseminate training approaches which can multiply the effect of training.** In addition to blended-learning and distance learning, use of the expected WMO Learn Resource Catalogue to make course materials from different events would be of enormous help. It can especially aid in the compilation of training resources in local languages and, specially, in WMO languages.
4. **Implementation of a Global Campus activities to help with competency management (e.g. tracking for QMS purposes) and for the recognition of education and training achievements.** This can take the form of a badging system or predesigned learning paths resulting in transcripts with equivalences to a credits system (e.g. ECTS)
5. As ETR needs in the field of Climate Services are maturing, **the WMO community and more specifically those universities attached to RTCs should network to foster and monitor the creation of higher education programs** adapted to WMO Competencies for the Provision of Climate Services and following the BIP-CS, whenever it becomes available.
6. Noting that human and economic resources specifically dedicated to the Global Campus initiative are very limited, **the quest for human and economic resources should be part of the Global Campus activities for Climate Services.**

3.3 WMO Global Campus Tools and WMO Learn

2017 saw the implementation of the WMO Learn portal to host WMO Global Campus information and to point to external tools and resources, where appropriate. This portal resides on the WMO public website at <http://learn.wmo.int>.

- At mid-year, the WMO Learn Events Calendar, hosted by CIMH, was made operational, and was further refined into 2018. This Calendar shares the same database structure and API as the EUMETSAT VLab calendar, which allows the two databases to automatically share confirmed events. This calendar is currently being promoted to RTCs and others to ensure a wide collection of upcoming events.
- The WMO Learn Resource Catalogue is currently planned as an addition to the WMO E-Library (<https://library.wmo.int/>). Joining with this platform looks like a very promising option, with its links already in place to all WMO guidance material, and also its use of standard metadata schema with import, export, and harvesting capabilities for existing resources. Costing and procedures, including submission standards and human resources requirements, are being discussed by the ETR Office and the WMO Librarian and Procurements office, with external advice from Technical Task Team members and PMD, the service provider of the system.
- Climate Services and Aeronautical Meteorology training events and learning resources, as priority areas, are being actively sought for inclusion in the Events Calendar and, eventually, the Catalogue.
- Quality assurance processes are in place for the Events Calendar, and draft processes have been documented for the Catalogue.
- A variety of promotional materials have been proposed, including articles for WMO publications, a brochure or flyer, and announcements via widely disseminated letters.
- A mechanism for using open digital badges as a consistent method to recognize achievement of education and training in qualification and competency areas is being explored.
- Other mechanisms for promoting collaboration and sharing and best practices in education and training innovations are under discussion, include publications and a database of experts.

3.4 WMO Global Campus and University Input to WMO Education and Training Programme⁷

Contributions of universities to WMO education and training activities have been extensive and key to the implementation of activities associated with priority areas of the Organization. Generally, university based experts play various important roles in the development and delivery of continuing education training needs. Nonetheless, quite a

⁷References:

[Meteorological training for the digital age: A Blueprint for a new curriculum \(SHORT\)](#)
[Meteorological training for the digital age: A Blueprint for a new curriculum \(LONG\)](#)
[Basic Instruction Packages via a Distributed Learning Network](#)
[Regarding a shared Online BIP- M Curriculum](#)
[EUMETLearn ERASMUS+ Project Proposal](#)

number of WMO Regional Training Centres do not have close-enough working relationship with universities.

With the increasingly changing socio-economic and technological challenges, and the need for meteorological and hydrological services to keep up with these developments, it is important to ensure that there is closer synergy between all facets of training institutions for meteorological and hydrological services experts in Member countries. Universities being at the cutting edge of tertiary teaching and research, as part of their fundamental preoccupation, have inalienable role to play in the development of human resources in meteorological and hydrological services through formal education. The challenge of integrating research and training in meteorology and hydrology is even much higher in least developed and developing countries than it is in the developed countries.

This agenda item will focus on university collaborations, changing roles in higher education, cooperation between training institutions on one hand, as well as between training institutions and WMO on the other. The Panel is therefore requested to look into how to bring universities closer into the into fold of WMO training activities, particularly with respect to operational training, climate services, human resource development, and other WMO priority areas.

4. Overall Support to Capacity Development in WMO

4.1 Overview of Training Needs in WMO Priority Areas⁸

WMO is working more actively on optimum use of resources, by way of minimizing duplication, and also ensuring the best use of its training infrastructure. The Panel will review information gathered from the Technical Departments on their training priorities with a view of advising on the best possible approach to delivery of these training activities. Education and training priorities and strategies for climate services, marine meteorology, DRR and MHEWS, impacts-based forecasting and warnings, global data processing and forecasting system, WIGOS implementation, PWS, agrometeorological services, atmospheric composition and air quality, integrated urban weather and climate services. ETRP response is expected to include viable options for RTC involvement and development of training resources.

Discussion and recommendation will focus on how to integrate priorities of technical programmes into education and training activities of WMO RTCs and specialized centres

⁸ References:

[Inputs on Training Plans and Needs from WMO Technical Departments](#)
[WMO Priority Areas and Example Course Topic Priorities 2018](#) (this has been submitted to RTCs for their information and feedback)
[2017 PRA Meeting Report](#)
[2017 PRA-PTC Conclusions and Recommendations](#)
[2017 PTC Meeting Report](#)
[SYMET Thematic Paper I: Service-specific education and training needs](#)
[WMO specialized regional centres \(all centres by region\)](#)
[2018-MISC-DRA-Willemstad-Declaration-Action Plan-2018-20_en.pdf](#)

(eg, RCC, RIC, WIGOS centres etc), involvement of other training providers, involvement of other training partners including universities, resource mobilization and how to ensure optimum coordination of these activities.

4.2 Training Needs for Hydrology and Water Resources

Hydrology and water resources do not feature strongly enough in many aspects of WMO activities. Yet issues relating to water resources are highly connected to socio-economic and development issues in many important ways. The training needs and the mechanisms of implementation in this area are clearly indicated in the [WMO Strategy on Capacity Building in Hydrology and Water Resources Management for the Period 2017-2020](#), adopted by CHy-15 via Resolution 9(CHy-15).

In addition, CHy-15 agreed on the way forward of its three main initiatives to support the operations of NHMSs:

- a) The Global Hydrometry Support facility (HydroHub)
- b) The WMO Flood Forecasting Initiative (FFI)
- c) The Global Hydrological Status and Outlook System (HydroSos)

ETR support for HydroHub will consist mostly of training in traditional hydrometry and data management subjects, the main emerging field being web-services based hydrological data exchange.

As regards FFI, its main component and associated projects, such as the FFGS, CIFDP, APFM, IDMP, SWFDP, all have developed their own training curricula and efforts are being made to identify suitable RTCs to host and eventually take over the continuous training on behalf of the projects.

The ETR support needed by HydroSos is currently under discussion, as this initiative has started its planning and pilot implementation in the second half of 2017. However, some emerging education and training needs are already becoming clear, such as linking global hydrological models with climate projections, quantifying seasonal hydrological predictions for decision-making, assessing the interaction between the cryosphere and the hydrosphere, and its socioeconomic and environmental impacts.

4.3 Integrating Management Development into Education and Training Programme⁹

As we are all aware, National Meteorological and Hydrological Services (NMHSs) need to remain effective in a complex and rapidly changing environment. Indeed, NMHSs need to ensure that full use is made of the organization's scientific and technical capabilities. To

⁹ Reference:

[DRAFT A Compendium of Topics on Management Development for NMHSs](#)

[Decision 55 \(EC-69\)](#) on "Enhancing Bilateral and Multilateral Assistance from Members to Support WMO Education and Training Activities"

[Decision 58 \(EC-69\)](#) on "WMO Volunteers"

[AMS Volunteering Committee](#): Early discussions on a national and international volunteering programme

be successful, NMHSs require managers who can direct the organization's activities and personnel, whilst providing leadership that inspires others to fulfil their potential and meet their personal goals and those of the organization. Considering the increasing attention of WMO to this issue, it is proposed that the Panel discuss issues such as how to integrate management development into the activities of RTCs and other training institutions to meet needs of developing NMHSs, development of management training curricula and integrate same into RTC offerings, promotion of management related activities and reflect on how to integrate management issue into a revised BIP and advise on how to promote the development of relevant training resources. An example of a management training resource developed by WMO is attached. The Panel may also wish to allow contribution to this issue by a representative of the US/NWS Leadership Academy and an experienced trainer in a developed meteorological service. This agenda item is aimed at seeking the guidance of the Panel on training aspects of management development.

4.4 WMO Volunteers Programme and Contributions to Capacity Development

Considerable amount of work is delivered by volunteers for WMO as experts in various fields. However not many of those volunteers are engaged full time for a reasonable length of time to assist either as mentors or in resolving specific technical issues. In addition to the existing regular faculty staffing RTCs, there is a need to seek cooperation across Members to augment the number of instructors, lecturers and researchers through international exchange of human resources. Such exchange will not only boost the existing capacity numerically, but it will also enhance cross-fertilization of expertise, competencies and international cooperation.

The Panel is invited to brainstorm on the WMO "volunteer programme", especially as regards how the programme could be used to assist in the delivery of education and training activities, with ETR playing a key role in a clearing house mechanism for the benefit of capacity development initiatives through RTCs and other training partners. Decision 55 (EC-69) on "Enhancing bilateral and multilateral assistance from Members to support WMO education and training initiatives" and Decision 58 (EC-69) on "WMO volunteers" which provide legislative basis for this initiative, could also provide a useful guide for aspects of the discussion.

4.5 Cooperation with Meteorological Societies and Academies of Sciences

There are several academy of sciences worldwide dealing with wide ranging scientific, social and technological issues from various perspectives. Given the fact that the core of the issues and activities of these academies dwell on the cutting edge of science, technology and application, it is important to work more closely with them from the perspectives of education and training in meteorology, hydrology and related disciplines.

Examples of societies WMO works with in the area of education and training are the African Academy of Sciences (AAS), American Meteorological Society (AMS), Chinese Academy of Science (CAS), European Meteorological Society (EMS), Russian Geographical Society (RGS) and The World Academy of Sciences (TWAS). Even though some activities are ongoing with these entities, there is still some work to be done in order to establish a good basis for effective and mutually beneficial relationship with

respect to WMO education and training activities. The Panel is invited to brainstorm on this issue with a view of making recommendations on the way forward.

(**weblinks** to official sites and AAS, AMS, CAS, EMS, RGS and TWAS)

<http://aasciences.ac.ke/> <https://www.ametsoc.org/ams/> <http://english.cas.cn/>

<http://www.emetsoc.org/> <https://www.rgo.ru/en> <https://twas.org/>

5. Review of Basic Instructional Packages and WMO Competency Frameworks

5.1 Update on Status of WMO Competency Frameworks

Guide to Competency: The Guide to Competency was published in early February, 2018. It provides guidance on competency framework development and competency implementation, including competency assessment, competency-based training, and competency management. See WMO-No.1205 at https://library.wmo.int/opac/doc_num.php?explnum_id=4237. A second publication, Compendium of WMO Competency Frameworks is planned for later this year, and will contain all developed levels of each competency framework. Lack of complete consistency between the frameworks is of concern to the publications department, and this is under discussion.

Aeronautical meteorological personnel (2 frameworks, Forecasters and Observers): The framework continues active implementation. Competency assessment of staff is reported as completed by 50% of Members, and nearly 70% have established national competency programmes for aeronautical personnel. Competency based training is offered both through courses at RTCs and other major centers, and online resources are mapped to the frameworks under Topic 2 at <http://www.caem.wmo.int/moodle/course/view.php?id=7>. This mapping appears to be kept up to date. It is still inconsistent, but improving, whether training offered is documented as meeting specific competencies. Published on the CAEM Moodle site.

Education and Training Providers: The WMO Online Course for Trainers continues to be offered each year, and this single course addresses about 90% of the competency framework. The small gaps are treated lightly in WMO-No. 1114 and WMO-No.1169. The course has been delivered to more than 150 students in 4 languages (English, Spanish, French, and Russian) who have successfully completed the course as a Trainer, Part-Time Trainer, or Training Manager (different sets of competencies are covered by each). 45 new students have enrolled in the 2018 course for Francophones. All resources are gathered in the WMO Trainer Resources Portal, organized by competency, at <http://etrp.wmo.int/moodle/course/view.php?id=30>. French, Spanish, and Russian portals are in progress. Published on the ETR Programme Website.

WIS: WIS competencies are all included in the 2017 release of the WIS manual Section 1.8 and in appendix E. (<https://wiswiki.wmo.int/ManualWIS>) Training guides are in the Guide to WIS Section 1.8 and Appendix A. (<https://wiswiki.wmo.int/GuideWIS>) The WIS office now needs GISCs and RTCs to commit to addressing the competencies in their Training Programmes. So far RA II-17 and RA VI -17 have added training schedules from

GISCs addressing this. In particular, they are looking for a West Africa center to offer training that addressed the competencies.

Climate Services: A new publication, Guidelines for the Assessment of Competencies for the Provision of Climate Services, is completed and expected to stimulate more rigorous implementation. This publication for the first time contains all 3 levels of the 5 competencies, including Performance Criteria and Learning Outcomes, to guide both assessment and training. Implementation in terms of training provision is already underway.

Marine Forecasters: This framework has been developed to 2 levels, and implementation is expected to begin this year in terms of assessment guidance and use in developing new and identifying existing training.

Public Weather Services: (4 frameworks, General Forecaster, Broadcasters, Weather Advisors to DRR and Others, Developers of New Products and Services) These frameworks have undergone significant revision since EC approval, distilled from 5 to 4 frameworks and will have rewritten performance criteria (2nd level) to be internally consistent and in line with new guidance (WMO-No. 1205). The revised frameworks will be sent to CBS for approval in March, and implementation will follow.

Observations (4 frameworks, Observers, Maintenance, Observing Network Managers, Calibration): These frameworks have been drafted to 2 levels, revised to a small extent during the past year, and will be presented to CBS management group for approval in March. They have not yet been implemented in terms of assessment or training guidance.

Hydrologists (# frameworks TBD): Several frameworks are intended to be developed starting this year, in conjunction with the revision of the Basic Instructional Packages for Hydrology. The goal for the first set of competencies is late 2019 or early 2020.

Skills and Knowledge Frameworks: (Satellite, NWP, Radar) The Guidelines on Satellite Skills and Knowledge for Operational Meteorologists framework has been published since and available on the WMO Online Library site, available in six languages. It is actively promoted to guide training through VLab and also by the ETR Office. The NWP and Radar frameworks have been through several revisions, including by the ETR Office, and was handed over to WDS in 3rd Quarter 2017 for provision to an expert team of CBS for review and submission for approval. This review is ongoing.

Table on Competency Framework status

Competency Framework audience (and oversight body)	Status, or date it came into force	Guidance material and Implementation Notes
Aeronautical Meteorological forecasters (CAEM)	1 Dec 2013	<p>Note: All competency frameworks are expected to be incorporated in the Compendium of WMO Competency Frameworks.</p> <p>To be incorporated into WMO-No. 732. Implementation is underway for both training and competency assessment</p>

Aeronautical Meteorological Observers (CAEM)	1 Dec 2013	To be incorporated into WMO-No. 732. Implementation is underway for both training and competency assessment
Marine Weather Forecasters (JCOMM)	Approved by CG-17 for implementation January 2016	Guidance material to be developed. Second level being implemented. To be hosted on the JCOMM website. Exploring implementation actions through the establishment of its new regional centers, including competency assessment of personnel, and incorporation into planned training on observations and wave forecasting.
Training Providers (EC Panel of Experts on ETR)	Approved by EC-65. Implementation date 1 July 2014.	Guidance within WMO-No. 1114. Being implemented through WMO Courses for Trainers and revised RTC criteria. Additional guidance in WMO-No. 1169.
WIS ICT personnel (CBS)	Approved by CG-17 for implementation after 1 July 2015	WIS competencies are all included in the 2017 release of the WIS manual Section 1.8 and in appendix E. https://wiswiki.wmo.int/ManualWIS Training guides are in the Guide to WIS Section 1.8 and Appendix A. https://wiswiki.wmo.int/GuideWIS Need GISCs and RTCs to commit to addressing the competencies in their Training Programmes. RA II-17 and RA VI-17 have added training schedules from GISCs addressing this.
Climate Services personnel (CCI)	Approved by EC-68 for implementation in 2017.	Competency framework implementation underway with recent draft of the Guidelines for the Assessment of Competencies for the Provision of Climate Services.
Public Weather Forecasters (CBS)	Approved by CBS and Cg-17 but a revision will go to EC-70 and WMO-No.49. For implementation in 2018.	CBS is expected to approve a substantial revision in 2 nd quarter, 2018. CBS will begin providing guidelines for competency assessment of personnel, operational implementation guidelines, and training guidelines.
Tropical Cyclone Programmes (RSMCs and RAs)	Approved by Regional Associations (not all in place)	The competency frameworks are being developed by region, and in some cases, sub-region. Many already are being used to guide training events and operations. The intent is still to look for common competencies to be included in the WMO Technical Regulations
Observing (CIMO)	Draft to be submitted to CBS	To be included in the planned revision of the CIMO Guide, in development. Moving toward approval by CIMO Management

		Group and approval by EC.
Calibration (CIMO)	Draft to be submitted to CBS	""
Maintenance (CIMO)	Draft to be submitted to CBS	""
Observing Programme and Network Management	Draft to be submitted to CBS	""

5.2 Basic Instructional Packages (BIP-M, MT WMO No 1083) next Update

The purpose of the BIP-M qualification frameworks is to facilitate a common understanding of the basic qualifications required of individuals who are to be recognized either as Meteorologists or as Meteorological Technicians, as defined by WMO, while assisting NMHSs in establishing their respective personnel classification systems and training programmes to satisfactorily meet international standards. The first sections of Part I of the present WMO-No. 1083 edition presents an overview of the WMO classification of personnel in meteorology. The second Part starts with an outline of the aims of the BIP-M, then specifies the learning outcomes associated with foundation topics. The last Part starts with an outline of the aims of the BIP-MT and then specifies the learning outcomes associated with foundation topics.

The purpose of this agenda item is to discussion of the general purpose and strategy for BIPs, and whether the changing role of forecasters needs to be considered in the next editions of the BIP-M and MT. It is important to ensure that the next edition take into account changing forecaster roles, and consider whether to factor in management training, knowledge of socio-economic benefits and working with the private sector. The Panel also needs to consider a plan for review and revision

5.3 Basic Instructional Package – Hydrology (BIP-H)

The latest editions of the BIP-H and BIP-HT were published in 2003 (WMO-No.258, Volume II: Hydrology). Given the many changes in related professions, CHy has established a Task Team to review the Basic Instruction Package for Hydrologists (BIP-H) and Basic Instruction Package for Hydrological Technicians (BIP-HT) and develop competencies standards for a few core job tasks in critical areas. The Task team initially was to be a joint one with UNESCO only, but in the course of its first meeting in 2015 it was agreed that the final output of the work of the Task Team would be a joint WMO/UNESCO/IAHS/IAHR publication on internationally agreed competency standards for hydrologists.

This wider composition of the Task Team, while ensuring greater recognition of its outcomes by the hydrological community, has complicated slightly its coordination. However, work has now reinitiated and currently first drafts of the BIP-H and BIP-HT are being prepared, the objective being that of having them approved by the different constituent bodies of the 4 partner organizations in late 2019-early 2020.

Note:

IAHS = International Association of Hydrological Sciences

IAHR = International Association for Hydro-Environment Engineering and Research

5.4 Basic Instructional Package Climate Services (BIP-CS)¹⁰

During the drafting process of the Guidelines for the Assessment of Competencies for Provision of Climate Services, learning outcomes have been written for each of the competency units and performance criteria. With this task nearly completed, the stage is now set for the development of a Basic Instructional Package for Climate Services. This is likely to be proposed as a next task of the ET on Human Resources Development of the CCI Focus Area on Capacity Development for Climate Service. Some clarification on how it would be used is required, because the competency framework itself is broad, covering many elements of climate services delivery and many jobs. Writing a BIP-CS in a way that is practical for a general qualification and a university curriculum must be considered.

6. WMO Fellowships Programme, Training Activities and Regional Training Centres

6.1 Fellowships Programme

Since the last Panel meeting in 2016, the following developments have occurred

- 1) Increased emphasis on operational training by using extra-budgetary fund to organize group training courses for instruments calibration and maintenance for 4 consecutive years from 2013-2016. In 2017 ran a group training on Urban meteorology with cooperation with University of Reading Malaysia campus.
- 2) Development of memoranda of understanding with new partners to supplement WMO regular fund, diversify opportunities and create more robust network of partners. Up to date, ETR updated or is updating MoUs with CSC (China Scholarship Council)
- 3) Improved internal coordination with technical departments through establishment of the Education and Training Committee (ETCOM)
- 4) Updating fellowship publications by updating the Manual on Policies and Procedures for WMO Fellowships (WMO/TD- No. 1356) and Guidelines for Applying for a WMO Fellowships (WMO-No.1104) and create an updated

¹⁰ **References:**

[Meteorological training for the digital age: A Blueprint for a new curriculum \(SHORT\)](#)

[Meteorological training for the digital age: A Blueprint for a new curriculum \(LONG\)](#)

[Basic Instruction Packages via a Distributed Learning Network](#)

[Regarding a Shared Online BIP-M Curriculum](#)

[EUMETLearn 2018, ERASMUS+ Proposal](#)

[BIP- M and BIP-MT \(from WMO- No. 1083\) for EC Panel Review](#)

[Guidelines for the Assessment of Competencies for Provision of Climate Services](#)

[BIP-H and BIP-HT \(WMO-No. 258 Volume II: Hydrology \(see chapters 3 and 4\)\)](#)

document that focuses on both fellowships and training. Updated the "Guide for WMO Fellows"(version Jan 2018).

	MoU or agreement	Host Member	Year of signature	Major	Comments
1	Ministry of Education, China	China	2018(TBD)	Meteorology and Hydrology	15 full scholarship BSc. MSc and PhD
2	Nanjing University of Information Science and technology	China	2016	Meteorology	15 full scholarship MSc and PhD.
3	Hohai University	China	2016	Hydrology	20 full scholarship MSc
4	DPRI, Kyoto University	Janpan	2017	Meteorology, research oriented	3 full scholarship for up to 6 months
5	ENM	France	2014	Meteorology	Mainly for francophone Members
6	Ewha Womens University	Korea	2016	Meteorology	3 MSc fellows, waive tuition fee
7	Leibenz University Hanover	Germany	2012	Hydrology	Up to 2 MSc Review in progress
8	IHE Delft	Netherlands	2017	Hydrology	Up to 3 MSc, tuition waive
9	RSHU	Russia	2016	Meteorology, Hydrology, and Environment	Up to 5 BSc, MSc tuition waive
10	ECMWF	United Kingdom	2014	Meteorology, research oriented	Attachment work up to 1 year
11	University of Reading	United Kingdom	2017	Meteorology	Up to 5 MSc 10% tuition reduction

Fellowship programme remains the key avenue to support capacity development in least developed and developing countries

2016 fellowship statistics

	Request by region	awarded by region	awarded in each region%	region awarded/global awarded%	Female request by region	Female request in each region%	Female awarded by region	Female awarded by female request in each region%
I	113	44	39%	56%	22	19%	10	45%
II	20	9	45%	12%	13	65%	7	54%
III	21	14	67%	18%	4	19%	2	50%
IV	14	7	50%	9%	7	50%	4	57%
V	12	3	25%	4%	5	42%	2	40%
VI	1	1	100%	1%	1	100%	1	100%
Total	181	78	43%	100%	52	29%	26	50%

2017 fellowship statistics as per 31 Dec 2017

	Request by region	Awarded by region	awarded in each region%	region awarded/global awarded%	Female request by region	Female request in each region%	Female awarded by region	Female awarded by female request in each region%
I	158	63	40%	52%	34	22%	11	32%
II	47	20	43%	17%	17	36%	9	53%
III	28	20	71%	17%	8	29%	7	88%
IV	14	8	57%	7%	3	21%	2	67%
V	21	8	38%	7%	3	14%	2	67%
VI	2	2	100%	2%	0	0%	0	0%
Total	270	121	45%	100%	65	24%	31	48%

- 5) Streamlined award process by re-emphasizing the need for candidates to obtain admission on merit, and go through competitive screening. This step insures the quality of the fellowship requirement in terms of academic background and learning language checking etc. ETR has consulted with all the fellowship partners, up to know all the cooperation partners agreed on the pre-admission procedure.
- 6) Updated EC criteria on award of fellowships and training sponsorships by Decision 10.1/4 (EC-69), which includes
 1. Criteria for the award of WMO fellowships
 2. Criteria for the award of WMO short-term training opportunities
 3. Criteria for consideration of requests for a familiarization visit by recently appointed Permanent Representative (PR) of a country with WMO

7) Promotion of gender balance

a) WMO has a MoU since 2012 with EHWA Womens University in Seoul , South Korea which is a dedicated women university to promote and enhance the education opportunities for female candidates.

b) In EC criteria for ETR opportunities adopted by EC69 in 2017, especially added the sentence that " The need to practice equal opportunity policies (Resolution 33 (Cg-XIV) – Equal opportunities for the participation of women in meteorology and hydrology.

c) In WMO annual SG circular letter calling for nomination for ETR opportunities, the gender equality policy is emphasized each time.

d) Extra points for females fellowship candidates are added when considering fellowship opportunities.

e) The gender stream policy is also included in the November 2017 WMO SYMETXIII statement, which said, "As the WMO Education and Training community works with students from many countries, language, gender and cultural awareness needs to be addressed across all activities. .

f) In each and every ETR statics and survey, female fellows and nominations are especially mentioned to raise the awareness for female candidates opportunities.

8) Involvement of fellows in professional conferences

a. Attend CMATC's 4- month forecaster's course after graduation from NUIST and Hohai University's academic study.

b. Attend the UK Meteorological Society's annual student conference

c. Attend the Beijing Climate Centre's annual summer school on climate science and climate changes.

9) Enhanced internal in- house coordination with WMO technical departments by set up the ETCOM on the bases of former FELCOM, and draft the Procedures for Interdepartmental Collaboration in the Organization and Implementation WMO Education and Training Events

6.2 WMO Fellowships Impacts Evaluation¹¹

The 68th session of the WMO Executive Council held in Geneva in June 2016 adopted Decision 10.2/4 to carry out an impact evaluation of the Programme to quantify the benefits accrued through fellowships to the Members with the aim of making a case for enhanced delivery of the Programme and improved efficacy. Amongst other things, the evaluation gave consideration to: i) effectiveness of delivery of the Programme in each WMO Region; ii) effectiveness in addressing areas of current and emerging demand in each WMO Region; iii) building of North-South and South-South partnerships to expand training opportunities, and vi) allocation of resources among Regions and priority areas within Regions.

¹¹ **References:**

[Decision 67 \(EC-68\)](#) on Fellowships Impact Evaluation.pdf
[Final Report](#) of Impact Evaluation of the WMO Fellowship Programme

From the analysis undertaken and the report produced (see link to full report), the fellowship programme has been found to be very positive and effective in its delivery at the national, regional and global levels. In view of this, it can be concluded that the programme is needed today more than ever before by the NMHSs of developing Member countries in order to continue to contribute effectively the sustainable development of their nations and the world at large. Indeed, due to the increasing demand in training and specific needs, especially in least developed and developing countries, and Small Island Developed States, it has remained a very relevant Programme to the Members.

The panel is invited to discuss impact evaluation report and make recommendation to EC and Congress.

6.3 Training Activities Division

The WMO Education and Training Office, Training Activities Division, was able to offer support to 111 experts from 35 Members in 6 Regions.

As shown in Figures 1 and 2 below, the numbers of requests for financial supports for short-term courses were increased in 2017, where the ratio of awarded supports were decreased. Although the numbers of awarded females are still low and remain the same, 27, the ratio slightly increased from 22% to 24% because of the decrease in the numbers of awarded males from 97 to 84 in 2017.

The WMO 2017 Online Course for Trainers, offered in English for RA- II Asia and RA-IV Pacific, with 46 participants receiving certificates of completion. This offering completes the circuit of all regions, delivered in English, French, Russian, and Spanish. The 2016 Online Course for Trainers for RA- III and RA-IV saw 57 participants receiving certificates. The WMO Training Development Workshop, the face-to-face follow-on to the online course served 21 participants in 2016 in Argentina, and 18 participants in 2017 in Australia.

Figures 1 and 2: 2016 and 2017 Requests and Awards by Gender

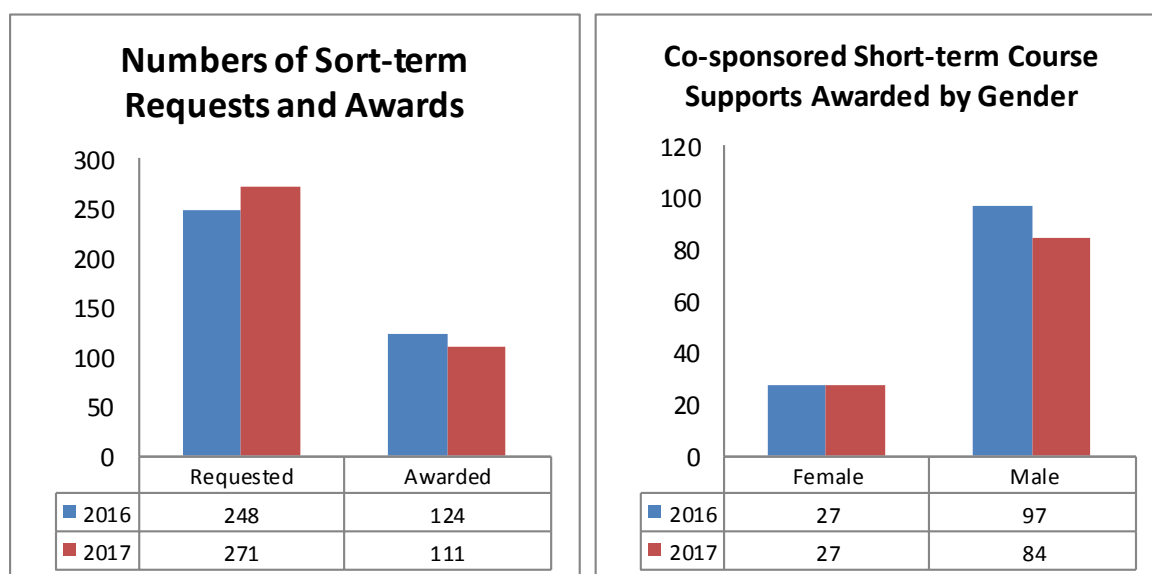


Table 1 shows the distribution of the short-term course support award by Regions in 2016, where Africa (60%), Asia (17%) and South-east Europe (17%) received the greatest number of awards.

Table 1: 2016 Short-Term Support by Region and Gender

Region	Female		Male		Total	%
I	12	16%	61	84%	73	59%
II	7	33%	14	67%	21	17%
III		0%	1	100%	1	1%
IV	1	50%	1	50%	2	2%
V	2	40%	3	60%	5	4%
VI	5	23%	17	77%	22	18%
Total	27	22%	97	78%	124	100%

Although the same Regions (I, II, and VI) received greatest supports, below table shows the increase in Asia (34%) in 2017.

Table 2: 2017 Short-Term Support by Region and Gender

Region	Female		Male		Total	%
I	13	22%	45	78%	58	52%
II	8	21%	30	79%	38	34%
III		0%	1	100%	1	1%
IV		0%	1	100%	1	1%
V	1	100%		0%	1	1%
VI	5	42%	7	58%	12	11%
Total	27	24%	84	76%	111	100%

The following tables in Annexes show the co-sponsored courses offered by RTCs and other training partners and the number of awarded participants by Member for each course offered. As the number of awarded participants for course offered by MeteoFrance compose approximately 70% of the awards, they are shown in separate tables.

Awarded participants in 2016 for co-sponsored short courses offered by RTCs and other training partners

Climate Change and Agriculture, Shefayim, Israel, 4-14 April 2016	6
British Caribbean Territories(1), Burundi (1), Ethiopia(1), Ghana (1), Myanmar (1), The former Yugoslav Republic of Macedonia (1)	
Global Framework for Climate Services (GFCS), Beijing, China, 5-15 April 2016	4
Bahamas(1), Bhutan (1), Thailand(1), United Republic of Tanzania (1)	
Observing Systems, Ankara, Turkey, 11-15 April 2016	0

Weather Radar Data Utilization for Meteorological Services, Seoul, Republic of Korea, 17 April-7 May 2016	0
Meteorological Communication, Data Processing, and TURKMETCAP, Alanya, Turkey, 25-29 April 2016	1
Kazakhstan (1)	
Nowcasting Techniques on Thunderstorm and Severe Convection, Beijing, China, 23 May-3 June 2016	2
Bhutan (1), Pakistan (1)	
Application of Meteorological Satellite Products, Beijing, China, 20 June-1 July 2016	3
Malaysia (1), Myanmar (1), Pakistan (1)	
Weather Forecasting for Operational Meteorologists, Seoul, Republic of Korea, 11-29 July 2016	2
Indonesia (1), Thailand (1)	
Agrometeorology, Beijing, China, 12-23 September 2016	3
Ethiopia (1), Guinea (1), Uganda (1)	
Basics of Calibration, Ankara, Turkey, 3-7 October 2016	2
Ukraine (1), Uzbekistan (1)	
Aeronautical Meteorology Services, Beijing, China, 24 October-4 November 2016	4
Iran, Islamic Republic of (1), Mozambique (1), Papua New Guinea (1), Swaziland (1)	
Workshop on Aviation Meteorology for Forecasters, Doha, Qatar, 6-10 November 2016	4
Bhutan (1), Lao People's Democratic Republic (1), Pakistan (1), Philippines (1)	
Radar Meteorology, Nanjing, China, 14-25 November 2016	5
Armenia (1), State of Palestine (3), Uganda (1)	
Tropical Cyclones, Nanjing, China, 21 November-2 December 2016	4
Mozambique (1), Papua New Guinea (1), Philippines (1), Yemen (1)	
Use and Interpretation of Mesoscale NWP for High-Impact Weather Forecasting, Hong Kong, China, 5-9 December 2016	2
Argentina (1), Kazakhstan (1)	
Grand Total	42

Awarded participants in 2016 for co-sponsored short courses offered by MeteoFrance

Climate Change, Toulouse, France, 14-17 March 2016	2
Guinea-Bissau (1), Mauritania (1)	
Climatology, foundation for climate services of the Ecole Nationale de la Meteorology (ENM), Toulouse, France, 30 May - 10 June 2016	18
Benin (1), Bosnia and Herzegovina (1), Ethiopia (1), Madagascar (2), Nigeria (1), Pakistan (2), Russian Federation (1), Sierra Leone (1), South Sudan (1), Spain (1), Thailand (1), The former Yugoslav Republic of Macedonia (2), Togo (1), Tunisia (1), Ukraine (1)	
Concepts and methods for weather forecasting à Météo-France, Toulouse, France, 19-30 September 2016	7

Benin (1), Côte d'Ivoire (1), Mauritania (1), Morocco (1), Togo (2), Tunisia (1)	
Elements de télédétection depuis l'espace, Lannion, France, 26-30 September 2016	7
Comoros(1), Congo (1), Lebanon (1), Morocco (2), Togo (1), Tunisia (1)	
International Training Course on Aeronautical Meteorology, Toulouse, France, 3-14 October 2016	3
Cameroon (1), Morocco (1), Tunisia (1)	
Meteorologie Aéronautique à Météo-France, Toulouse, France, 19-30 September 2016	1
Madagascar (1)	
Meteorologie Marine à Météo-France, Toulouse, France, 7-18 November 2016	8
Algeria (1), Benin (1), Côte d'Ivoire (1), Madagascar (1), Morocco (1), Togo (3)	
Meteorologie Modulaire à Météo-France, Toulouse, France, 14-18 November 2016	1
Togo (1)	
Satellite Weather Forecasting for forecasters Météo-France, Toulouse, France, 21-25 November 2016	9
Algeria (1), Burkina Faso (1), Cameroon (1), Congo (1), Guinea-Bissau (1), Mauritania (1), Morocco (1), Senegal (1), Togo (1)	
Techniques et organisation de la prévision à Météo-France, Toulouse, France, 12-16 September 2016	14
Algeria (1), Burundi (1), Comoros (1), Gabon (1), Guinea-Bissau (2), Lebanon (1), Madagascar (1), Malaysia (1), Morocco (1), Sao Tome and Principe (1), Togo (1), Tunisia (1), Ukraine (1)	
Training Weather forecasting in mid latitude regions mod 1 and mod 2, Toulouse, France, 28 November to 9 December 2016	12
Algeria (1), Belarus (1), Côte d'Ivoire (1), Egypt (1), Georgia (1), Latvia (1), Mauritania (1), Morocco (1), Pakistan (1), Russian Federation (1), The former Yugoslav Republic of Macedonia (1), Ukraine (1)	
Grand Total	82

Awarded participants in 2017 for co-sponsored short courses offered by RTCs and other training partners

Advanced Workshop on "Meteorological Warnings"	1
Ukraine (1)	
Climate Change and Agriculture	3
Benin (1), Comoros (1), The former Yugoslav Republic of Macedonia (1)	
Climate Services for Disaster Prevention	2
Benin (2)	
Course on Global Framework for Climate Services (GFCS)	1
Ukraine (1)	
Course on the Application of Meteorological Satellite Products	5
Curaçao and Sint Maarten (1), Democratic Republic of the Congo (1), Iraq (2), Tajikistan (1)	
International Training Course on "Numerical Weather Prediction"	1
Venezuela, Bolivarian Republic of (1)	

The International Training Course on Aeronautical Meteorology Services	1
Tajikistan (1)	
Upper Air Observing Systems	1
Gambia (1)	
Urban Meteorology, Environment and Climate Services	10
China (1), India (1), Iraq (1), Mongolia (1), Philippines(1), Poland (1), Singapore (1), Sri Lanka (1), Thailand (1), Uzbekistan (1)	
Workshop on Implementation of ICAO Met Info Exchange Model	2
Iraq (1), Thailand(1)	
Weather Forecasting for Forecasters	4
Iraq (4)	
Surface Observation Course	2
Iraq (2)	
Grand Total	33

Awarded participants in 2017 for co-sponsored short courses offered by MeteoFrance

Assimilation of GPS data in the ARPEGE and AROME models	2
Morocco (1), Tunisia (1)	
Changement Climatique	1
Morocco (1)	
Climatologie Foundation for Climate Services	13
Algeria (1), Benin(1), Burkina Faso (1), Côte d'Ivoire (1), Democratic Republic of the Congo (1), Guinea (1), Guinea-Bissau (1), Madagascar (2), Mali (1), Mauritania (1), Morocco (1), Togo (1)	
Concepts and Methods for Forecasting	1
Tunisia (1)	
Concepts and Methods for Weather Forecasting	4
Algeria (1), Benin(1), Morocco (2)	
Elements of remote detection from space	11
Algeria (1), Benin(1), Congo (1), Côte d'Ivoire, (1), Lebanon (1), Mauritania (1), Morocco (1), Senegal (1), Togo (1), Tunisia (2)	
Meteorologie Aeronautique	3
Cameroon (1), Madagascar (1), Morocco (1)	
Meteorologie Marine	6
Algeria (1), Côte d'Ivoire (1), Madagascar (1), Morocco (1), Senega (1), Togo(1)	
Météorologie Zone Afrique pour prévisionnistes	7
Burkina Faso (1), Cameroon (1), Côte d'Ivoire (1), Guinea(1), Madagascar (1), Mali (1), Mauritania(1)	
Modular Meteorology	4
Democratic Republic of the Congo(1), Togo (1), Tunisia(2)	

Satellite Weather Forecasting for Forecasters	9
Algeria (1), Benin(1), Comoros(1), Côte d'Ivoire (1), Democratic Republic of the Congo (1), Gabon, (1), Lebanon (1), Morocco (1), Tunisia (1)	
Techniques et organisation de la prevision	4
Algeria (1), Cameroon(1), Morocco (1), Tunisia (1)	
Tropical Meteorology	2
Benin (1), Togo (1)	
Weather Forecasting in Mid-latitude Regions	5
Morocco (1), The former Yugoslav Republic of Macedonia(1), Tunisia, (1), Ukraine (1), Egypt (1)	
Workshop on WMO Information System	6
Armenia (1), Georgia(1), Morocco (1), Senegal (1), Ukraine (1), United Republic of Tanzania (1)	
Grand Total	78

Co-sponsored short courses advertised and/or supported by ETR Office in 2016

China-CMATC	Nowcasting Techniques on Thunderstorm and Severe Convection, Beijing	23-May-2016	3-Jun-2016
China-CMATC	Aeronautical Meteorology Services, Beijing	24-Oct-2016	4-Nov-2016
China-CMATC	Agrometeorology, Beijing	12-Sep-2016	23-Sep-2016
China-CMATC	Global Framework for Climate Services (GFCS), Beijing	5-Apr-2016	15-Apr-2016
China-CMATC	Application of Meteorological Satellite Products, Beijing	20-Jun-2016	1-Jul-2016
China-NUIST	Radar Meteorology, Nanjing	14-Nov-2016	25-Nov-2016
China-NUIST	Tropical Cyclones, Nanjing	21-Nov-2016	2-Dec-2016
Hong Kong China-HKO	Use and Interpretation of Mesoscale Numerical Weather Prediction (NWP) for High-Impact Weather Forecasting	5-Dec-2016	9-Dec-2016
Israel-PTCAM	Climate Change and Agriculture, Shefayim	4-Apr-2016	14-Apr-2016
Korea-KMA	Weather Forecasting for Operational Meteorologists, Seoul	11-Jul-2016	29-Jul-2016
Korea-KMA	Weather Radar Data Utilization for Meteorological Services, Seoul	17-Apr-2016	7-May-2016
Qatar-QAC	Workshop on Aviation Meteorology for Forecasters, Doha	6-Nov-2016	10-Nov-2016
Turkey-TSMS	Observing Systems, Ankara	11-Apr-2016	15-Apr-2016
Turkey-TSMS	Meteorological Communication, Data Processing, and TURKMETCAP, Alanya	25-Apr-2016	29-Apr-2016
Turkey-TSMS	Basics of Calibration, Ankara	3-Oct-2016	7-Oct-2016

Annex-VI: Co-sponsored short courses advertised and/or supported by ETR Office in 2017

China-CMATC	Course on Global Framework for Climate Services (GFCS)	17-Apr-2017	28-Apr-2017
China-CMATC	Course on the Application of Meteorological Satellite Products	5-Jun-2017	16-Jun-2017
China-CMATC	The International Training Course on Aeronautical Meteorology Services	11-Sep-2017	22-Sep-2017
China-CMATC	International Training Course on the Adaptation to Climate Change	12-Oct-2017	25-Oct-2017
China-NUIST	International Training Course on Tropical Cyclone	13-Nov-2017	24-Nov-2017
China-NUIST	International Training Course on "Numerical Weather Prediction"	20-Nov-2017	1-Dec-2017
Egypt-EMA	Weather Forecasting for Forecasters	5-Nov-2017	16-Nov-2017
Egypt-EMA	Surface Observation Course	19-Nov-2017	30-Nov-2017
France-ENM	Climatologie Foundation for Climate Services	20-Feb-2017	3-Mar-2017
France-ENM	Changement Climatique	6-Mar-2017	9-Mar-2017

France-ENM	Concepts and Methods for Weather Forecasting	6-Mar-2017	17-Mar-2017
France-ENM	Tropical Meteorology	20-Mar-2017	30-Mar-2017
France-ENM	Météorologie Zone Africaine pour prévisionnistes	12-Jun-2017	16-Jun-2017
France-ENM	Techniques et organisation de la prévision	19-Jun-2017	23-Jun-2017
France-ENM	Workshop on WMO Information System	29-Jun-2017	30-Jun-2017
France-ENM	Concepts and Methods for Forecasting	18-Sep-2017	29-Sep-2017
France-ENM	Elements of remote detection from space	25-Sep-2017	29-Sep-2017
France-ENM	Meteorologie Marine	6-Nov-2017	16-Nov-2017
France-ENM	Modular Meteorology	14-Nov-2017	18-Nov-2017
France-ENM	Satellite Weather Forecasting for Forecasters	20-Nov-2017	24-Nov-2017
France-ENM	Assimilation of GPS data in the ARPEGE and AROME models	20-Nov-2017	1-Dec-2017
France-ENM	Weather Forecasting in Mid-latitude Regions	27-Nov-2017	8-Dec-2017
Germany-DWD BTZ	1st OSCAR/Surface Training Course for RA VI	23-May-2017	24-May-2017
Germany-DWD BTZ	Weather Radar Applications in Nowcasting for Weather Forecasters	29-May-2017	2-Jun-2017
Hong Kong China-HKO	Workshop on Implementation of ICAO Met Information Exchange Model	10-Oct-2017	12-Oct-2017
Iran-IRIMO	Atmospheric Hazards in Aviation	25-Feb-2017	1-Mar-2017
Israel-PTCAM	Climate Change and Agriculture	14-May-2017	24-May-2017
Israel-PTCAM	Advanced Workshop on "Meteorological Warnings"	6-Nov-2017	16-Nov-2017
Italy-IBIMET	Climate Services for Disaster Prevention	20-Nov-2017	1-Dec-2017
Korea-KMA	Weather Forecasting for Operational Meteorologists	6-Feb-2017	24-Feb-2017
Korea-KMA	Course on Weather Radar Operations	12-Jun-2017	23-Jun-2017
Korea-KMA	International Training Course for Leaders of RA I	5-Nov-2017	9-Nov-2017
Peru-UNALM	International Training Course on Seasonal Climate Forecast	29-Mar-2017	29-May-2017
Turkey-TSMS	MetcapPlus Visualization Package and TAC2BUFR Software	24-Apr-2017	28-Apr-2017
Turkey-TSMS	Upper Air Observing Systems	16-Oct-17	20-Oct-2017
Turkey-TSMS	Operation and Maintenance of Radar Systems	6-Nov-2017	10-Nov-2017
Turkey-TSMS	AWOS Installation, Maintenance and Operation	13-Nov-2017	17-Nov-2017
UK-Reading University	Urban Meteorology, Environment and Climate Services	28-Aug-2017	8-Sep-2017

6.4 Status of WMO Regional Training Centres¹²

The WMO ETR Office tracks the performance of its WMO Regional Training Centers based on the annual reports provided to the office each year from each RTC component (38). The majority of centers provide them, but as of the drafting of this document, 17 had not submitted their reports (see Table 1 in References). Five components have not submitted reports in the last four years, and another five have failed to submit at least 2 of the 4 expected reports. It is expected that these are among the least active RTCs, and that therefore this does not change the total statistics very much. Additional reports may arrive before the Panel Meeting, and this paper will be updated.

In 2017, the WMO RTC network supported a total of 2,553 international participants, 820 in long term courses and Fellowships, and 1104 in short courses, and 629 in distance learning courses (short or long). (See Table 3) Most of these support figures are stable or show upward movement for the

¹² **Reference:**
[2016-2017 RTC Annual Reports.docx](#)

last four years (see table below). The slight decline in support from 2016 to 2017 may be related to budgets.

In regards to gender balance in 2017, total percentages were 42% female, and 58 % male. This is probably a bit higher than the percentage of females employed by NMHSs. As shown in Figure 3, this balance is not equal across course type. For short-term courses, 28% of participants were female, for long-term courses, 45% were female, and for distance learning courses, 60% were female.

Figure 4 shows that course offerings in 2017, 43% were short-term, 32% were long term, and 25% were distance learning. Both gender balance and use of distance learning show positive growth over the last 4 years, as show in the table below. Note that distance learning is used much more for national participants than for international participants. Only nine RTC components are using distance learning for regional or international training, including components in Argentina, India, Italy, Kenya, Russian Federation, and South Africa.

Participants Served, Trends for 2014-2017

	2014	2015	2016	2017
International support (total)	1897	1793	2629	2553
Long-term training	(90 courses)	(158 courses)	820	820
Short-term training	(216 courses)	(166 courses)	1310	1104
Distance learning (all forms)	NA	381	499	629
Females supported (all courses)	NA	35%	34%	42%

Additional information on distribution of courses over the WMO priority areas and additional non-training activities carried out by the RTCs will be provided at the meeting.

7. Review of Actions, Briefings on Plan and Document for the Seventieth Session of the WMO Executive Council and Closure of the Meeting

The meeting will brainstorm on an overview of key outcomes in the context of the Strategic Plan and ETR document for EC 70.