EXECUTIVE COUNCIL
PANEL OF EXPERTS ON EDUCATION AND TRAINING

TWENTY-FIFTH SESSION

Pune, India

26 – 30 MARCH 2012

FINAL REPORT WITH RECOMMENDATIONS
WMO General Regulations

**Regulation 42**
Recommendations of working groups shall have no status within the Organization until they have been approved by the responsible constituent body. In the case of joint working groups the recommendations must be concurred with by the presidents of the constituent bodies concerned before being submitted to the designated constituent body.

**Regulation 43**
In the case of a recommendation made by a working group between sessions of the responsible constituent body, either in a session of a working group or by correspondence, the president of the body may, as an exceptional measure, approve the recommendation of behalf of the constituent body when the matter is, in his opinion, urgent and does not appear to imply new obligations for Members. He may then submit this recommendation for adoption by the Executive Council or to the President of the Organization for action in accordance with Regulation 9(5).
Executive Summary

The twenty-fifth session of the WMO Executive Council Panel of Experts on Education and Training (the Panel) was held in Pune, India from 26 to 30 March 2012.

The Panel addressed a number of topical and difficult issues relating to the certification of courses and training institutes, development of transferable skills for meteorological, hydrological and climatological staff, education and training requirements for climate service personnel, support for distance and online learning, trainer competencies, fellowships and the future role and operations of Regional Training Centres.

At a strategic level the Panel has recommended that:

- A review of the future role and operation of RTCs with no new RTCs to be considered until after the review is finalized. All reconfirmations and the two new RTCs recommended by this Panel session only to be approved to 31 December 2015. Reconfirmation of these RTCs for an additional four years after 2015 to be dependent upon the outcome of the review and Cg-17 determinations.
- A timeline for Panel interactions to provide input into the drafting of the WMO Strategic and Operating Plans and also the draft budget for 2016 to 2019.
- That EC-64 request the Regional Association terms of reference to be updated to include formal roles for ETR focal points.

At a tactical level the Panel has recommended:

- EC-64 to reconfirm the RTCs in China, India, the Russian Federation and Turkey for a maximum of four years (to 31 December 2015) to allow the wider RTC review to be completed. Depending upon the outcome of the review, the designation of these RTCs could be extended for a further four years to complete the typical eight year cycle. The RTC in Uzbekistan to be reconfirmed, initially for two years. Further extension of the RTC in Uzbekistan will be dependent upon the outcome of the wider RTC review and whether Uzbekistan shows evidence of addressing regional education and training needs.
- The Panel recommended that the RTCs that have been dormant or unresponsive for four years or more should be identified as ‘inactive’ and that EC-64 identify a process to withdraw their designation.
- That to ensure that Members can more readily demonstrate that the Basic Instruction Package for Meteorologists (BIP-M) and for Meteorological Technicians (BIP-MT) courses conducted by their training institutes meet the BIP-M/MT requirements, all Regional Training Centres and national training institutes should have a Quality Management Framework or approved accreditation process in place, or follow the ISO 29990 guidance for “Learning services for non-formal education and training — Basic requirements for service providers”
- That IF the main way of collecting data for the WMO Monitoring & Evaluation system is via questionnaire, EC-64 could consider linking fellowship and training support to the return of the questionnaires.
- An update to the WMO Fellowship publication be produced to include revised guidance on the granting of Fellowship support for students studying in their own country (responding to a Congress request).
- A Panel working group on Enhancing Distance and Online Learning (WG-EDOL) be established to liaise with Regional Associations and Regional Training Centres on the
demand for distance and online learning, particularly, with an initial top priority being to support the competency and qualification requirements for Aeronautical Meteorological Personnel (AMP) standards.

- The Commission for Climatology (CCI) take note of the Panel advice relating to the development of competencies for climate services personnel
- New modes of operation for the Panel to be undertaken over the next four years particularly on an intra-sessional basis to take advantage of the communication tools now available.
- The development of a publication for educators and trainers in meteorology, climatology and hydrology.

These decisions are expected to assist Members through:
- Providing better monitoring and focus for the ETRP
- Clearer, best-practice based guidance on the education and training of trainers
- More effective networking of Regional Training Centres
- Promotion and application of distance learning
- Promotion of the quality of national training programmes
Figure 1. Members of the Twenty-fifth Session of the Executive Council Panel of Experts on Education and Training

Back row: (L – R) T. Spangler, B. Mukhopadhyay, B. Sarr, K. Johnson (Acting Chair), E. Aguilar, R. Deslandes, R. Riddaway,

, J. Wellens Mensah,

Unable to attend Session: D. Grimes, C. Webster
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GENERAL SUMMARY OF THE WORK OF THE SESSION

1 ORGANIZATION OF THE SESSION

1.1 Opening of the Session

The twenty-fifth session of the Executive Council Panel of Experts on Education and Training (PAN-25) was held in Pune, India from 26 to 30 March 2012. In opening the session, Mr. Kent Johnson, on behalf of the President of WMO and Chair of the Panel, thanked Dr. Ajit Tyagi (Permanent Representative of India with WMO), Dr. L.S. Rathore (Director General of Meteorology) and Mr. Shri S. Krishnaiah (ADGM(R), IMD, Pune) for offering to host this session, and the staff of the RTC in Pune, particularly Dr. Somenath Dutta, for the excellent arrangements and support to the session.

Dr. Tyagi and Dr. Rathore stressed the critical role that Regional Training Centres (RTC), such as the RTC in India, can play in assisting developing and least developed countries to develop their manpower in key areas such as weather forecasting, climate, agriculture and disaster risk reduction. Dr. Rathore stressed the importance of developing the managers and leaders of National Meteorological and Hydrological Services (NMHSs) and complimented the WMO Secretariat on the recent Human Resource Development workshops. He hoped that the Session would provide even further support for these events. Mr. Grimes (in a note read by the acting Chair) challenged the Panel to look to the future as well as continue the excellent work on dealing with the immediate issues such as improving cooperation and coordination between regional associations, technical commissions and the Secretariat for setting regional priorities, in order to serve Members more efficiently. The acting Chair commented that it is crucial for members of the Panel to seize this occasion to review the WMO training requirements particularly in developing and least developed countries where often, full advantage of the developments in science and technology cannot be taken due to insufficiently skilled personnel.

The acting Chair observed that many WMO RTCs are currently facing challenges including the recruitment and training of instructors, enrolment of foreign students and improvement of facilities. These challenges will be exacerbated in the coming years as the RTCs will be expected to contribute to capacity development activities in areas such as Disaster Risk Reduction, the Global Framework for Climate Services and improvements in the development and implementation of observation and communication networks and systems. Given the role of the RTCs in the WMO ETRP, it is now an opportune and timely moment to further review the difficulties being faced by the RTCs, and make recommendations for policies and the direction to be followed in the future.

To assist the Panel in planning, implementing, monitoring and evaluating their work, the acting Chair observed that the ETRP will be working within the WMO Results Based Management framework. The next Strategic Plan has the ETRP in three Key Outcome areas under Expected Result 6. The monitoring of the Key Outcomes through Key Performance Indicators will tell us whether we are achieving the Expected Results and evaluation of the Expected Results will lead to an assessment of whether we are on track towards our Strategic Thrusts. Thus, the discussion of Key Outcomes and Key Performance
Indicators for the ETRP by the Panel is very timely. Mr. Johnson finished Mr. Grimes’ remarks by noting that the Panel members were leaders in meteorological and hydrological education and training and he looked forward to harnessing their knowledge, creativity and passion in the work of the Panel over the next four years.

Mr. Jeff Wilson, Director of the WMO Education and Training Office, acknowledged the key role IMD had played in the Panel over the last 30 years and thanked Dr. Tyagi and Dr. Rathore for the friendly and helpful assistance that the staff from the RTC in Pune had provided to the ETR Office in the preparation for this session. Mr. Wilson also acknowledged the Panel members for their contribution towards preparing documents for the session, in leading the RTC assessment visits and contributing to the various Panel tasks over the last two years that lead to Cg-16 adopting the revised definitions of Meteorologist, Meteorological Technician and their respective BIPs as Standards.

1.2 Adoption of the Agenda

The provisional agenda was adopted by the session with some amendments, and is reproduced in Annex I. Annex II lists the participants in the Session.

1.3 Programme of Work

The Chair proposed that the working hours would be from 09:30 up to 13:00 and from 14:30 up to 18:00, with the usual half-hour coffee breaks at 11:00 and 16:00. The Panel would review the papers prepared for the Session in plenary and then create working groups to consider the major issues in detail as required.

2. MAJOR OUTCOMES FROM THE SIXTEENTH WORLD METEOROLOGICAL CONGRESS-16 AND EXECUTIVE COUNCIL-63

2.1 Major Outcomes from Congress and Executive Council

The Panel noted that the Sixteenth World Meteorological Congress was held in Geneva from 16 May to 3 June 2011. Among the many decisions taken by Congress the following were the key decisions for the Education and Training Programme:

- Determined high priority areas for the 2012 to 2015 financial period (GFCS, Aviation, Disaster Risk Reduction, WIS/WIGOS and Capacity Development)
- Approved strategies (Service Delivery and Capacity Development);
- Approved ETR Standards for personnel and their associated BIPs;
- Recognised new RTCs in Peru and South Africa and confirmed RTCs in Madagascar and the Philippines;
- Re-established the education and training programme (Annex III).

The Cg-16 decisions could be viewed as a funnel or filter for the Panel, starting from organization wide priorities, utilising the strategies and the renewed ETRP and the new Standards to implement activities through the RTCs and other training institutes. The role of the Panel is determined by the Terms of Reference EC-62 agreed in 2010 following the 24th Session of the Panel (Annex III).

2.2 High Priority areas
The Panel recalled that Cg-16 agreed to put special focus on the following high priority areas for this financial period. The Panel noted that the ETRP is expected to support each of these areas.

**Global Framework for Climate Services (GFCS)** – a new initiative coming from World Climate Conference Three in 2009. The key role for the ETRP in GFCS will be to work with the Climate and other programmes to help them define and deliver education and training for the NMHS staff who will be developing and providing the new and extended services. The primary focus will be on assisting NMHSs in developing and least developed countries to educate and train their staff to undertake the Basic and Essential service roles outlined in the GFCS proposal.

**Aviation services** – the Panel has been involved in developing the AMP competency standards and in defining the learning outcomes aeronautical meteorological forecasters and observers are expected to satisfy.

**Disaster Risk Reduction** – Activities in this area can be broken down into two groups. Group one for NMHS staff designed to improve their knowledge, skills and behaviours in providing the services and the second group, more outward looking, assisting NMHSs work with partner agencies.

**WIS/WIGOS** – The RTCs in China, Islamic Republic of Iran and Turkey are collaborating with the OBS department on WIS and WIGOS related training activities.

**Capacity Development** – Education and Training is just one aspect of Capacity Development. Three other aspects are: policy and legislative frameworks; organizational structures; and, infrastructure capability. ETRP contributes towards Capacity Development through Fellowships, support to RTCs and training activities for Management Development, Train the trainer and technical training.

### 2.3 Strategies

**Service Delivery Strategy** – The WMO Strategy for Service Delivery affects the ETRP in two ways: i) working with the PWS programme, the RTCs and national meteorological training institutes to include material on service delivery in their courses; and ii) considering the work undertaken in the ETRP as a service and thus meeting the aims of the Service Delivery Strategy in the work of the ETRP.

**Capacity Development Strategy** – The Panel noted that Cg-16 requested Executive Council to take the lead in preparing a Capacity Development Strategy. The work was assigned to the Development and Regional Activities Department (DRA) with guidance from the EC Working Group on Capacity Development. The EC Working Group on Capacity Development met in December 2011 and discussed this matter extensively.

### 2.4 ETR Standards

The Panel recalled that Cg-16 updated the definition of meteorologist and meteorological technician, broke the link between classifications and job tasks (allowing each Member to decide whether the task of forecasting is undertaken by meteorologists or meteorological technical officers, or their national designations) and approved updated BIP-M/MT. Cg-16 decided to include the definitions and BIP-M/MT descriptions in the WMO Technical Regulations as Standards. Cg-16 also approved a publication to support the implementation of the new education and training standards. This will become a Manual and will be WMO Publication 1083. The Panel appreciated that the Manual should be published around mid-2012 and that the current edition of the WMO Technical Regulations is being updated to take into account the decisions of Cg-16 and Executive Council.
2.5 RTCs

The Panel recalled that WMO Regional Training Centres have been in existence since the late 1960s. In most cases RTCs are a national training institute or university that has agreed to open their facilities to allow staff from neighbouring countries to participate in face-to-face courses at the institute. The Panel acknowledged that initially the RTCs focused on long-term training (i.e., courses in excess of 6 months). In recent years Members such as China, the Islamic Republic of Iran, Israel and Turkey have become quite active in providing short term training courses to help address the need for Continuous Professional Development.

The Panel appreciated that in many cases the Governments of the RTC host country either waive or reduce tuition fees and some provide further financial assistance to foreign students. Prior to 2010, the number of RTCs had been constant at 23 for about 10 years. Since 2010 a further 3 RTCs (Qatar, Peru, and South Africa) have been recognised and this session of the Panel recommended to EC that an RTC also be recognised in Indonesia. The Panel recalled that while WMO does not directly support RTCs, some funding is put aside in the ETRP budget to support staff from the RTCs to attend appropriate workshops and meetings.

The Panel noted that it is timely to review the future roles and operations of RTCs: due to the growing number of RTCs; increasing expectation of Congress that the RTCs add new courses; change delivery mechanisms and adapt to new accreditation and certification measures to meet the WMO high priority needs areas (see agenda item 4.11 this session).

2.6 Update on the Status of Strategic and Operational Plans from an Education and Training Perspective

The Panel was advised that the Executive Council Working Group on Strategic and Operational Planning (EC WG SOP) is expected to commence work on the next WMO Strategic Plan in 2013. The acting Chair advised the Panel that the EC WG SOP is expected to maintain the current framework of Global Societal Needs, Strategic Thrusts and Expected Results. The ETRP supports Strategic Thrust three (Strengthening capacity-building) and Expected Result Six (Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfill their mandates). The Panel noted that, within Expected Result Six, the ETRP programme currently contributes to three of the four Key Outcomes (KO); these being:

6.1 NMHSs and Regional Centres are improved, particularly in developing and least developed countries;
6.2 Infrastructure and operational facilities of NMHSs and Regional Centres are improved, particularly in developing and least developed countries; and particularly
6.3 Education and training development activities at national and regional levels are improved, especially in developing and least developed countries.

The Panel recalled that Key Outcome 6.3 has three performance indicators agreed at its 24th Session in Boulder in 2010:
- The number of RTCs providing education and training support for GFCS related activities;
- The degree to which Members are getting value for money from the WMO Fellowship Programme;
- The degree to which the RTCs support the regional training demands in particular for students from developing and least developed countries.

The Panel was advised that the WMO Monitoring and Evaluation plan states that the ETR Office will collect the statistics for the first performance indicator while the second
and third will be collected via regular surveying of WMO Members. Recalling that the response rate on WMO Questionnaires was generally quite low, and the returns often did not fully represent the requirements and needs of the developing and least developed countries, the Panel suggested the following: if the primary means of collecting data on the second and third performance indicators was to be by questionnaire, EC-64 could consider whether to link member support for activities such as training courses and fellowships to return of this key WMO Questionnaire.

2.7 Role of the EC-Panel over the 2012 to 2015 period

The Panel was advised that the Chair suggested that the Panel may want to look at their role in advising EC on education and training matters by examining the ETRP in the framework of the typical training cycle in Figure 2.

![Figure 2. Typical training cycle](image)

Connecting the typical training cycle with the role of the EC Panel

The Panel applied the typical learning cycle to the ToRs of the Panel and the Cg-16 and EC directions for the ETRP. Table 1 links the ToRs with directions from Cg-16 and EC. The third column highlights the responsibility of Members and additional bodies for the delivery of these actions.

<table>
<thead>
<tr>
<th>Steps in the training cycle</th>
<th>Panel role</th>
<th>Key roles. Members to play leading role in each case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify learning needs</td>
<td>To liaise with and respond to the WMO Regional Associations and Technical Commissions in the field of education and training within their respective areas of responsibility (ToR 2)</td>
<td><strong>Members</strong>&lt;br&gt; RAs&lt;br&gt; RTCs&lt;br&gt; Secretariat</td>
</tr>
<tr>
<td>Choose learning solution</td>
<td>To recommend suitable WMO symposiums, courses, workshops, seminars and distance learning</td>
<td><strong>Members</strong>&lt;br&gt; RTCs</td>
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</table>
opportunities. (ToR 6)

To further elaborate on the proposal by the EC Panel of Experts on Education and Training to form a consortium of RTCs, NMHSs and other institutions to develop an accredited online course in meteorology, consistent with the BIP-M requirements, to assist Members in meeting their education and training requirements (Cg-16 request to EC)

<table>
<thead>
<tr>
<th>Design learning activities</th>
<th>To advise on and promote training resources and methodologies suitable for use by WMO Regional Training Centres, training centres of National Meteorological and Hydrological Services and other training institutions. (ToR 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Members RTCs RAs TCs Secretariat</td>
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</table>

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<tr>
<th>Deliver learning activities</th>
<th>To advise on actions for strengthening the existing Regional Training Centre network and for monitoring the Centres’ activities, as well as the designation of suitable training institutions as WMO Regional Training Centres, and encourage training centres of National Meteorological and Hydrological Services to utilize the Executive Council criteria for the recognition of Regional Training Centres in monitoring the quality of their programmes. (ToR 7)</th>
</tr>
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<tr>
<td></td>
<td>Members RTCs Secretariat RAs TCs</td>
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</table>

| Evaluate learning activities | To review the priorities and direction of the education and training activities undertaken by the Secretariat. (ToR 3)
To review the fellowships programme, providing guidance and advice on actions aimed at strengthening the programme and its effectiveness. (ToR 4) |
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<td></td>
<td>Members RAs TCs RTCs Secretariat</td>
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</table>

Underpinned by

| Organizational Context | To promote and provide guidance on the education and training of personnel of National Meteorological and Hydrological Services, particularly in developing and least developed countries. (ToR 1)
To contribute to the preparation of the WMO Strategic and Operational Plans for the period 2016–2019 by providing input, comments and recommendations with regard to the capacity-building parts of the Plans. |
|------------------------|-------------------------------------------------------------------------------|
Table 1 clearly indicates that it is the Members themselves who are the key players in the Education and Training Programme. The Members are both the recipients and the providers of the education and training and through the Regional Associations it is they who determine the education and training priorities for the region or sub-region. Congress then tasks the ETRP with addressing these prioritised education and training needs within the available resources, with the Panel acting as a review body for Executive Council.

Panel activities in 2012 to 2015

The Panel considered how to conduct its work over the 2012 to 2015 period. The operational plan makes provision for two formal sessions of the Panel in this period, this session and a second session in the first quarter of 2014 calendar year. The acting Chair remarked, on behalf of Panel members, that with such an active programme there was need to have more frequent discussions utilizing net meetings, the MOODLE forums and website and opportunities for reduced Panel meetings in conjunction with activities such as the Symposium, CALMET and COCOM meetings or workshops. Noting the high demand on the Chair’s time these additional “meetings” could be seen as a reduced follow-up rather than formal Panel sessions, with the Chair assigning one of the Panel members to represent the Chair when he wasn’t available to participate in the discussions. The Panel agreed to hold a reduced session immediately after the Symposium, to discuss the 2016 to 2019 training needs identified during the Symposium and prepare for the full Panel session early in 2014.

The Panel session in early 2014 is to recommend ETR input, based on the prioritised needs discussed at the ETR Symposium, for the 2016-2019 WMO planning and budgeting cycle.

Clariﬁcation of roles and accountability

The Panel noted the possibility for confusion between its role and that of the technical commissions in terms of setting requirements and standards for delivery of education and training. To assist Panel members and others in gaining clarification on this important topic the following table, Table 2, was found to be of use.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Who Sets requirements</th>
<th>Oversees education and training delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation, Marine, ... etc</td>
<td>Technical commissions</td>
<td>EC Panel</td>
</tr>
<tr>
<td>General forecasting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIP-M</td>
<td>EC Panel</td>
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<tr>
<td>General Transferable skills</td>
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</table>

Table 2. Accountability for setting requirements and oversight of the BIP-M.

This table is essentially an expansion of the “triangle” figure used within the ETR Standards found in WMO Technical Regulations Volume I. Responsibility is assigned for the setting of requirements for education and subsequent specific training in support of service delivery areas. The difference between this table and the ‘Tech Regs’ triangle is that the table highlights the role that the Panel plays in overseeing education and training delivery on behalf of EC as well as providing a little more detail in terms of forecasting requirements. A similar diagram could be constructed for the BIP-MT.
The table is important as it demonstrates how the Panel links with technical commission Expert Teams who have education and training included in their Terms of Reference. The table defines the role of the technical commission Expert Teams in developing education and training requirements (based on the prioritized Members’ needs as provided through the regional associations), provide review and endorsement of courses within their area of expertise and potentially to assist in the development of resource materials. The Panel would be responsible for overseeing the delivery of education and training for WMO Members, particularly through the RTC network.

3 EXCHANGE OF VIEWS ON THE GOALS AND OBJECTIVES OF THE WMO EDUCATION AND TRAINING PROGRAMME (ETRP)

To partially address the need to improve direct communication between the Panel and the various Regional Associations and Technical Commissions, the following Panel members were asked to take on the role of Panel representatives to work in close coordination with their equivalent regional association Education and Training Focal Points (see also Section 6):

- Benoit Sarr for RA I (already part of the RA I Working Group on Education and Training)
- Wang Meihua for RA II
- Claudia Campetella for RA III
- Kent Johnson for RA IV
- Chris Webster for RA V
- François Lalaurette for RA VI

François Lalaurette to act as the liaison to the PWS programme
Tim Spangler to act as the liaison with JCOMM
Biswajit Mukhopadhyay to act as the liaison with CIMO
Benoit Sarr to act as the liaison with CAgM

The ETR Office was requested to make first contact between the education and training focal points nominated by the presidents of the various regional associations and these Panel members. The acting Chair thanked the Panel members for taking on these key roles and requested the ETR Office to assist the members in their roles.

IDENTIFICATION OF WMO HUMAN RESOURCE DEVELOPMENT REQUIREMENTS

4.1 Climate Services – Human Resource Development

The Panel recalled that a Global Framework for Climate Services (GFCS) was established by the World Climate Conference Three in 2009. Capacity Development in all of its forms will be an essential success factor of the GFCS implementation with Human Resource Development being one of the key areas.

As GFCS will be a major issue in this (and succeeding) financial periods, the Panel reviewed a discussion paper prepared by Dr. Enric Aguilar from Spain examining many of the education and training issues related to delivering climate services under GFCS.
The paper was warmly welcomed and led to extensive discussions on how the Commission for Climatology could proceed with the work and the role of the Panel in assisting them.

The Panel noted the high priority of assisting GFCS Category I and Category II Climate Services. The Panel recommended that CCI initially focus on developing the competency framework for tasks related to these service categories and identifying options for developing and delivering the underpinning knowledge, skills and behaviours to allow Members to develop and increase their staff competence in these areas. Dr. Aguilar’s paper summarized some early work on such competencies (Annex IV). A lesser but still important priority will be to identify the common learning outcomes (knowledge and skills) to enable personnel to work across a number of the competency areas. This could be considered equivalent to the BIPs. The Panel recommended that CCI focus on the competence of staff to undertake particular climate service related tasks and leave the question of qualifications and classifications up to each Member to decide based upon their national circumstances. At some stage, it may be necessary to define what a climatologist is in terms of the common learning outcomes identified during the development of the job competencies. The Panel thanked Enric Aguilar, Ian Lisk and Biswajit Mukhopadhyay for offering to update the discussion document for submission to the CCI Management Group later in 2012.

4.2 Certification of personnel in meteorology and training institutes

The Panel recalled that a key aspect of classifying individuals as Meteorologists or Meteorological Technicians was for Permanent Representatives to establish robust and transparent arrangements for assessing whether the BIP requirements were being satisfied. The Panel was reminded that WMO is not an accrediting agency and thus cannot accredit courses or certify individual staff from an NMHS so these tasks must be undertaken at the national or perhaps regional level.

The Panel recommended that Members work in coordination with their Regional Training Centres, the WMO ETR Office, other international training coordination bodies such as SCHOTI (Standing Conference of the Heads of Training Institutions of National Meteorological Services) and regional education and training groups such as EUMETCAL. This will assure the quality of national training delivery while sharing, reviewing and exchanging examples of BIP implementation best practice. Such a process would ensure transparency and consistency in the application of the BIP requirements and should be underpinned by the implementation of an ISO Quality Management System.

Executive Council and Congress Decisions Relating to the Classification of Personnel as Meteorologists and Meteorological Technicians

The Panel recalled that the following dates are based on the implementation deadlines as set by previous sessions of WMO Executive Council and Congress. For example, the original implementation date for the replacement of the ‘old’ four Class-based personnel system with the two class system described in WMO-No.258 Fourth Edition was 1\textsuperscript{st} January 2005 but this was subsequently put back to 1\textsuperscript{st} January 2007. Similarly, Congress-16 (2011) agreed that the implementation date for the revised/updated ‘Meteorologist’ and ‘Meteorological Technician’ definitions would be 1\textsuperscript{st} December 2013. It is important to note that unless there are specific national or organizational drivers, the personnel classification implementation dates do not impact on AMP competency Standards considerations.

The Panel recommended that educational institutions and NMHSs will need to ensure that there is adequate documentation (ideally as part of an overarching Quality Management System) for an external agency to be satisfied that an individual classified as a
Meteorologist or Meteorological Technician has indeed met the requirements specified by the BIPs according to the date they commenced the BIP courses.

*Personnel commencing BIPs Pre 1st January 2007*

as described in WMO 258 4th edition (Chapter 1.1, Basic Assumptions part ( C ) )

*Personnel commencing BIPs between 1st January 2007 and 30th November 2013*

as described in WMO-No.258 4th edition or WMO Technical Regulations (WMO-No. 49), Vol. I

*Personnel commencing BIPs Post November 30th 2013*

as described in WMO Technical Regulations (WMO-No. 49), Vol. I.

The Panel requested that the clarification of classification implementation dates be added to the 258 replacement FAQs document available at http://www.wmo.int/pages/prog/dra/etrp/tech49/tech49.php and also requested that EC-64 strongly urged Members to take the necessary actions to meet the impending AMP competency standards (1 Dec 2013) and BIP-M related requirements (1 Dec 2016) deadlines.

**BIP-M and Aeronautical Meteorological Forecasters (AMF)**

From 1st December 2016 all international air navigation meteorological service providers shall, ‘for their area and airspace of responsibility; in consideration of the impact of meteorological phenomena and parameters on aviation operations and; in compliance with aviation user requirements, international regulations, local procedures and priorities’ be required to be able to demonstrate that their AMF have successfully completed the BIP-M.

ISO 29990:2010(E) – ‘Learning Services for non-formal Education and Training – Basic Requirements for Service Providers’

The Panel discussed the importance of accreditation and certification of training institutes and courses, particularly those related to aeronautical meteorology. While noting that formal accreditation with a relevant national tertiary/academic or vocational body was the best method, the Panel agreed that this may not be possible for all RTCs or national training institutes. In such cases the Panel indicated that these organizations would be well served by following a quality management framework approach to demonstrating that their courses clearly met the BIP-M/MT requirements.

The Panel recommended to EC-64 that all Members with training institutes should have formal accreditation procedures in place for those training institutes. The Panel also recommended that where such procedures were not already in place, Members be strongly urged to use ISO 29990:2010(E) – ‘Learning Services for non-formal Education and Training – Basic Requirements for Service Providers’ to underpin the accreditation of their training institutes. The Panel further recommended that WMO fellows, particularly those taking courses related to aeronautical meteorology, should only be placed in training institutes that could show that their courses clearly meet the BIP-M/MT requirements.

**4.3 Trainer Competencies**

The Panel recalled that EC-62 agreed with the proposal of the 24th session of EC Panel to split WMO Publication No. 258 into two separate new publications: the first one dealing with classifications and qualifications of personnel; and the second aimed at educators and trainers. The Panel considered an early draft of a publication entitled “Guidelines for Educators and Trainers in Meteorology and Hydrology” which will replace the 2001 publication “Notes for the Training of Instructors in Meteorology and Operational Hydrology” (WMO / TD No. 1058).
The Panel noted that while primarily intended for training and development professionals, this publication is also relevant to senior staff in National Meteorological and Hydrological Services. It has been structured around the six competencies for training and development professionals that, in turn, are related to the well-known training cycle. Each chapter is based on one aspect of the competencies that are specified in terms of what someone can do and what they know.

The Panel identified that for training and development professionals, jobs vary according to the level of responsibility, area of expertise and size of the parent institution. This affects the range of competencies required for a specific job. Consequently, the competencies specified in the publication are rather general and should only be used as a basis for generating those that are appropriate for specific jobs within a particular organization. The Panel recommended that in addition to having the competencies appear at the start of each chapter of this publication they are consolidated as a short document similar to the top and second level competencies for the other disciplines.

The Panel noted that the first draft is well advanced, though incomplete in that there are still a number of issues to be addressed:

- Graphics should be added to illustrate and replace or support the text.
- Include an executive summary or review the current introduction.
- More examples should be included based on good practice from NMHSs, though these could also be held on a linked website.
- At the end of each chapter add: (a) some questions to help readers think about how the information presented fits into their national context, (b) some references and sources of additional information, and (c) a summary of that Chapter.
- Develop this publication as an electronic publication to enable readers to easily access sections and related links.
- Produce this publication in as many languages as possible.
- Consider changing the title to better reflect the scope of the publication.

It is envisaged that the publication will have multiple uses. It will be used for individuals and institutions as a guide to developing their training function or staff. It will also be used as a framework for the content and structure of training seminars and workshops offered through the WMO Education and Training Office. The Panel identified the desirability of developing and delivering an online train-the-trainer course based upon this material.

The Panel created a working group of the ETR Office, Dr. Robert Riddaway, Mr. Chris Webster and Mr. Julius Wellens-Mensah to develop the next version. Tim Spangler, and Ian Bell have offered to review the document. The next version will be approved by the Panel, on an intra-sessional basis, before publication.

4.4 Human Resource Development – Capability Framework

The Panel noted the activities of the ETR Office in delivering a number of Human Resource Development workshops in South America, South Africa and the Philippines in 2010 and 2011. The Panel noted with appreciation that these workshops addressed, at least at a basic level, many of the areas indicated by Members as areas with which they required assistance. The Panel also noted that a one-week workshop was not enough to allow participants to fully grasp and consolidate the workshop content and was pleased to be advised that Spain and the UK were also offering online management courses for Members.

In addressing competencies, the Panel recalled that a number of NMHSs were incorporating the competency-based approach for technical education and training within a
larger organization capability framework. In light of the growing requests for assistance in human resource development in the management and leadership arena, the Panel suggested that a significant number of Members may appreciate a document outlining the concept and benefits of a capability framework with examples of good practice from Members with such systems already in place. Such a document would be a useful adjunct or resource for the ongoing human resource development workshops and could provide a common framework to link the training opportunities being offered by Members and the Secretariat. This framework would act as a bridge between the guidance provided in the documentation and Statements outlining the Roles and Operations of National Meteorological/Hydrological and Climatological Services and the competencies being developed as technical regulations and guidance. The Panel formed a working group of the ETR Office, Roger Deslandes and Ian Lisk to further progress this activity.

4.5 Report from the Co-Chairs of the Task Team on Distance and Online Learning

The Panel received a comprehensive report on the TT-DOL activities and congratulated the Task Team on their achievements. Noting that the basis for the work of the original Task Team had changed since it was formed in 2008, but that the uptake of distance learning was still vital, the Panel updated the Terms of Reference (Annex V) and suggested that the work be undertaken by a working group (WG-EDOL) composed of Panel and co-opted members.

The Panel noted the pioneering work being currently undertaken by CIMH and COMET for a group of aeronautical meteorological forecasters in the Caribbean and that a Spanish version of the course would be provided for one Member in Central America from the University of Costa Rica. The Panel considered the pending deadline of 1 December 2013 for providers of meteorological services to air navigation to demonstrate competency of personnel. As a result, the Panel requested that the WG-EDOL, as a first priority, coordinate with and encourage RTCs and other training institutes to work with the Regional Associations to identify any learning gaps. Further, the WG-EDOL was asked to encourage the provision of distance and online training to assist members in reducing the gaps. It is critical that courses such as the one being delivered by CIMH be offered to Members in South America, Africa, Asia and the South Pacific before 1 December 2013. Ideally, the RTCs should take a leading role in this delivery. In developing training to assist Members in meeting the 1 December 2013 deadline, the Panel reminded the WG-EDOL to also consider training requirements for the aviation meteorological observers.

4.6 Aviation competencies

The Panel was informed that five Competency Assessment Development Workshops had been conducted with more than 110 participants from a wide range of countries. Many Members have not yet begun the process and significant support will be required if they are to meet the deadline of 1 December 2013. Noting the importance of assisting Members with meeting the competency requirements, the Commission for Aeronautical Meteorology (CAeM) has changed its Expert Teams to create one team covering Education, Training and Competency Assessment (ET-ETC) chaired by Kent Johnson of the Meteorological Service of Canada.

Members who have attended the AMP Competency Assessment Workshops (Kenya, Barbados, Hong Kong China, Turkey and India)
Support for Competency Assessment

- A competency assessment forum has been established on the CAeM moodle website for Members to share progress and best practices as well as to pose questions or identify difficulties. Members of the ET-ETC will moderate the forum and respond to the questions.
- The ET-ETC has established a working group to support actual competency assessment. This support could be in the form of developing a competency assessment plan or in reviewing actual assessment of aeronautical meteorological observers and forecasters.
- It is envisaged that the ET-ETC would endorse assessments and suggest opportunities for improvement. This would not be a certification but would follow QMS principles and could be identified in the QMS of a Member State.
- In the longer term, it is hoped that other WMO Members would provide this support for each other or that RTCs could take on a role in assessment.

Training Material and CAeM website

The CAeM website (www.caem.wmo.int/moodle/) includes various resources associated with aeronautical meteorology. This includes reference material, discussion fora and training resources. The website will increase in popularity as the competency assessment forum is announced and as more resources are added and advertised. With this anticipated success comes a requirement to redesign the page and to undertake regular updates and maintenance of the site. Without this ongoing support it will not be possible for the CAeM website to fully support Members in addressing the wide range of issues related to aeronautical meteorological matters.

Training to Fill Competency Gaps

To ensure that personnel from current and future courses will have the required background knowledge and skills required of AMP, RTCs will have to align their programmes...
with the required competencies in WMO Technical Regulation 49 as well as with the “Implementation Guidance for Competency Standards” (formerly the Second Level Competencies). The competency standards and other resource material are accessible from the CAeM website (www.caem.wmo.int/moodle/), by selecting “Regulatory and Reference Material” and “Login as a guest”.

It is anticipated that Members will identify some gaps in knowledge, skills and behaviours of some of their staff when carrying out their AMP competency assessments. Thus Members will need to seek targeted training for specific competencies. In addition, there will be a need for low-cost training for AMP such as that delivered remotely. CIMH in the Caribbean have recently worked with COMET to create an online course to address much of the background knowledge and skills requirements for aeronautical meteorological forecasters. This could form a good model for other RTCs to take up in assisting Members address the training needs. Finally, the Panel was reminded that significant training resources are available in English but, for other languages, few options exist.

In summary the Panel concluded that:

1. RTCs be requested to align their aviation training programs with the “Implementation Guidance for Competency Standards” for AMP.
2. RTCs place a high priority on the exploitation and delivery of online training to support the knowledge and skills requirements of AMP.
3. Members are requested to assist with the development of training material in different languages.
4. There was a need to promote the availability of ET-ETC support for AMP competency assessment.

The Panel confirms its support to assist Technical Commissions and Regional Associations to follow the CAeM example in establishing competency descriptions and assessment for other WMO disciplines.

4.7 WMO Fellowship Manual

The Panel noted that the WMO Manual on Policies and Procedures for Fellowships was developed in 2006 in response to the need for a more effective and transparent delivery of WMO fellowship activities. The manual addresses the entire process from the level of application, through selection, to delivery and monitoring of awards, but is only available in English. WMO is one of the few agencies that has developed a manual detailing the award process and entitlements for fellowships.

The Panel recalled that the manual was developed with due consideration to the other fellowship schemes that operate within the United Nations system. Hence the manual should adhere to certain standards within the UN family. As some provisions of the WMO fellowships are different from those provided by other UN organizations and agencies, e.g., no home leave travel and lower monthly stipend due to budgetary constraints, there is a need to reconcile the differences with the UN system. The Panel recommended that these and similar conditions that are, in practice, waived or reduced by WMO, are kept in the new top-level publication for conformity with the other UN agencies.

In reviewing the draft update to the Fellowship manual, the Panel recommended to the ETR Office that Appendix B of the current draft and updated forms be made readily available in at least English, French, Russian and Spanish for WMO Members. This smaller, user friendly publication should be reviewed at the start of each financial period to take account of the funding set aside for fellowships in that financial period. This smaller publication could state that, due to financial constraints, it would not be possible to provide
home leave and UN standard stipends for the current financial period, thus providing the link between the wider UN conditions and those in WMO for this period. The Panel decided that the redrafting of the complete fellowship manual should continue with a small working group of Vilma Castro, Biswajit Mukhopadhyay and Karen McCourt (co-opted from the Met Office, UK) to assist and further review the current and next draft of both publications.

The Panel suggested that the EC Criteria for Fellowships be included on the agenda of the next Panel session.

4.8 The WMO Fellowship Programme

The Panel noted that WMO Fellows are placed in all continents. Table 4 shows that, in line with EC criteria, most of the awards have been given to experts from developing and least developed countries. Since 2010, WMO has awarded 167 fellowships, amounting to 1,847 person-months with a total amount awarded of CHF 2,265,380. There was an increase in the number of fellowships, person-months and total amount invested in 2011 compared to 2010. Approximately 50% of the awards were for least developed countries. Expectedly, RA I where most of the LDCs are located, had about 50% of the awards, followed by RA IV. Of recent, more applications are being received from RA III and RA IV, perhaps as a response to an increased fellowship promotion campaign.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total No of awards</th>
<th>Man/ months</th>
<th>Amount of awards CHF</th>
<th>LDCs</th>
<th>RAI</th>
<th>RAIi</th>
<th>RAIii</th>
<th>RAIV</th>
<th>RAV</th>
<th>RAVI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>80</td>
<td>883</td>
<td>1,057,054</td>
<td>44</td>
<td>54</td>
<td>5</td>
<td>6</td>
<td>12</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2011</td>
<td>87</td>
<td>964</td>
<td>1,208,326</td>
<td>40</td>
<td>42</td>
<td>8</td>
<td>7</td>
<td>18</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

The Panel recalled that Congress requested the Panel to investigate and make recommendations to EC on whether WMO fellowships should be awarded for fellows to study in their home country. Following extensive discussion and looking at the benefits and disadvantages of supporting fellows to study in their own country, the Panel recommended to EC:

*where suitable education and training institutes exist in the fellows’ home country, the Member is expected to provide national support for such education and training. Exceptions to this general guidance could allow support for fellows to undertake distance learning courses at foreign institutes while still continuing to work in their home country or, in exceptional circumstances, avoid the situation of sending someone abroad to undertake a course that could be undertaken in their home country at a fraction of the cost. In this later situation the WMO fellowship grant should be restricted to the tuition fees alone, with the fellows’ institution covering any other costs such as book allowance, medical insurance, thesis allowance and stipend.*

The Panel considered the case where fellowships at universities are requested for people to work in areas such as aeronautical meteorological forecasting, and the home country does not have the facility to provide the job specific training following a fellowship award. Noting the growing importance of competencies, particularly in aeronautical meteorological forecasting, the Panel recommended to EC that, in such a case, the ETR Office should attempt to find an on-the-job or short-term training opportunity in the host country. This recommendation was reached in clear knowledge that this additional training would place even further demands on a tight fellowship budget. However, if this additional
investment is not made, it is unlikely that the fellow would be able to undertake the role for which they were originally awarded the fellowship, thus voiding the value of the original investment. The Panel concluded that in an area of increasing regulation and legal liabilities, it is better to invest in fewer fellows who can meet the requirements than a larger number of fellows who cannot.

The Panel further recommended that WMO fellows, particularly those taking courses related to aeronautical meteorology, should only be placed in training institutes that could show that their courses clearly meet the BIP-M/MT requirements.

4.9 Update on Competency activities

The Panel recalled that Cg-16 appreciated the work being undertaken in the ETRP and the various Technical Commissions to develop competency standards for the core job-tasks in meteorology and hydrology. Congress recommended that all technical commissions make this a high priority activity and incorporate this task into their current work programmes. Congress requested that the technical commissions follow the model developed by the Commission for Aeronautical Meteorology in providing top level competency Standards that could be incorporated into the WMO Technical Regulations( if there is a critical need to do so).

The Panel acknowledged the creation of a webpage to provide Members with a central link to the competency statements from the Technical Commissions. http://www.wmo.int/pages/prog/dra/etrp/competencies.php. The page will be updated as the Technical Commissions develop and implement their competency statements.

The Panel thanked the ETR Office for preparing a short summary of competency activities in the various commissions.

Commission for Aeronautical Meteorology (CAeM)
At the present time the Commission for Aeronautical Meteorology is the only Commission that has developed and approved competency statements (Standards for AMP as they are included in the WMO Technical Regulations). Through the CAeM Expert Team on Education, Training and Competencies (ET/ETC) five workshops for Members on the use of the Competency Assessment Toolkit have been held since late 2010. More than 100 individuals from 70 Members have participated in this training. See section 4.6.

Commission for Climatology (CCI)
Developing competencies and identifying suitable education and training resources for personnel involved in delivering climate services will be an important part of implementing GFCS and its associated capacity development. The Panel discussed this issue at depth based on a paper from Dr. Enric Aguilar.

Joint Commission for Oceanography and Marine Meteorology (JCOMM)
JCOMM will be meeting in Korea in May 2012. From discussions with the Co-President of the Commission and the WMO Marine Meteorology and Oceanography Division, one of the major work tasks anticipated for the next period of JCOMM will be to develop competency statements for Marine Meteorology and Oceanography. They are anticipating following the model used in CAeM and will most likely use some work already completed by NOAA as a starting point. Tim Spangler agreed to offer as a contact point with JCOMM on Education and Training matters.

Commission for Hydrology (CHy)
The CHy Advisory Working Group (AWG) met in December 2011 and included a specific item on classifications, qualifications and competencies for Hydrological personnel on their agenda. The AWG noted the request by Cg-16 to review the definitions
of Hydrologist and Hydrological Technicians and address related classification and competencies issues. The AWG agreed that this was a challenging task, in view of the need to engage with and involve other stakeholders in the hydrological community (e.g. UNESCO IHP, UNESCO IHE, IAHS, etc.) in the discussions. The AWG felt that the issues fall within the CHy Quality Management Framework-Hydrology thematic area and decided that they should initially be addressed in the current work plan to the extent possible, and then in the future work plan of the Commission to be finalised at the Fourteenth Session of the Commission to be held in Geneva in November 2012.

Commission for Instruments and Methods of Observation (CIMO)

At its last session (2010) the Commission for Instruments and Methods of Observation added an additional work task related to developing competencies for meteorological observers. From discussions with the President and the Secretariat Office supporting CIMO, it would appear that this task is seen as having not as high priority as other tasks for CIMO given all of the other challenges they face. At CIMO’s request the Panel has nominated Biswajit Mukhopadhyay as a contact person from the EC Panel familiar with instruments and methods of observation.

Commission for Basic Systems (CBS)

The Public Weather Services (PWS) aspects of competency are being addressed. The task was split into three: one looking at the general forecasting competencies; a second looking at competencies associated with products and services improvement and development; and a third looking at competencies associated with client relationships and service delivery. To date two of the three PWS expert teams have met and developed material consistent with, but not in quite the same format as, the aeronautical meteorology competencies. The third expert team on products and services improvement and development will meet soon and will develop similar material. The PWS Implementation and Coordination Team (ICT) will meet at the end of April 2012 in Canada to review and finalize for approval by CBS-XV (September 2012) the full definitions developed by all expert teams. Mr. François Lalaurette from the Panel offered to act as the point of contact with the PWS and SWFDP groups in CBS on competency development.

4.10 Review of RTCs during 2011

The 2008-2015 schedule of RTC assessments continued with China, India, Russian Federation, Turkey and Uzbekistan assessed during 2011.

Each of the assessments was undertaken in a full team spirit and a high level of support from the host countries. On the whole, satisfactory progress was reported although there are key issues and challenges to be addressed by some of the RTCs (table 5, below). These include availability of relevant literature in the language(s) of the foreign students, effective coordination and collaboration between RTC components and universities at the national level, and the need to establish direct communication with the WMO Secretariat, Regional Associations and NMHSs. Noting the decisions at Congress-16, issues of accreditation and certification will be more prominent in the future. Noting that the RTC in Uzbekistan had not had any foreign students for some years, the Panel recommended that Uzbekistan be reconfirmed for a period of two years to allow them to better engage with the Region and attract foreign students. If, after two years the RTC is still not supporting foreign students, the Panel recommends that the institute no longer be recognized as an RTC. If the RTC has attracted foreign students or shown best efforts, the Panel recommends that the RTC be reconfirmed for a maximum of an additional six years to make a total of eight years. The extension is to be dependent upon the review of RTCs that will be carried out in parallel.

The Panel recommended that EC-64 reconfirm the status of RTCs in China, India, the Russian Federation and Turkey as WMO recognized Regional Training Centres for a
maximum of 4 years, and the RTC in Uzbekistan for 2 years. Reconfirmation of these RTCs past 31 December 2015 for up to four years should be dependent on implementation of the agreed assessment recommendations from this cycle of assessments and the outcome of the review of future roles and operations of RTCs.

The Panel recommended that the RTCs that have been dormant or unresponsive for four years or more (currently Angola, Brazil, Costa Rica, Italy, Venezuela) should be classed as ‘inactive’ and EC requested to identify a process to withdraw recognition.

The Panel recommended renewal of the RTCs as per Annex V and updated the schedule for assessments of RTCs as shown in Annex VIII.

<table>
<thead>
<tr>
<th>RTC</th>
<th>Improve communication with WMO &amp; Members</th>
<th>Improve WMO - RTC agreement</th>
<th>Improve facilities &amp; equipment</th>
<th>Improve Courses</th>
<th>Increase no of foreign students</th>
<th>Update staff skills</th>
<th>Improve collaboration with other institutions &amp; universities</th>
<th>Improve teaching resources</th>
<th>Increase use of DL</th>
<th>Need to do TNA of Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td></td>
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<tr>
<td>India</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Russian Federation</td>
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<td>Turkey</td>
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<tr>
<td>Uzbekistan</td>
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</table>

Table 5. Matrix of RTCs and major areas of interest. Shaded cell denotes more attention required for this RTC in this area.

Review of requests for establishment of new WMO- RTCs

**Indonesia**

The Panel reviewed the documentation prepared by BMKG and RCWC to support the recognition of a WMO Regional Training Centre in Indonesia. The Panel commended Indonesia for preparing an extensive and well documented proposal setting a benchmark for any future RTC proposals. The Panel concluded that recognition of the two proposed RTC components should assist RA V and some RA II members in addressing their education and training needs in the areas of meteorology and hydrology. The ability and desire of this RTC to engage Members in this widely dispersed area using distance learning was seen as a strong point of the proposal.

The Panel recommended that EC-64 recognize the training facilities of BMKG and RCWC in Indonesia as two components of a WMO Regional Training Centre in Indonesia to at least 31 December 2015 with extension for an additional four years dependent upon the outcome of the review of future roles and operations of RTCs

**India**
The Panel noted that the Secretary-General received a request from the PR of India with for the National Water Academy of India (NWA), located in Pune, to be recognized as a component of the RTC in India. NWA offers complementary education and training opportunities in hydrology, focusing on short-term training programme utilizing India’s growing capacity in the area of distance education and training in hydrology.

Taking advantage of meeting in Pune the Panel visited the NWA to inspect its facilities and discuss the training programme and proposals with the staff and management of NWA. The Panel concluded that the NWA was well organized with excellent programme and support facilities at international level. The Panel was particularly impressed with the NWA’s approach to and support for participants in their first distance learning course. The Panel concluded that recognition of the NWA as a third component to the WMO RTC in India would assist RA II and some RA I members in addressing their education and training needs in hydrology and water resource management.

The Panel recommended that EC-64 recognize the National Water Academy in India as a third component to the WMO Regional Training Centre in India to at least 31 December 2015 with extension for an additional four years dependent upon the outcome of the review of future roles and operations of RTCs

The Panel approved resolution Pan 1 (Annex VI)

**Review of training activities of WMO-RTCs during the period 2010 – 2011**

Table 6 summarises the reports for the period 2010 and 2011 from 18 of the 23 WMO-RTCs. No reports were received from the RTCs in Angola, Italy and Venezuela since 2007.

Although the RTC in Barbados did not submit their reports, the RTC is active and involved in short-term and long-term training.

The courses offered ranged from long-term courses in MSc, BSc and Meteorological Technician to short- and very short-term courses in fields such as meteorology, climatology, agro-meteorology, aeronautical meteorology, weather forecasting, hydrology, water resources management, satellite meteorology, numerical weather prediction and meteorological instruments.

Table 6 provides an indication of the RTCs that are actively involved in the training of foreign students and that are therefore fulfilling the main requirement for their establishment and the expectation of their respective regions.

<table>
<thead>
<tr>
<th>Nr.</th>
<th>RTC Host Country</th>
<th>Nr. Of Courses</th>
<th>Local Participants</th>
<th>Foreign Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Algeria (IHFR)</td>
<td>6</td>
<td>41</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Angola (INAMET)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Argentina (SMN) &amp; (UBA)</td>
<td>98</td>
<td>1'129</td>
<td>113</td>
</tr>
<tr>
<td>4</td>
<td>Brazil (UFPA)</td>
<td>2</td>
<td>733</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Barbados (CIMH)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>China (NUIST) &amp; (CMATC)</td>
<td>37</td>
<td>214</td>
<td>409</td>
</tr>
<tr>
<td>7</td>
<td>Costa Rica (UCR)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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Table 6. Summary of RTC course details for 2010 and 2011

Comparing these figures with those for 2007, 2008 and 2009, shows that the average numbers of foreign students trained in the RTCs are very similar at 700 and 750 per year.

The RTCs in Niger and Turkey trained many more foreign than local students. 80% of the foreign students were trained in five RTCs located in Argentina, China, Niger, Russian Federation and Turkey.

The RTCs in Brazil, Iraq and Uzbekistan reported that they have not trained any foreign students in 2010 and 2011. Five RTCs located in Algeria, Islamic Republic of Iran, Madagascar, Nigeria and Philippines trained fewer than 10 foreign students during the same period.

The Panel requested that copies of the RTC annual reports be sent to the Presidents of Regional Associations and Technical Commissions as per the designated RTC reporting mechanisms.

4.11 Future Role and Operation of WMO Regional Training Centres

The Panel recalled that at its 19th session in April 2000, the topic of “Future Roles and Operations of RMTCs” (Annex X) was discussed with EC-54 approving the subsequent action plan in June 2002 (ANNEX XI). The Panel noted the similarity of issues between 2002 and 2012 and agreed with the comments on the outcomes of the 2002 action plan (ANNEX XII). This was further reinforced by the number of dormant or inactive RTCs for the 2010 and 2011 period. In a spirited discussion the Panel noted that:

- If the RTC network was considered to be fully effective there would be no need to reconsider the future of the RTCs. Also if there were easy ways of improving their overall effectiveness, action would have already been taken.
- The external assessment process for RTCs has been effective in helping enhance the quality of their training provision and in some cases may have assisted in helping them improve facilities. However, there was little evidence that the assessments had led to an increase in the number of foreign students attending RTC courses.
- The number of RTCs is increasing while some existing RTCs appear to be inactive.
Based on these considerations, the Panel established a Task Team to carry out a wide-ranging and thorough review of the future of RTCs. Its remit includes an assessment of the advantages and disadvantages of the options (with nothing ruled out) along with considerations of the practicalities of how any changes could be implemented. Also, if possible, the Task Team would make a recommendation about its preferred option. The Task Team will consider issues such as implementing quality assurance, meeting regional needs and providing opportunities for vocational training. In addition, the criteria for creating RTCs will be reviewed and, if a new structure is recommended (e.g. having a two-tier structure), the associated criteria will be proposed. The Task Team will report to and solicit input from the entire Panel periodically. The report of the Task Team will be presented to the next meeting of the Panel. Suggested Task Team members François Lalaurette, Julius Wellens-Mensah, Winifred Jordaan, Benoit Sarr, Bob Riddaway and the ETR Office. The Terms of Reference, membership and chair is to be agreed with the WMO President. The ETR Office is to progress discussions via the online forum prior to EC-64 agreement on the task.

The Panel also recommended that, until a decision has been taken about the future of RTCs, that no new RTCs should be established. Additionally, any reconfirmations should be for a period of three years. This will allow the Panel to make recommendations to EC and to Cg-17 for changes to the RTC concept.

5 ETRP TRAINING ACTIVITIES

5.1 Twelfth WMO Education and Training Symposium (SYMET 12)

While noting that significant funds had been put aside to hold a Symposium in 2013, the Panel debated the benefit for Members of holding a Symposium versus utilizing these funds for other high priority education and training activities. Following a lengthy and active debate, the unanimous decision was that the Symposium would benefit Members. Possible topics included: certification of institutes, marine meteorology, climate, links with universities, attracting students to meteorology, climatology and hydrology, and RTC review. The Panel believed that addressing topics such as these will greatly assist Members to identify and address their education and training needs to support the delivery of weather, water and climate services in the period 2014 to 2019. The Panel noted the desirability of linking to other international organizations such as WHO, WFP, FAO in addressing the education and training requirements related to climate services. The Panel, however, cautioned on the need to keep the focus on the NMHS education and training requirements to deliver services to the groups represented by these international organizations.

The Panel formed a planning committee of Kent Johnson (Chair of Planning Committee), François Lalaurette, Winifred Jordaan and Ian Lisk to work with the ETR Office to further refine themes, identify suitable keynote speakers, pursue possible host countries and institutes etc. The Panel further agreed that the proposed outcomes for the Symposium be clearly articulated. Suggestions for Symposium themes will be made through a forum created by Kent Johnson on the Panel MOODLE site. Suggestions and input will be received before the end of April 2012.

5.2 Proposed Training events for 2012 to 2015

The Panel reviewed the education and training activities outlined in the Operational Plan discussed during Cg-16. The Panel noted that the scope of the activities was quite wide and it was possible to categorise most of them into one of the high priority areas for this
financial period but there appeared to be little or no prioritization or tactical strategy. The Panel noted that the proposed activities were similar to those undertaken in the previous financial period and there appeared to be little innovation shown in terms of delivery method. The Panel requested that the next Panel session be scheduled to allow them to provide input and guidance into the strategic planning and budget for the 2016 to 2019 financial period.

6 IDENTIFICATION OF GAPS BETWEEN DEVELOPMENT REQUIREMENTS AND CURRENT PLANS AND OPTIONS TO REDUCE THE GAPS

The Panel noted that, without a comprehensive and up to date training needs analysis from the Members and the Regional Associations, it was impossible to carry out the gap analysis in a meaningful manner. To overcome this in the future, the Panel recommended to EC-64 that:

- Regional Association terms of reference should be updated to include the designation of Regional Association ETR Focal Points (ETR FP). The ETR FP should be a PR from the Regional Association Management Group (MG), should work in close coordination with the designated EC Panel of Experts on Education and Training regional representative and Regional Training Centres, and be assigned responsibilities for:
  - Gathering and prioritizing regional learning needs for consideration by the Regional Association Management Group;
  - Monitoring and evaluation of regional education and training activities;
  - Reporting on, and requesting endorsement of, prioritized regional learning needs at Regional Association sessions and at the four yearly ETR Symposium;
  - coordinating the use of Regional meetings/workshops/seminars as opportunities for gathering information on Regional learning needs.

- The ETR Symposium in late 2013 be used as an opportunity to address the consolidated and prioritized 2016 to 2019 learning needs gathered by the ETR FPs.

Having reviewed the current and proposed education and training plans against the wider WMO priorities, the Panel noted that the resources available to the ETRP were insufficient to meet all of the proposed demands in a meaningful manner. A consolidated and prioritized learning needs analysis could improve the effectiveness of the ETRP within the current budget framework.

7 REPORT ON THE EDUCATION AND TRAINING OFFICE

7.1 Status Report on the WMO Education and Training Office

The Panel congratulated the ETR Office on the quality and quantity of the activities carried out over the last two years, particularly with the staffing and resource constraints.

ANY OTHER BUSINESS

The Panel recommended that COMET be recognized as a DCPC (Data Collection and Production Centre) for WIS, specializing in education and training resources. CBS will consider this at their next session in Indonesia in September 2012.
The Panel discussed the proposed WMO Volunteer programme, supported the concept and believed that it had the potential to assist Regional Training Centres and national meteorological training institutes. The Panel was pleased to note that the proposed programme now included a number of education and training roles.

The Panel asked to be briefed, on an intra-sessional basis, on the Country Profile Database (http://www.wmo-sat.info/~wisuser/cpdb/) and potential links to the Education and Training Programme.

The Panel briefly addressed the question of how to attract and retain new students to meteorology, hydrology and climatology in developing and least developed countries where salaries were low, job opportunities limited and in some cases few secondary school students with adequate mathematics and physics. The Panel noted that the problems were complex and primarily needed to be addressed at individual Member level. Panel members exchanged their experiences of: using WMO Day as a focus to invite the public and schools into their NMHSs; using partnerships such as GLOBE and national institutions to work with the primary and secondary education sectors in their countries; opportunities for creating jointly funded chairs in meteorology, climatology and or hydrology at the university level; options for WMO to sponsor / support the International Earth Science Olympiad (Argentina 2012 and India in 2013); and, using support such as the WMO HOMS page (http://www.wmo.int/pages/prog/hwpr/homs/homs_index.html), the WMO Virtual Laboratory (http://www.wmo-sat.info/vlab/) and the COMET MetEd site (https://www.meted.ucar.edu/) to exchange information and resources for professionals and students. The Panel requested that the ETR Office provide information about WMO’s public education programme and career brochures on an intra-sessional basis to further discussion.

The Panel were informed about a CIMO proposal to update the Cloud Atlas and a proposal to develop a global satellite interpretation manual based upon the European SatManu. The Panel requested the ETR Office to continue liaison with CIMO on the Cloud Atlas and with the Space Programme on the satellite interpretation manual, and to assist within available resources and priorities.

The Panel received an update of the action items from the previous session via the forum and noted that the majority of the actions had been completed with the remaining ones ongoing. The Panel agreed to write it into the meeting report (see Annex XIII). The Panel requested the ETR Office to update the Panel on action items in approximately 12 months time and also formally include a report on action items in the meeting agenda for the next session.

**NEXT MEETING**

The Panel agreed that its next session should take place in the first quarter of 2014. Noting that a Panel session had never been held in Africa the Panel encouraged the ETR Office to investigate options for holding the next session at one of the African Regional Training Centres, taking into account cost effectiveness and security concerns.

The Panel was also advised that the Informal Planning Meeting (IPM) had noted an interest in holding their meeting in parallel with the next session of the Panel in early 2014.

**APPROVAL OF THE DRAFT REPORT**
The Panel reviewed the draft report of the session and approved it, subject to the inclusion of agreed corrections and editorial amendments to be overseen and approved on behalf of the Panel by the acting Chair, Mr Kent Johnson.

CLOSURE OF THE SESSION

The acting Chair of the session expressed his satisfaction with respect to the constructive spirit in which the Panel worked throughout the present session.

He commented on the positive aspects of holding the Session in a Regional Training Centre outside of Geneva. The acting Chair expressed appreciation for the opportunity to visit and meet the staff of key partner organizations such as the Regional Centre in Pune and the National Water Academy. In closing he once again thanked the host country and the team at the RTC Pune for their continuous support, hospitality and local arrangements.

The session was closed on 30 March 2012 at 1:58 PM
Annex I. A REVISED AGENDA

1. ORGANIZATION OF THE SESSION
1.1 Opening of the session
1.2 Approval of the agenda
1.3 Programme of work

2. MAJOR OUTCOMES OF CONGRESS-16 AND EXECUTIVE COUNCIL - 63
2.1 Major Outcomes From Congress And Executive Council
2.2 Update on the status of Strategic and Operational Plans from an Education and Training perspective
2.3 Role Of The EC-Panel Over The 2012 To 2015 Period

3. EXCHANGE OF VIEWS ON THE GOALS AND OBJECTIVES OF THE WMO EDUCATION AND TRAINING PROGRAMME (ETRP) IN THIS FINANCIAL PERIOD

4. IDENTIFICATION OF WMO HUMAN RESOURCE DEVELOPMENT REQUIREMENTS
4.1 Climate Services – Human Resource Development
4.2 Certification of personnel in meteorology
4.3 Trainer Competencies
4.4 Human Resource Development – Capability Framework
4.5 Report from the Co-Chairs of the Task Team on Distance and Online Learning
4.6 Aviation competencies
4.7 WMO Fellowship Manual
4.8 The WMO Fellowship Programme
4.9 Update on Competency activities
4.10 Review of RTCs
4.11 Future Role and Operation of WMO Regional Training Centres

5. PLANNED TRAINING ACTIVITIES AND APPROACHES TO MEET THE DEVELOPMENT REQUIREMENTS
5.1 Twelfth WMO Education and Training Symposium (SYMET 12)
5.2 Proposed Training events for 2012 to 2015

6. IDENTIFICATION OF GAPS BETWEEN DEVELOPMENT REQUIREMENTS AND CURRENT PLANS AND OPTIONS TO REDUCE THE GAPS

7. REPORT ON THE EDUCATION AND TRAINING OFFICE
7.1 Status Report on the WMO Education and Training Office

8. DATE AND PLACE OF NEXT SESSION

9. APPROVAL OF THE DRAFT REPORT

10. CLOSURE OF THE SESSION
## Annex II. LIST OF PARTICIPANTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Position/Role</th>
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<th>TEL:</th>
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<td>Education and Training Office</td>
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Annex III. The WMO Education and Training Programme

The WMO Education and Training Programme

Cg-16 decided:
− That the major thrust of the WMO Education and Training Programme shall continue to be directed towards assisting Members’ NMHSs develop competent and qualified staff so as to enable them to effectively meet their relevant national and international obligations and challenges;
− That the main strategy of the ETRP to achieve this goal is to collaborate with national and international partners, training institutions, schools, academia, the media, and public and private sectors in order to assist NMHSs to meet their education and training needs in the most cost-effective manner;
− That special emphasis should be placed on promoting and supporting the exchange and sharing of training resources and expertise among Members, including e-learning;
− That the Education and Training Programme should contribute to the WMO Strategy for Service Delivery and to the Global Framework for Climate Services.

Cg-16 requested the Executive Council:
− To take all necessary actions to enable the Education and Training Programme to meet its objectives under the WMO Strategic Plan 2012–2015 and beyond;
− To give high priority to ensuring effective overall coordination and leadership of the Programme and ensure that WMO standards are maintained;
− To continue to draw fully on the advice and assistance of its Panel of Experts in meteorological and hydrological education and training in the further development of the ETRP;
− To further elaborate on the proposal by the EC Panel of Experts on Education and Training to form a consortium of RTCs, NMHSs and other institutions to develop an accredited online course in meteorology, consistent with the BIP-M requirements, to assist Members in meeting their education and training requirements.

EC-63 renewed the Panel and elected members to oversee the ETRP according to Terms of Reference in Resolution 19 (EC-LXII):
(1) To promote and provide guidance on the education and training of personnel of National Meteorological and Hydrological Services, particularly in developing and least developed countries;
(2) To liaise with and respond to the WMO regional associations and technical commissions in the field of education and training within their respective areas of responsibility;
(3) To review the priorities and direction of the education and training activities undertaken by the Secretariat;
(4) To review the fellowships programme, providing guidance and advice on actions aimed at strengthening the programme and its effectiveness;
(5) To contribute to the preparation of the WMO Strategic and Operational Plans for the period 2016–2019 by providing input, comments and recommendations with regard to the capacity-building parts of the Plans;
(6) To recommend suitable WMO symposiums, courses, workshops, seminars and distance learning opportunities;
(7) To advise on actions for strengthening the existing Regional Training Centre network and for monitoring the Centres’ activities, as well as the designation of suitable training institutions as WMO Regional Training Centres, and encourage training centres of National Meteorological and Hydrological Services to utilize the Executive Council criteria for the recognition of Regional Training Centres in monitoring the quality of their programmes;
To advise on and promote training resources and methodologies suitable for use by WMO Regional Training Centres, training centres of National Meteorological and Hydrological Services and other training institutions.
### Annex IV. Indicative Climate Service Competencies

#### A. Climate Database Development, Maintenance and Implementation

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<th>Competency</th>
<th>Details</th>
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| A.1 Understand and communicate the importance of Climate Database Development, Maintenance and Implementation | A.1a Have appreciation for the local, regional and global importance of climate data.  
A.1b Be aware of the goal of a Climate Database: to preserve, capture, and provide access to climate data and climate data products for use by planners, decision makers, and researchers.  
A.1c Understand the special requirements of the climate-oriented data models (for example, the need to extract long term data sets)  
A.1d Know the different components of a climate data model and the relationships between them  
A.1e Have knowledge of the Essential Climate Variables (ECVs) that have to be included in the data model and their different resolutions and sources |
| A.2 Have Advanced knowledge on databases                                      | A.2a Have advanced knowledge of database implementation and management theory, including design, maintenance and programming  
A.2b Have advanced knowledge (programmer, user) of a Climate Database Management System software  
A.2c Have knowledge advance knowledge (programmer and user) of tools to design, implement, and maintain user-friendly web-based dataset access and retrieval  
A.2d Have knowledge of the statistical principles involved in the preparation of a dataset |
| A.3 Design, implement and maintain a climate data model                       | A.3a Prepare the climate data model to distinguish between raw, quality-controlled, and adjusted data and to document the different data sources.  
A.3b Design, along with the data model, the metadata model. |
| A.4 Design, implement and maintain a data and metadata acquisition system     | A.4a Prepare adequate routines to ingest into the CDMS data and metadata in digital formats  
A.4b Prepare adequate routines and tools to ingest data and metadata from different hard copy sources  
A.4c Prepare adequate validation tools to ensure the high quality of the ingested data and metadata |
| A.5 Design, implement and maintain data access and retrieval procedures       | A.5a Document the Climate Database  
A.5b Establish routine protocols to document all the components and protocols of the climate data model  
A.5c Establish routine protocols to document all the managerial operations performed over the database |
| A.6 Apply Climate Database management procedures                              | A.6a Monitor and manage the adequate performance of the CDMSs  
A.6b Monitor, evaluate, and manage the security risks of the CDMSs  
A.6c Identify the necessary hardware and software requirements to efficiently and safely run the CDMS |
| A.7 Document the Climate Database                                             | A.7a Assess and locate the sources and holders of climate data and metadata to be rescued  
A.7b Analyze the national climate dataset to identify critical data to be rescued  
A.7c Assess the efforts and logistic required and design realistic data rescue campaigns, prioritizing the critical information previously identified |

#### B. Climate Data Rescue

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<th>Competency</th>
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| B.1 Understand and communicate the importance of Climate Data Rescue – DARE procedures as a way to recover, preserve, and put in use the historical and scientific heritage represented by ancient climate data sources. | B.1a Have appreciation for the local, regional and global importance of ancient climate data and ancient climate data sources.  
B.1b Be aware of the importance of climate DARE for a correct reconstruction and evaluation of past local, regional, and global climate  
B.1c Understand the need in terms of organization and coordination of the hard copy data and metadata transfer from the original sources.  
B.1d Understand the necessity of including metadata in any rescue operation |
| B.2 Design and organize a climate DARE strategy                             | B.2a Assess and locate the sources and holders of climate data and metadata to be rescued  
B.2b Evaluate the data which can be potentially rescued and design inventory procedures  
B.2c Analyze the national climate dataset to identify critical data to be rescued  
B.2d Assess the efforts and logistic required and design realistic data rescue campaigns, prioritizing the critical information previously identified |
| B.3 Manage climate data rescue operations                                    | B.3a Apply techniques for quick data imaging, including scanning, digital photo and OCR  
B.3b Organize effective and reliable data and metadata keying campaigns  
B.3c Organize and preserve the hard copy and digital data and metadata files |
| B.5 Manage the validation and documentation of the DARE process              | B.5a Design and set up validation strategies on data entry time  
B.5b Design and set up specific quality control routines for the rescued data  
B.5c Integrate the rescued data and metadata into the CMDS with clear indication of the data procedure and other metadata associated to its acquisition  
B.5d Integrate the rescued data into the national dataset, understanding and assessing the benefits (longer and more complete time series) and the drawbacks (potential inhomogeneities and quality control problems) derived from this process. |
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<th>C. Climate Data Quality Control</th>
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<tr>
<td>C.1 Understand and communicate the mechanics, importance and need of climate data quality control for climate analysis</td>
<td>C.1.1 Understand quality datum as those representative of what was intended to be measured and hence free of non-systematic errors</td>
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<tr>
<td>C.1a Understand the nature and sources of non-systematic errors</td>
<td>C.1b Understand the mechanics and principles of climate data quality control, including the peculiarities of different climates, climate elements, resolutions and networks</td>
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<tr>
<td>C.1c Understand the mechanics and principles of climate data quality control</td>
<td>C.1d Understand the relationship between raw, quality controlled and adjusted data and the need for preserving all the available data and data versions</td>
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<td>C.1e Understand the uses and limitations of quality controlled climate data</td>
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<td>C.2 Acquire the technical capacity to produce quality control routines</td>
<td>C.2a Be proficient in the programming languages oriented to produce statistical routines for climate data quality control.</td>
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<td>C.2b Be proficient in the adaptation graphical tools, including GIS, to produce graphical routines for climate data quality control.</td>
<td>C.2c Be proficient in the preparation of database queries for climate data quality control</td>
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<td>C.3 Design and manage the climate data quality control system</td>
<td>C.3a Select the quality control procedures for the organization, including those for DARE and data acquisition</td>
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<td>C.3b Produce an adequate stage of validation flag code and implement it into the CDMS</td>
<td>C.3c Set up and manage the validation procedures of quality of flagged data</td>
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<td>C.3d Document all the climate data quality control procedures</td>
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<tr>
<td>C.4 Manage, use and transmit quality controlled climate data</td>
<td>C.4a Integrate the quality controlled climate data into the CDMS</td>
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<td>C.4b Prepare documentation files for the quality controlled climate datasets and include them in any data transmission</td>
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<th>D. Climate Data Homogenization</th>
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<td>D.1 Understand and communicate the concept, needs and objectives of climate data and homogenization</td>
<td>D.1.1 Understand the concepts of homogeneous and inhomogeneous climate data</td>
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<tr>
<td>D.1b Be aware of the need of climate data homogenization as a previous requisite to any climate data analysis</td>
<td>D.1c Understand the problems associated with the use of non-homogeneous climate data and avoid its utilization</td>
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<td>D.1d Understand the position of climate data homogenization in climate data management and the need for previous DARE and QC</td>
<td>D.1e Understand the objectives of climate data homogenization and the limitations associated to homogenized climate data</td>
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<td>D.1f Understand the value of metadata information in climate data homogenization</td>
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<tr>
<td>D.2 Acquire the capacity to understand the theoretical principles of the homogenization techniques</td>
<td>D.2a Understand the principles of direct, relative and absolute homogenization and their conditions of application</td>
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<tr>
<td>D.2b Know the statistical principles and different methods associated with change point detection</td>
<td>D.2c Be aware of the most common homogenization methods and their theoretical principles</td>
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<tr>
<td>D.2d Know the statistical principles and different methods associated with homogeneity adjustments</td>
<td>D.2e Understand the different needs in terms of homogenization in function of the climate, climate elements, data resolution and network characteristics</td>
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<td>D.3 Select and modify the homogenization techniques relevant to the data</td>
<td>D.3a Use statistical packages, programming languages and GIS tools necessary to run, modify or program homogenization tools and validation procedures</td>
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<td>D.3b Select and be able to adapt and apply different homogenization packages</td>
<td>D.3c Select a set of homogenization and validation tools to use in homogenization campaigns</td>
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<td>D.4 Prepare and coordinate homogenization campaigns</td>
<td>D.4a Run homogenization software</td>
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<td>D.4b Interpret and modify accordingly the results of break-point detection in the light of metadata</td>
<td>D.4c Prepare and apply statistical validation procedures of the adjusted data</td>
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<td>D.4d Prepare and apply graphical validation tools</td>
<td>D.4e Document all the homogenization and validation procedures applied to data</td>
</tr>
<tr>
<td>D.5 Manage, use and transmit homogenized climate data</td>
<td>D.5a Integrate the adjusted data into the CDMS, with clear reference to the homogenization procedures passed</td>
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<tr>
<td>D.5b Prepare documentation files for the quality controlled climate datasets and include them in any data transmission</td>
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Annex V. TERMS OF REFERENCE FOR WORKING GROUP ON ENHANCING DISTANCE AND ONLINE LEARNING

Terms of Reference:
(i) Encourage and stimulate the development and use of distance and online learning through partnerships and collaborations; accomplished through broad distance learning programs and specific activities conducted by Regional Training Centres.

(ii) Provide leadership through the organization of online training in a key priority area;

(iii) Look for opportunities to acquire training resources from accredited institutions.

WORKPLAN AND TIMELINES
- Develop a list of potential proactive members and recruit to serve on the Task Team;
- Update the inventory of available resources that can be utilised for distance and online learning and make available through the WMO-ETRP web-site;
- Explore the need (through a Regional Association) for a Review of Aeronautical Meteorology Distance Learning Course (based on the work by CIMH and COMET);
- Adapt the Review of Aeronautical Meteorology Distance Learning Course for application to another Region.
- If the need exists conduct a train-the-trainer course to facilitate the running of the Review of Aeronautical Meteorology Distance Learning Course;
- Explore the development of a second BIP-M component course in the same manner as the Tropical Synoptic Meteorology course.

CORE MEMBERSHIP
Dr. Vilma Castro, Costa Rica (Chair) RA IV
Dr. Tim Spangler, USA RA IV
Someone from CAeM ET-ETC
Roger Deslandes
François Lalaurette to provide link to EUMETCAL
Claudia Campetella
China Meteorological Administration Training Centre
Kathy-Ann Caesar
Person from CWCR Indonesia

WMO SECRETARIAT Point of Contact
Jeff Wilson, D/ETR or C/TRA
Annex VI. DRAFT RECOMMENDATION 4/1 (PAN-25) - RECONFIRMATION OF RTCs ASSESSED DURING 2010-2011

The EC Panel of Experts on Education and Training

Noting

1. That the external assessment missions undertaken during 2010 and 2011 for RTCs in China, India, the Russian Federation, Turkey and Uzbekistan have shown that these RTCs meet most of the EC Criteria for the Recognition of WMO RTCs, and aspire to meet them all.

2. That the external assessment reports following the above referred missions recommend the continued recognition of those training Centres as WMO RTCs albeit with recommendations for further improvements in programmes, facilities and curricula.

3. That the 15th session of RA V (Bali Indonesia, May 2010) nominated the RCWC facilities in Indonesia as a WMO Regional Training Centre.

4. An extensive written proposal submitted by the Permanent Representative of Indonesia with WMO has been reviewed by the EC Panel of Experts on Education and Training with site visits carried out by representatives of the Secretary-General.

5. That EC-58 requested that the revised Criteria for the recognition of existing and new WMO-RTCs be strictly applied.

6. The EC Panel of Experts in Education and Training has recommended an extensive review of the future roles and operations of RTCs that could suggest major changes to the current RTC concept.

Recommends to the Executive Council of WMO
to reconfirm the status of RTCs in China, India, the Russian Federation and Turkey as WMO recognized Regional Training Centres for a maximum of 4 years and the RTC in Uzbekistan for 2 years. Reconfirmation of these RTCs past 31 December 2015 for up to four years should be dependent on implementation of the agreed assessment recommendations from this cycle of assessments and the outcome of the future roles and operations of RTCs.

Further Recommends to the Executive Council of WMO
to recognize the training facilities of BMKG and RCWC in Indonesia as two components of a WMO Regional Training Centre in Indonesia to at least 31 December 2015 with extension for an additional four years dependent upon the outcome of the future roles and operations of RTCs.

to recognize the National Water Academy in India as a third component to the WMO Regional Training Centre in India to at least 31 December 2015 with extension for an additional four years dependent upon the outcome of the future roles and operations of RTCs.
Annex VII. EXECUTIVE SUMMARY OF THE EXTERNAL ASSESSMENT REPORTS OF RTCS DURING 2011

I. WMO RTC- China

Nanjing University of Information Science and Technology (NUIST), Nanjing China
Meteorological Administration Training Centre, Beijing (April 2011) - Dr. Vilma Castro, Member of the EC Panel of Experts on Education and Training

The assessment of the two components of the RTC China took place in April 2011, during the days 26 and 27 (NUIST-Nanjing University of Information Science and Technology, Nanjing component) and 28 and 29 (CMATC-China Meteorological Training Centre, Beijing component).

Quoting the previous assessment, which took place in December 2003, both Centres offer a notable and excellent academic environment for education and training purposes in meteorology and related fields, with great quality faculty as well as remarkable, outstanding facilities and equipment. Indeed, facilities are well modernized and used for the benefit of the trainees. The level of human resources capacity is also very high, with most of the staff being extensively exposed to international issues and with good network of contact with credible experts and intellectuals abroad.

Considering that the recommendations from the previous assessment have been fully accomplished and that the improvement in the facilities both in Nanjing and Beijing in the past eight years is remarkable, the review team recommends that the EC Panel of Experts on Education and Training endorse, congratulate and encourage the work of the two components of the RTC China.

Recommendations to the RTC China-NUIST Nanjing

In the self-assessment prepared by the RTC-NUIST, there is a list of improvements that NUIST is intending to accomplish. The assessment team encourages NUIST to achieve such improvements, i.e:

- Consider specific management towards WMO scholarship international students.
- Consider internship arrangements for students, to facilitate their on-the-job skills.
- Increase the availability of English textbooks and references.
- Adopt system of two supervisors to let students get more guidance in research work and thesis writing.
- Attach students to some labs or institutes for more practical training.
- Organize high degree students to help lower degree students in study, for example, PhD students to deliver lectures for masters and undergraduates.
- Open more courses regarding meteorological software for master students in the first year.
- Integrate multi-disciplinary resources of the university, to broad education and training subjects and promote application of public and economic management, information science and technology, remote sensing technology, and environmental technology in MHS, and promote application of multi-media, distance learning and other new approaches in the training activities.

Three recommendations were added during the visit:

- Find ways to help students overcome their difficulty of integrating with the Chinese learning environment. There is an approach with HohaiUniversity which is already adopting in support of the international students, which NUIST could also adopt. Perhaps a survey of experience of other universities in coping with problems of international students could help in adopting a lasting solution to the current problem which some of the fellows are facing.
- Establish tutorial time for each course.
- Stress and maintain awareness that training must be localized when international fellows return to their countries.
Recommendations to WMO regarding NUIST Nanjing

- Support students in localizing their training by encouraging countries to supply local data from their home countries.
- Encourage NUIST and other host institutions in China to give priority to students who wish to continue their studies, in terms of seeking local scholarship opportunities. Presently scholarships are available only for undergraduate and MSc students.
- Consider granting scholarships to candidates from other regions in the world, not only Africa.

Recommendations to the RTC China-CMATC Beijing

- Consider increasing the already existing involvement of universities with CMATC, to better fulfil the mission of filling the gap between theory and operational work.
- Consider the translation of training material, particularly regarding climate change.
- Consider increasing the service to other countries by making English texts available on the web.
- Consider closing the gap between climatology and hydrology, as well as biology in view of the relationship between climate and water issues, biodiversity, desertification, health and others by working more closely with other institutions and experts dealing with those issues.
- Consider interacting with international trainees before their arrival to Beijing using distance learning methods.
- Consider developing distance learning alternatives for the international courses that are normally delivered face-to-face.

Recommendations to WMO regarding CMATC Beijing

- WMO should work more closely with the RTC in organizing and holding more operational meteorological training and on-the-job training related activities.
- WMO should assist CMATC in closing the gap between climatology and hydrology, as well as biology in view of the relationship between climate and water issues, biodiversity, desertification, health and others.

Regional Comments on Recommendations:

"Thank you for giving me an opportunity to be a part of the assessment team. The report has been quite comprehensive and I could learn a lot about RTC China. I congratulate the team of external assessment team. The RTC China is emerging as the best destination for getting trained, as the centre has excellent infrastructure and a large number of resource personnel. I fully agree with the recommendations, especially, those related to minimizing language and other requirement, like, utilization of distance learning. I think WMO would have no difficulty in continuing recognition. (Mazumdar)"
II. WMO RTC - India
Components at Pune and New Delhi, (21 to 28 March 2011)- Ms Meihua Wang, Member of the EC Panel of Experts on Education and Training

The New Delhi and Pune components of the WMO Regional Training Centre in India were visited by a three person review team from 21 March to 28 March 2011. The review reconfirmed the depth and scope of expertise that the Indian Meteorological Department have in place to ensure that their staff meet the international (WMO) education and training requirements. IMD are willing to provide this expertise to WMO Members in RA II and beyond but the review team found that this expertise could be much more pro-actively promoted by IMD, the RA II Association and the WMO Secretariat. There have been no WMO long term fellows trained in India since 2006.

However the review team was pleased to note that IMD has provided at least one long term fellowship under bilateral arrangements and a number of short term training events of varying duration as part of multi-lateral or bilateral co-operation in the last five years. The review team noted with appreciation the support that IMD offered to potential fellows and trainees: waiving of tuition fees for IMD courses, long and short term accommodation provided free of charge or heavily subsidized in the student hostels in New Delhi and Pune; contribution to per diem; assistance with visas and settling in; provision of education and training materials including a small book allowance. The review team also noticed the difficulties that IMD had encountered with some past students who had arrived with poor English and / or academic background. It is suggested that IMD could consider using written tests, or similar, as part of their selection and admission process to reduce the occurrence of these problems in the future. IMD has recently commenced a modernization programme and this change is reflected in the content of their training programme. The training programme is gearing up to support the change to: digital communications; introduction of Doppler weather radar and imminent introduction of polarized Doppler radar; advanced forecaster workstations and automated observing systems. All of these domains are of interest to WMO Members in the high priority areas for the 2012 to 2015 Financial Period. On the human side of things IMD have a well structured staffing scheme that links closely to their technical and management training requirements. Within the training programme they are in the process of introducing the requirement for the core trainers to have undertaken educational train-the-trainer courses as well as train-the-trainer courses in their subject domain.

The review teams were pleased to observe that the RTC had implemented a number of the recommendations from the previous assessment however more work remains to be done. Overall, the assessment team found that the RTC mainly meets the requirement for being reconfirmed as an RTC but there is some room for improvement.

Summary and Recommendations

The review team would like to thank the PR of India (Gen Tyagi, retired) and his staff for their warm welcome, open discussions and support during the assessment mission. Overall the assessment team found that the RTC mainly meets the requirement for being reconfirmed as an RTC but there is some room for improvement (see Annex VI for the rating table). The following recommendations indicate areas where there are opportunities for further development of the training provided by the RTC. Full implementation of these recommendations would be a major step to restoring the India RTC to its former international prominence. The assessment team suggest that IMD advise the WMO Education and Training Office of actions taken to implement these recommendations prior to 1 January 2012 and thereafter on an annual basis.

a) IMD to actively promote the education and training opportunities offered by the RTC for Regional Association II and contact the Regional Association on at least an annual basis to assess how the RTC can address the wider Regional training needs (Pune and New Delhi).

b) Regularly monitor and maintain the hostel facilities to bring them to international standard. Improve the existing hostel accommodation at Pune and New Delhi to similar standards as the hostel under
construction in Pune. Whilst the current facilities are clean they would benefit from more regular maintenance and improvements in ambience (Pune and New Delhi).

c) Course information should clearly state the learning outcomes for the course and individual subject areas as well as carry information on syllabus, reference material, study hours, term information etc. Long term fellows would benefit from an increase in the book allowance provided by IMD (Pune and New Delhi).

d) Continue the practice of requiring training staff to undergo train-the-trainer courses and link these to the review of subject material and teaching approaches (Pune and New Delhi).

e) Establish a central register for international education and training activities to ensure that all such education and training activities are recorded for easy accessibility and reporting. As IMD operates a number of WMO Centres (RSMC, RTH and possibly a GIS and a RIC in the future) any secondments and training undertaken as part of these Centres should be linked to RTC activities (Pune and New Delhi).

f) New Delhi component of the RTC to coordinate with the Pune component regarding processes and forms for course evaluations.

g) Create a training consultative committee to ensure that the training programme is meet the needs of IMD and the Region, the training courses are keep the updated knowledge to weather and climate prediction and other related services offered by the NMHSs.

h) Encourage IMD to continue endeavoring to cooperate with universities for gaining of academic credit for the long courses such as the Advanced Meteorologist Training Course (AMTC).

Minor recommendations:

i) Provide more details and structure in the on-the-job training components of courses (New Delhi).

j) Better utilization of the resources available across the RTC can be done through teacher – teacher and teacher – student interaction on a real time basis in a regular and structured manner. These may include periodical faculty meetings and interim teacher-student dialogue once a month or a fortnight (Pune and New Delhi).

k) Consider the use of course management software such as MOODLE (http://moodle.org/) to allow centralization of their training resources and improve access for students (New Delhi and Pune).

l) Actively take the opportunity of training needs reviews and course reviews, and use the anonymous student feedback to recast the courses into learning outcomes and to develop competency Standards for the common job areas. The assessment team noted that the last major review of most courses was undertaken between 2006 and 2008. The team was advised that the next review was due in 2012 (Pune and New Delhi).

m) Encourage the RTC to introduce a selection process that clearly identifies the English proficiency of the prospective students and also their mathematics and physics competencies.

**Regional Comments on Recommendations:**

“I finished reading the report on the external assessment of the Indian WMO Regional Training Centre (RTC) components at Pune and New Delhi. The report describes clearly details about the status and problems in the operation of the two RTC components. I think the recommendations the review team suggests the Indian Meteorological Department (IMD) to implement are appropriate and will be a help to the improvement of the RTCs in India.”
The only question I have about the report is whether or not the computing facilities in the RTCs have specification enough for training programs to be conducted without difficulties. In the report the review team briefly mentions that the RTCs have networked workstations configured to run Linux and Windows operating systems, but I think, the report could be improved if it includes the quick assessment of the capabilities of those workstations (or computing facilities).

It was pleasure to have opportunity to review this report and help your organization assess the global education and training program. (Hee-Sang Lee, Ph. D.)

**Local Comments on Recommendations:**

“At Pune component of WMO RTC India, we have following computing facilities:

1. In all PCS, in the network, microsoft fortran compiler is there. It is very useful for small computation even for running diagnostic models, for example to compute orographic uplift, orographic rainfall, convective updraft, convective instability, convective rainfall etc.
2. We have one PC fully equipped with unix platform (Redhat Linux), PGI compiler and WRF model. Using this model simulation study, studies on sensitivity to different physics/dynamics scheme etc can be done. Very shortly we are going to get five more such systems.
3. We have Metflosolver-7 platform, where the AGCM model VARSHA has been installed.
4. We have Synergie work stations, which is a very powerful tool for weather analysis.
5. Besides very shortly we are going to have GFS model installed in HPCS. Besides GFS, WRF has also been installed here. Although these models are primarily for operational forecasting, but it will also be used for training purpose also. (Somenath Dutta)”
III. WMO RTC – Russian Federation
Russian State Hydrometeorological University (RSHU), St. Petersburg, Roshydromet Advanced Training Institute (ATI/IPK) and the Moscow Hydrometeorological College, (MGMC) (6 to 11 June 2011) - Dr Gustavo Necco, former Member of the EC Panel of Experts on Education and Training

Dr. G.V. Necco carried out a review of the three components of the WMO RTC at the Russian Federation. The review was accomplished during the period 6 to 11 June 2011 at the Russian State Hydrometeorological University (RSHU), St. Petersburg, and from Monday 6 to Thursday 9 at the Roshydromet Advanced Training Institute (ATI/IPK) and the Moscow Hydrometeorological College, (MGMC) from Thursday 9 to Friday 10, accompanied by Mr. Momadou Saho, Chief, Training Division of the WMO Education and Training Office, and by Prof. Grigori Chichasov, Rector of ATI, as local member of the assessment team.

The assessments were carried out following, as much as possible, the guidance provided at the document of the EC Panel “Guidelines for the Recognition or Reconfirmation of WMO Regional Training Centres (RTCs)” of 20 September 2010, and taking into account previous reports and personal visits.

The assessment is as follows:

All three components:

✓ Offer a wide range of education and training programmes and activities taking into account the WMO Guidelines in the area of meteorological and hydrological education and training (WMO No.258);
✓ Have the necessary facilities and qualified staff for an efficient and effective provision of the required education and/or training;
✓ Host a number of international students from the Regional Association VI as well as other regions, the Russian Government offering scholarships for young candidates.

In particular, when compared from previous visits and reviews:

The RSHU St. Petersburg shows a marked improvement in terms of:

- Renewal of facilities and equipment and support to students,
- Offering of courses in the English language,
- Arrangements for the administration, governance and assessment of students, local and international,
- Strengthening of its International Relations Office,
- A clear and solid governance and planning from the present management.

The ATI/IPK and the MGMC, Moscow, very much improved their training and lodging facilities and computer educational equipment preparing the way for an expanded use of modern computer based training approaches.

Following the previous (2004) review it is recommended that:

i. The present interaction between all RTC components under the guidance of the Coordinating Council be strengthened in order to assure that the Roshydromet modern hydrometeorological equipment is available for training;
ii. The cooperation with other RTCs be increased with a view of expanding the exchange of training materials, implementing joint training events and exploring other areas of collaboration;
iii. The present plans and initiatives to expand on CAL-based approaches be implemented as soon as possible.

Finally, from the above considerations, the reviewer strongly recommends to the Panel the reconfirmation of RSHU, ATI and MGMC as a WMO RTC.
Local Comments on Recommendations:

“Taking into account the recommendations contained in the report on the WMO inspection, the WMO RMTC components in the Russian Federation will continue to develop their activities in the following directions:

- Development of a closer interaction between RF RMTC components in continuous education and training in line with modernization requirements;
- Enhancement of cooperation with other Regional Training Centres to exchange teaching materials and research findings;
- Further development of cooperation with the National Meteorological Services of the CIS countries in the field of education and training; and
- Development of cooperation with RA II and RA VI with a view to identifying regional requirements for training and assistance from the WMO RTC in the Russian Federation in addressing these issues.

Particular attention will be paid to the further development and implementation of modern educational technologies, including online distance learning methods. In 2012, it is planned to hold 10 online distance courses on aviation services, which will be attended by 80 experts.

We are grateful for the support of our activities in the field of education and training of hydrometeorological personnel and in increasing the visibility of the Russian Federation Hydrometeorological Service (Dr. A. Frolov).”

Regional Comments on Recommendations:

“Thank you for giving me the opportunity to review the report and recommendations of the external assessment of the WMO Regional Training Centre (RTC) in the Russian Federation carried out by Dr Necco with the assistance of Mr Saho.

To put my comments into perspective it should be noted that:

- I carried out the previous review of the RTC in 2004.
- I visit RSHU each June as chair of the examination panel for students completing a Bachelors Degree in Meteorology in English.
- I met Dr Necco and Mr Saho when they were carrying out the assessment at RSHU.

In my opinion the report is clear, concise and well written. Also it provides a lot of useful and interesting information. However, I do a few specific comments to make about the report.

- The description of the activities and capabilities at RSHU are in line with my own experience based on my annual visits over more than ten years.
- All three components should be congratulated on the number of foreign students that participate in their courses.
- The relationship between the three components is effective and allows the RTC to offer a wide range of education and training opportunities.
- The actions taken in response the recommendations from the previous assessment are appropriate and appear to have been successful.
- The recommendations from the current assessment are reasonable and should help enhance the capabilities of the RTC.”
It is a pity that the report did not explicitly address the criteria that need to be satisfied by a RTC, as I believe satisfying those criteria should be the basis for reconfirmation. However, based on the assessment report and my own experience I have no doubt that RSHU, ATI and MGMC should be reconfirmed as a RTC. Indeed I believe that the RTC is one of the most active and successful in terms of the range of courses offered and its willingness to engage with the wider meteorological community. (Bob Riddaway)"
RTC Turkey offers training facilities at three different locations: Ankara, Istanbul and Alanya. The review team has visited the facilities at the first two locations only during its review from 5 to 8 December 2011, but it was given full access to the description of training activities and facilities in all three locations. The team was provided with excellent working conditions, great openness and very generous hospitality throughout the visit both in Ankara and Istanbul.

Although RTC Turkey has offered long-term initial training in meteorology at the Meteorological Technician (MT) level in the past through the Anatolian Meteorological High School (AMHS), this has been discontinued since 2009 without an arrangement with a partner institution to continue a similar training activity. This has been identified by the review team as a weak point for addressing the training needs of WMO members in the area, particularly in the light of WMO 16th Congress decisions on higher standards for training and competencies. It should be noted however that the review team was given the opportunity to visit the Meteorological Department of Istanbul Technical University and to have a meeting with its chairman and RTC representatives to discuss a potential partnership with RTC Turkey.

RTC Turkey concentrates its activities on very short-term (1 to 3 weeks) training events covering a wide range of topics of interest for the professional development of meteorologists in the area. The RTC is fully funded by the TSMS, and all trainees benefit from a no-fee policy including training, boarding, lodging and airport transfers. Accommodation and training facilities are maintained at the highest standard, including international standard conference facilities in Istanbul and Ankara.

Given the high level of support provided by the Turkish government and the excellent quality of the RTC infrastructure and facilities, it is recommended that the RTC Turkey be reconfirmed as a Regional Training Centre for a period of eight years taking into account the following recommendations:

i. To get a mandate from TSMS on the use of the RTC facilities for the training of TSMS personnel at the Meteorologist and/or Meteorological Technician level;

ii. To liaise with RTC partners (prospective as well as current ones) to enquire on their needs for developing a sustainable offer for long-term BIP-M and/or BIP-MT courses, taking into account the latest decisions of WMO Congress on training and competencies (including for aviation);

iii. To conclude a MoU with a relevant university (e.g. Istanbul Technical University) by which the RTC could organize long-term BIP-M and/or BIP-MT courses that would be recognised at university-degree level;

iv. To include a procedure for the selection and training of trainers as part of the TSMS QMS;

v. To develop the use of distance-learning techniques in order to enhance the effectiveness of short-term training sessions (preparation and follow-up);

vi. To enquire on a regular basis with the regional association and with NMHS in order to identify their major training needs and to adjust the RTC training activities accordingly; to also report back on a regular basis to the regional association and WMO.

---

1 Basic Instruction Package, see WMO Standard Vol 49 Chapter B.4
2 Whether this means that all or part of these courses are to be part of a university-organized course remains a matter for negotiation between the partners
3 Learning management systems such as the WMO-ETR Moodle service, web- or video-conferencing sessions, COMET or Eumetcal material
V. WMO RTC - Uzbekistan
WMO RTC Uzbekistan (12-15 April 2011) - Mr Christophe Billard, former Member of the EC Panel of Experts on Education and Training

The Regional Training Centre in Uzbekistan consists of the Tashkent hydrometeorological professional college, which is funded and monitored by the Government of the Republic of Uzbekistan. The facilities are at highest standards after a renovation conducted two years ago. Interesting and fruitful contacts with students and teachers took place during the visit of the review team. It confirmed the advanced quality of training delivered by the College and the general satisfaction of those enjoying it.

The RTC regularly runs courses lasting three years for Meteorological/Hydrological Technicians coming from the different countries in the region. Actually, almost all (95 %) students are Uzbek nationals and no WMO fellow was recently hosted. The courses and curricula are in rather good compliance with the guidelines/standards provided by the WMO-No. 258.

The intrinsic qualities of the action conducted by the RTC are strong, but still basically unknown. Increasing the general visibility of RTC in liaison with WMO secretariat should certainly foster its attractiveness among international clients and students with appropriate language mastering. This can imply inter alia the definition and implementation of a real training offer policy, permanent as well as active relationships with other RTC, or a substantial increase of short professional courses as necessary.

It is recommended that the RTC Uzbekistan be reconfirmed as a Regional Training Centre for a period of eight years.

Summary and Recommendations

The major facts/data observed and collected during the mission in Tashkent can be summarized through the two classical categories hereafter detailed:

Strengths: The RTC has very qualified and experienced teachers and administrators, excellent modern facilities, relevant programmes, appropriate syllabus, sufficient experienced and competent staff, teachers maintaining regular relationships among them and with University, a well-developed administration and governance scheme, social actions (cultural, sportive, …) towards the students and personnel.

Weaknesses: The awareness of WMO role and action is rather poor and might surely be improved to a large extent by developing active direct communication and exchange with its Secretariat. As possible consequences, WMO publications in the RTC library are still too scarce, relationships with other RTC’s do not reach a high level, the visibility of RTC remains limited, even for satisfying major training needs in the Region or Sub-Region, professional training, aimed at meeting requirements of Members which cannot be met by existing facilities in the same Region, is de facto strictly national; and no use at all of the important WMO fellowship programme is done.

As a whole, the current status of the RTC is in satisfactory compliance with the EC criteria for the recognition/reconfirmation of regional training centres (see Appendix C).

Thus the Review Team decided to put forward four recommendations, out of which two are key-recommendations that should enjoy the highest priority:

Communication and co-operation, especially with WMO

The RTC Uzbekistan is strongly encouraged to define and implement a communication policy and an active training offer, with appropriate support provided by the government of the Republic of Uzbekistan and Uzydromet.

Regarding the concrete actions which could be conducted, a dramatic improvement of advertisement for the courses held in Tashkent is particularly important throughout the Regional Association either by direct contact...
with NMHSs, the Regional Association-II President or Management Group, the Focal Points for Education and Training in the different countries, the WMO Secretariat or all of these.

**Local Comments on Recommendations:**

"Thank you very much for the draft report on External Assessment of RTC of Uzbekistan performed in spring 2011. In general, Uzhydromet is satisfied with the draft version of Report, has taken to consideration your recommendations and started the elimination of weak sides of RTC. Uzhydromet has no remarks and proposals. Looking forward for further cooperation (Prof. V.E.Chub)".

**Regional Comments on Recommendations:**

"First of all I thank you for giving me an opportunity to act as a member of the external assessment team. The report has been well written and covers all relevant aspects required for continuance of recognition of RTC. I appreciate and congratulate the members for their meticulous efforts to bring many salient features. Though it has been mentioned in the report, in one form or other, yet I would like to reiterate some points as mentioned below:

The RTC may be encouraged to:

ANNEX I. Organize more frequent short term courses for continuing education;
2. Utilize more effectively modern audiovisual aids and accordingly may upgrade their infrastructure for the same;
3. Improve linkage with WMO E &T office to get high quality educational aids and fellowship support;
4. Have a website where all details about their activities and programs could be available to other NMHSs and RTCs, in fact all RTCs having websites could be encouraged to provide links to other RTCs;
5. Enhance participation from other NMHSs especially from neighbouring countries.

I am happy to join other members of external assessment team to recommend continuance of the RTC status to Uzbekistan (A B Mazumdar)".
Annex VIII. **RTC EXTERNAL ASSESSMENT PROGRAMME**

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### AGREEMENTS BETWEEN WMO AND MEMBERS HOSTING RECOGNIZED RTCs

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* With University component
** 2 RTCs
Annex X.  FUTURE ROLE AND OPERATION OF RMTCs [2002 Concept Paper]
(Concept Paper endorsed by the Executive Council at its 54th session, 11-21 June 2002)

1. BACKGROUND

1.1 The Executive Council Panel of Experts on Education and Training, at its nineteenth session (Pan XIX, April 2000), requested the Secretariat to prepare a Concept Paper on the Future Role and Operation of RMTCs. The paper was discussed at the twentieth session of the Panel (Pan XX, April 2002) and a revised version was agreed. This paper is the result of that process.

1.2 The aim of this paper is to stimulate debate about how RMTCs might develop so that they can better meet the evolving requirements of their stakeholders. In support of this aim the following specific issues are addressed:

(a) The present state of RMTCs and any factors which adversely affect their activities and future development;

(b) The strategic issues facing RMTCs and their stakeholders;

(c) A possible development framework for RMTCs.

1.3 The Executive Council has agreed criteria for the recognition of RMTCs. A key feature of these criteria is that a new RMTC should only be designated if it meets the expressed requirements of Members of the relevant regional association which cannot be met by existing facilities. This means that RMTCs exist primarily to meet regional training needs rather than the national needs of the host country.

1.4 In order to obtain up-to-date information about the RMTCs, the Education and Training Department (ETR) sent an evaluation questionnaire to all 23 RMTCs requesting details of their current activities and future plans. This paper is based on the responses from the 19 RMTCs that replied. Also the following were used:

(a) Complementary information available from within WMO (e.g. Report of Pan XIX, documentation of Pan XX, and the draft text of the sixth WMO Long-term Plan);


2. CURRENT STATE OF RMTCs

2.1 Between 1998 and 2001 the RMTCs trained approximately 12,600 people in meteorology and operational hydrology. Out of this figure, 1,676 were foreign students and 371 were WMO fellows. The ratio of the professional-level versus technician-level was fairly even for foreign students (861 professional level and 815 technician-level), but was nearly a ratio of 1 to 2 in favour of technician-level training for the national students.

2.2 In the same four year period there were great variations in the level of activity in the RMTCs. Four RMTCs provided no information which may indicate that they are inactive. Of the others:

(a) Three RMTCs trained no foreign students during the past four years;

(b) Five RMTCs trained on average 1 to 3 foreign students per year;

(c) Four RMTCs trained between 4 and 20 foreign students per year;
Six RMTCs trained more than 20 foreign students per year.

On the basis of the evidence available, only about half the RMTCs appear to be fully active in providing training that is meeting a regional need. It should also be noted that even some of the most active RMTCs remained partially under-utilized, as compared with their declared potential for training delivery.

2.3 Though many RMTCs have spare capacity, in every Region there are expressed training needs which remained unsatisfied. Consequently there is the potential for more use to be made of RMTCs to meet at least some of these regional training needs.

3. CHALLENGES FACED BY RMTCs

3.1 The majority of RMTCs that responded to the questionnaire experienced lack of adequate financial resources. This resulted in problems preventing sustainability and/or improvement in the number of teaching and research personnel, and in upgrading the facilities of RMTCs.

3.2 Specific operational challenges that affect several RMTCs included:

(a) **Instructors.** There are difficulties in recruiting and training instructors, and in the awarding of sufficient WMO fellowships to instructors to attend training and scientific events abroad;

(b) **Training equipment and material.** New meteorological instruments and laboratory equipment are required for training purposes, and difficulties with equipment maintenance need to be addressed. Also there are insufficient textbooks, periodicals and training publications available;

(c) **Trainees.** Often, candidates submitted for training at RMTCs do not possess the specified entrance qualifications in the level of professional education and/or the language of instruction.

3.3 Despite these problems many RMTCs offer a high-quality and wide-ranging training programme. Also at some RMTCs there have been significant improvements in accommodation, laboratory equipment and use of modern training aids and methodologies.

3.4 Information available from the periodic *Questionnaire on Members’ Training Requirements, Opportunities and Capabilities* indicates that a considerable number of meteorological and hydrological personnel require more advanced/specialized training. This suggests that there are opportunities for RMTCs to increase the number of foreign students that are trained by introducing new courses in topics such as modern climatology, operational hydrology, marine meteorology and physical oceanography, and meteorological economics.

3.5 The challenge for RMTCs is to continually adapt their training programmes so that they can respond to the changing needs within the region they serve. If this leads to an increase in the number of foreign students then some of the resource problems faced by RMTCs may at least be partially addressed.

4. STRATEGIC QUESTIONS

4.1 In order to have a clear view about the further development of the RMTCs network, there are a number of strategic questions that need to be considered:

(a) **NMHSs.** Are the training needs of NMHSs properly identified and prioritised as part of a plan for human resource development? Are national training resources fully utilised by NMHSs? Do NMHSs give full consideration to taking advantage of the training programmes offered at RMTCs? Are there effective mechanisms for identifying regional training requirements and influencing the training programmes offered by RMTCs?
(b) **RMTCs.** Are the training programmes at RMTCs responsive to the changing training needs of the Region? Do RMTCs cooperate with NMHSs in identifying regional training requirements? Are the financial and organizational arrangements at RMTCs attractive for foreign trainees? Are there too many or too few RMTCs? Should the RMTCs become more specialized? Should there be more collaboration between RMTCs? Do RMTCs have mechanisms for assessing their own performance?

(c) **Other Stakeholders.** What does the Executive Council, Regional Associations and Technical Commissions expect of the RMTCs? Does the current operation of RMTCs respond to the needs of these stakeholders? Do these stakeholders have a clear vision of how the RMTCs should develop? Are there mechanisms for these stakeholders to influence the development of RMTCs? Do these stakeholders support the RMTCs in establishing sustainable funding?

4.2 The answers to these questions will vary between the RMTCs, NMHSs and other stakeholders. However, consideration of these questions forms the basis for initiating a process that leads to the further development of the RMTCs.

5. **DEVELOPMENT FRAMEWORK**

5.1 To assist in the process of further developing the RMTCs it is proposed that there should be two main objectives:

(a) To improve mechanisms for cooperation and interaction between RMTCs, NMHSs and other stakeholders so that:

- The educational policies, practices and programmes at RMTCs respond quickly to the new challenges faced by the NMHSs;
- The training programmes offered by RMTCs complement rather than duplicate the training available on a national basis;

(b) To enhance the programmes for foundation and specialized training offered at RMTCs so that they remain relevant and are of high quality in terms of both content and the learning process.

5.2 To achieve these objectives it is proposed that the following main lines of action are pursued:

(a) **To reinforce regional cooperation in the organization and operation of RMTCs.** The existing arrangements for identifying regional training needs, and the procedures for monitoring the effectiveness of RMTCs to satisfy these needs should be reviewed by the regional associations in partnership with the RMTCs. Also there should be enhanced cooperation between RMTCs and National Training Institutions to ensure their activities are complementary. A genuine educational partnership should be established between all the stakeholders;

(b) **To improve awareness of the capabilities of RMTCs.** The RMTCs should be more active in ensuring the NMHSs are aware of the training programmes and facilities that are on offer. Also they should take the initiative in entering into dialogue with NMHSs in their Region to ascertain their training requirements and how the RMTCs might contribute to satisfying these;

(c) **To improve the planning of human resource development.** NMHSs should be more active in planning the development of their human resources so that the RMTCs are able to anticipate new requirements in and develop their training programmes accordingly. Also there should be more emphasis on mobilising funds required for the national/regional implementation of those plans;

(d) **To encourage lifelong learning and continuing professional development.** Policies and plans for the development of a lifelong learning culture should be introduced in NMHSs and RMTCs. In particular plans for the continuing professional development and specialization of the staff are also needed.
Such initiatives may require changes to traditional management styles in order to cope with the new demands from public and private sectors;

(e) To improve the content of training programmes. Curricula should be updated to adequately reflect the rapid advancements in meteorological science and training techniques. In doing this account should be taken of the new WMO classification of personnel and the associated guidelines on curricula. Also an interdisciplinary approach should be taken when appropriate;

(f) To enhance the learning process. Instructors should be encouraged to develop their training expertise so that they are able to promote active learning methods, integrate new technologies into the learning process, and be innovative in their approach to training. Also the management processes at the RMTCs should be such that all staff have the opportunity to contribute to decision-making about key issues affecting teaching and learning;

(g) To improve access to training materials. Improved access to training materials and meteorological information should be facilitated by initiating/accelerating connection of RMTCs to the Internet. Also the international exchange of educational expertise, products and services should be encouraged;

(h) To strengthen the role of the Education and Training Department (ETR). The role of ETR in monitoring international trends in education, assessing the results of educational research and their impact on WMO activities, and undertaking comparative analyses at regional/sub-regional training requirements should be strengthened. Also ETR should continue to facilitate the promotion of joint projects to strengthen national and regional educational capacities, and seek partnerships between WMO and other relevant organizations to improve the quality of training in meteorology (including climatology), hydrology and related environmental disciplines.

6. NEXT STEPS

6.1 It is proposed that the following steps are now taken:

(a) Executive Council. To take note of the development proposal, approve its framework, and provide guidance on the possible phased implementation within the available resources;

(b) Secretariat. To revise the development proposal taking into account the 6LTP projections and the decisions and recommendations of EC-LIV. To seek backing for the development proposal by other constituent bodies, particularly by regional associations. To prepare a detailed Action Plan for implementation of the development proposal;

(c) Fourteenth Congress. To consider the development proposal and possibly endorse an Action Plan;

(d) RMTCs and Stakeholders. To implement the Action Plan, starting from the second half of 2003, and continuing throughout the whole fourteenth financial period (2004-2007).

6.2 The manner of implementing the development programme is as important as the content. It is essential that the development of the RMTCs is viewed as a continuing process (learning by doing) in which partnership between all the stakeholders leads to benefits for everyone. The periodic external assessment of the RMTCs under the auspices of the EC Panel of Experts on Education and Training should contribute to this process.
1. To reinforce regional cooperation in the organization and operation of RMTCs
   
a. RMTCs should copy their Annual Report and regularly updated Lists of Training Programmes for the next year(s) to the Presidents of Regional Associations (RAs) and their Rapporteurs on Education and Training (hereafter “RA Rapporteurs”), and to Heads of NMHSs; and ask for regular feedback on such reports and programmes;

   Implementation: Immediate (in the sense that no special provisions are needed).
   Responsible Bodies: RMTCs; RAs Presidents/Rapporteurs; Heads of NMHSs.

   b. The Terms of Reference of RA Rapporteurs should include: identification of regional training needs through surveys, determining how these needs may be satisfied by RMTCs, and monitoring the effectiveness of RMTCs by measurable indicators;

   Implementation: RA session.
   Bodies: RAs Presidents; WMO Secretariat.

   c. Regional Associations should encourage regional and sub-regional economic groupings to support RMTCs in their respective areas.

   Implementation: RA session.
   Bodies: RAs; Heads of NMHSs; WMO Secretariat; EC.

2. To improve the awareness of capabilities of RMTCs

   RMTCs and NMHSs should continue dialogues in exchanging information with respect to the training capabilities of RMTCs and reciprocal information of NMHSs of their training needs every year.

   Implementation: Immediate.
   Bodies: RMTCs; Heads of NMHSs.

3. To improve the planning of human resource development and to encourage lifelong learning and continuing professional development

   a. RAs should encourage the NMHSs to establish medium- and long-term Human Resource Development (HRD) plans, which should include programmes on continuing professional development and specialization of their staff.

   b. NMHSs should inform RMTCs of their HRD plans so that RMTCs are able to anticipate new requirements and develop their training programmes accordingly.

   Implementation: RA session
   Bodies: RAs, Heads of NMHSs.

4. To improve the content of training programmes and to enhance the learning process

   a. RMTCs and training units of NMHSs should develop new and appropriate programmes in order to meet the changing requirements of NMHSs. The NMHSs should use the RMTCs as much as possible to enhance their learning processes.
Implementation: Immediate.
Bodies: RMTCs, Training Units of NMHSs.

b. Regional Associations and NMHSs should facilitate RMTCs access to the Internet, to advanced data sets, and to real-time data as a way of improving the skills of the RMTCs graduates, and facilitating continuous education programme in the region.

Implementation: Immediate
Bodies: RAs, NMHSs

5. To improve access to training materials

Present regional initiatives such as MeteoForum and ASMET should be continued and extended to other regions with assistance of SCHOTI/CO-COM and other supporting bodies.

Implementation: As soon as possible
Bodies: WMO Secretariat, Members, other supporting bodies

6. To strengthen the role of the Education and Training Programme (ETRP)

a. International trends in education should be monitored and their impact on WMO activities should be assessed;

b. Assistance should be provided to Rapporteurs and RMTCs in assessing regional training needs and requirements;

c. Collaboration and coordination with Regional and Subregional offices should be strengthened in the organization of training activities in order to use efficiently RMTCs and NMTCs capabilities;

d. Distance learning should be promoted.

Implementation: Ongoing
Bodies: ETR, TCO, Regional and Sub-regional Offices
ANNEX XII. ACTION ITEMS FROM 2002 PLAN FOR IMPROVING EDUCATION AND TRAINING TO MEMBERS THROUGH R(M)TCS

<table>
<thead>
<tr>
<th>Action</th>
<th>WHO</th>
<th>When</th>
<th>What happened</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To reinforce regional cooperation in the organization and operation of RMTCs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. RMTCs should copy their Annual Report and regularly updated Lists of Training Programmes for the next year(s) to the Presidents of Regional Associations (RAs) and their Rapporteurs on Education and Training (hereafter “RA Rapporteurs”), and to Heads of NMHSs; and ask for regular feedback on such reports and programmes;</td>
<td>RMTCs; RAs Presidents/Rapporteurs; Heads of NMHSs.</td>
<td>Immediate.</td>
<td>Some RTCs are doing this to a limited extent. Many have websites that have some course details. The ETR office requests and publishes on the ETR website information about RTC course schedules but the content is not always current. ETR has recently received information from each of the Presidents nominating someone to take on many of the roles of a regional rapporteur. ETR to connect these people to the Panel and to the Regional Training Centres. This action still on ETR.</td>
</tr>
<tr>
<td>b. The Terms of Reference of RA Rapporteurs should include: identification of regional training needs through surveys, determining how these needs may be satisfied by RMTCs, and monitoring the effectiveness of RMTCs by measurable indicators;</td>
<td>RA session</td>
<td></td>
<td>No evidence that this has occurred.</td>
</tr>
<tr>
<td>c. Regional Associations should encourage regional and sub-regional economic groupings to support RMTCs in their respective areas.</td>
<td>RAs; Heads of NMHSs; WMO Secretariat; EC.</td>
<td>RA session</td>
<td>Noted in RA session reports but no known ongoing activity. It is worth noting that MASA encouraged the PR of South Africa to bid for SAWS / UP to become an RTC to assist with sub-Regional training issues. CIMH is similarly supported.</td>
</tr>
<tr>
<td>2. To improve the awareness of capabilities of RMTCs</td>
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<td></td>
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<tr>
<td>RMTCs and NMHSs should continue dialogues in exchanging information with respect to the training capabilities of RMTCs and reciprocal information of NMHSs of their training needs every year.</td>
<td>RMTCs; Heads of NMHSs.</td>
<td>Immediate.</td>
<td>Unknown</td>
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<tr>
<td>3. To improve the planning of human resource development and to encourage lifelong learning and continuing professional development</td>
<td>RA session</td>
<td>This has been noted in RA Session reports. Some Members have developed HRD plans, but not many.</td>
<td></td>
</tr>
<tr>
<td>4. To improve the content of training programmes and to enhance the learning process</td>
<td>RA session</td>
<td>Unknown, suspect nil.</td>
<td></td>
</tr>
<tr>
<td>a. RMTCs and training units of NMHSs should develop new and appropriate programmes in order to meet the changing requirements of NMHSs. The NMHSs should use the RMTCs as much as possible to enhance their</td>
<td>RMTCs, Training Units of NMHSs</td>
<td>Immediate</td>
<td>Unknown, suspect some exchange but not systemic</td>
</tr>
</tbody>
</table>
learning processes.

5. Regional Associations and NMHSs should facilitate RMTCs access to the Internet, to advanced data sets, and to real-time data as a way of improving the skills of the RMTCs graduates, and facilitating continuous education programme in the region.

<table>
<thead>
<tr>
<th>Regional Associations and NMHSs</th>
<th>RAs, NMHSs</th>
<th>Immediate</th>
</tr>
</thead>
</table>

Indications are that this has improved since 2002, however the demands for bandwidth are also higher so the overall situation is still less than satisfactory in many RTCs.

5. To improve access to training materials

Present regional initiatives such as *MeteoForum* and *ASMET* should be continued and extended to other regions with assistance of SCHOTI/CO-COM and other supporting bodies.

<table>
<thead>
<tr>
<th>Present regional initiatives such as MeteoForum and ASMET</th>
<th>WMO Secretariat, Members, other supporting bodies</th>
<th>As soon as possible</th>
</tr>
</thead>
</table>

ASMET continues with significant funding support from EUMETSAT and inkind assistance from the USA. In RA VI EUMETCAL provides some of this functionality.

6. To strengthen the role of the Education and Training Programme (ETRP)

<table>
<thead>
<tr>
<th>a. International trends in education should be monitored and their impact on WMO activities should be assessed;</th>
<th>ETR, TCO, Regional and Subregional Offices</th>
<th>Ongoing</th>
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</table>

This is part of the ETR activities and is being undertaken.

<table>
<thead>
<tr>
<th>b. Assistance should be provided to Rapporteurs and RMTCs in assessing regional training needs and requirements;</th>
<th>ETR, TCO, Regional and Subregional Offices</th>
<th>Ongoing</th>
</tr>
</thead>
</table>

ETR Office (ETRO) recently assisted Qatar and the RA I Education and Training group in developing and delivering questionnaires on Member education and training requirements. Qatar received some responses, RA I returned several responses but no word from the RA I ETR group.

<table>
<thead>
<tr>
<th>c. Collaboration and coordination with Regional and Subregional offices should be strengthened in the organization of</th>
<th>ETR, TCO, Regional and Subregional Offices</th>
<th>Ongoing</th>
</tr>
</thead>
</table>

With the reorganization of the Secretariat in 2008 ETRO was clustered with the Regional Offices and LDCR Office. Whilst coordination could always be improved there are joint efforts being undertaken in HRD activities and the regional offices.
training activities in order to use efficiently RMTCs and NMTCs capabilities; are assisting in fellowship and training activities. ETRO is also working closely with the technical departments to encourage them to use the RTC facilities and content.

3. Distance learning should be promoted.

| ETR, TCO, Regional and Sub-regional Offices | Ongoing | ETRO continues to promote distance learning by getting people to conferences and workshops and funding train-the-trainer programmes in DL. ETRO is also using the tools in its own work. |
## Annex XIII. EC-PANEL 25 ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
<th>Who</th>
<th>When</th>
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<tbody>
<tr>
<td><strong>Recommendations to EC-64</strong></td>
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<tr>
<td>• Reconfirmation of RTCs in China, India, the Russian Federation and Turkey for three years with further extension of five years possible depending upon wider RTC review</td>
<td>D/ETR</td>
<td>Before end of April 2012</td>
</tr>
<tr>
<td>• Reconfirmation of RTC in Uzbekistan for two years with further reconfirmation if foreign students participate in courses with further extension of six years possible depending upon wider RTC review</td>
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<tr>
<td>• The RTCs (Angola, Brazil, Costa Rica, Italy, Venezuela) who have been inactive or dormant for four years or more should be identified as inactive and EC requested to identify a process to withdraw recognition.</td>
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<tr>
<td>• That no new RTCs should be established until a decision has been taken about the future of RTCs. Additionally, any reconfirmations should be for a period of three years or less. This will allow the Panel to make recommendations to EC-65 and to Cg-17 for changes to the RTC concept.</td>
<td></td>
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<tr>
<td>• If the primary means of collecting data on the ETRP second and third performance indicators was to be by questionnaire, EC-64 could consider whether to link member support for activities such as training courses and fellowships to return of this key WMO questionnaire.</td>
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<tr>
<td>• EC-64 strongly urged Members to take the necessary actions to meet the impending AMP competency Standards (1 Dec 2013) and BIP-M related requirements (1 Dec 2016) deadlines.</td>
<td></td>
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<tr>
<td>• That all Members with training institutes should have formal accreditation procedures in place for those training institutes. The Panel also recommended that where such procedures were not already in place, Members be strongly urged to use ISO 29990:2010(E) – ‘Learning Services for non-formal Education and Training – Basic Requirements for Service Providers’ to underpin the accreditation of their training institutes.</td>
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<tr>
<td>• That WMO fellows, particularly those taking courses related to aeronautical meteorology should only be placed in training institutes that could show that their courses clearly meet the BIP-M/MT requirements.</td>
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</table>
• In relation to requests for fellowships where suitable education and training institutes exist in the fellows’ home country, the Member is expected to provide national support for such education and training. Exceptions to this general guidance could allow support for fellows to undertake distance learning courses at foreign institutes while still continuing to work in their home country or, in exceptional circumstances, avoid the situation of sending someone abroad to undertake a course that could be undertaken in their home country at a fraction of the cost. In this later situation the WMO fellowship grant should be restricted to the tuition fees alone, with the fellows’ institution covering any other costs such as book allowance, medical insurance, thesis allowance and stipend.

• Where fellowships at universities are requested for people to work in areas such as aeronautical meteorological forecasting, and the home country does not have the facility to provide the job specific training following a fellowship award, the ETR Office should attempt to find an on-the-job or short-term training opportunity in the host country to provide this required training.

• Regional Association terms of reference should be updated to include the designation of Regional Association ETR Focal Points (ETR FP). The ETR FP should be a PR from the Regional Association Management Group (MG), should work in close coordination with the designated EC Panel of Experts on Education and Training regional representative (ECP-ET Rep) and Regional Training Centres and be assigned responsibilities for:
  - Gathering and prioritizing regional learning needs for consideration by the Regional Association Management Group;
  - Monitoring and evaluation of regional education and training activities;
  - Reporting on, and requesting endorsement of, prioritized regional learning needs at Regional Association sessions and at the four yearly ETR Symposium;
  - coordinating the use of Regional meetings/workshops/seminars as opportunities for gathering information on Regional learning needs.

• The ETR Symposium in late 2013 be used as an opportunity to address the consolidated and prioritized 2016 to 2019 learning needs gathered by the ETR FPs.

**Update to FAQs supporting classification dates for meteorologist**
The Panel requested that the clarification of classification implementation dates be added to the 258 replacement FAQs document available at D/ETR Before end of April 2012
and also requested that COMET as a DCPC in WIS
The Panel recommended to CBS that COMET be recognized as a DCPC (Data Collection and Production Centre) for WIS, specializing in education and training resources. CBS will consider this at their next session in Indonesia in September 2012.

<table>
<thead>
<tr>
<th>Reduced Panel session in 2013</th>
<th>Plan reduced session of the Panel immediately after the 2014 Symposium. Purpose of session to provide input on priority of training needs for the 2016 – 2019 Budget and planning cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA and TC focal points for the Panel</td>
<td>The ETR Office was requested to make first contact between the education and training focal points nominated by the Presidents of the various Regional Associations and these Panel members. The acting Chair thanked the Panel members for taking on these key roles and requested the ETR Office to assist the members in their roles. Tim Spangler agreed to offer as a contact point with JCOMM on Education and Training matters. At CIMO’s request the Panel has nominated Biswaitij Mukohphady as a person of contact from the EC Panel familiar with instruments and methods of observation. Mr. François Lalaurette from the Panel offered to act as the point of contact with the PWS and SWFDI groups in CBS on competency development.</td>
</tr>
<tr>
<td>Personnel standards for Climate Service Personnel</td>
<td>The Panel recommended that CCI initially focus on developing the competency framework for tasks related to these service categories and identifying options for developing and delivering the underpinning knowledge, skills and behaviours to allow Members to develop and increase their staff competency in these areas, Dr. Aguilar’s paper summarized some early work on such competencies (Annex IV). A lesser but still important priority will be to identify the common learning outcomes (knowledge and skills) to enable personnel to work across a number of the competency areas. This could be considered equivalent to the BIPs. The Panel recommended that CCI focus on the competency of staff to undertake particular climate service related tasks and leave the question of qualifications and classifications up to each Member to decide based upon their national circumstances. At some stage, it may be necessary to define what a climatologist is in terms of the common learning outcomes identified during the development of the job competencies. The Panel thanked Enric Aguilar, Ian Lisk and Biswajit Mukhopadhyay for offering to update the discussion document for submission to the CCI Management Group later in 2012.</td>
</tr>
<tr>
<td><strong>Accreditation of Training Institutes</strong></td>
<td><strong>D/ETR (in EC Paper and in advice)</strong></td>
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<tr>
<td>The Panel recommended that Members work in coordination with their Regional Training Centres, the WMO ETR Office, other international training coordination bodies such as SCHOTI (Standing Conference of the Heads of Training Institutions of National Meteorological Services) and regional education and training groups such as EUMETCAL. This will assure the quality of national training delivery while sharing, reviewing and exchanging examples of BIP implementation best practice.</td>
<td>Publication team led by Bob Riddaway and supported by ETR Office</td>
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<thead>
<tr>
<th><strong>Publication for educators and training in meteorology, climatology and hydrology</strong></th>
<th><strong>Publication team led by Bob Riddaway and supported by ETR Office</strong></th>
<th><strong>By 1 September 2012</strong></th>
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<tbody>
<tr>
<td>The Panel recommended that in addition to having the competencies appear at the start of each chapter of this publication they are consolidated as a short document similar to the top and second level competencies for the other disciplines.</td>
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<tr>
<td>The Panel created a working group of the ETR Office, Dr. Robert Riddaway, Mr. Chris Webster and Mr. Julius Wellens-Mensah to develop the next version. Tim Spangler, and Ian Bell have offered to review the document. The next version will be approved by the Panel, on an intra-sessional basis, before publication.</td>
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<tr>
<th><strong>HRD Capability Framework</strong></th>
<th><strong>D/ETR, Roger Deslandes and Ian Lisk</strong></th>
<th><strong>By 1 September 2012</strong></th>
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<tbody>
<tr>
<td>The Panel suggested that a significant number of Members may appreciate a document outlining the concept and benefits of a capability framework with examples of good practice from Members with such systems already in place. Such a document would be a useful adjunct or resource for the ongoing human resource development workshops and could provide a common framework to link the training opportunities being offered by Members and the Secretariat. This framework would act as a bridge between the guidance provided in the documentation and Statements outlining the Roles and Operations of National Meteorological/Hydrological and Climatological Services and the competencies being developed as technical regulations and guidance. The Panel formed a working group of the ETR Office, Roger Deslandes and Ian Lisk to further progress this activity.</td>
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<tr>
<th><strong>Working Group on Enhancing Distance and Online Learning (WG-EDOL)</strong></th>
<th><strong>Tim Spangler and Vilma Castro with ETR Office</strong></th>
<th><strong>1 Jan 2013</strong></th>
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<tr>
<td>The Panel requested that the WG-EDOL, as a first priority, coordinate with and encourage RTCs and other training institutes to work with the Regional Associations to identify any learning gaps. Further, the WG-EDOL was asked to encourage the provision of distance and online training to assist members in reducing the gaps. It is critical that courses such as the one being delivered by CIMH be offered to Members in South America, Africa, Asia and the South Pacific before 1 December 2013. Ideally, the RTCs should take a leading role in this delivery. In developing</td>
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training to assist Members in meeting the 1 December 2013 deadline, the Panel reminded the WG-EDOL to also consider training requirements for the aviation meteorological observers.

<table>
<thead>
<tr>
<th>Requests to RTCs regarding aeronautical meteorological personnel ETR</th>
<th>D/ETR</th>
<th>By end of April 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> RTCs be requested to align their aviation training programs with the “Implementation Guidance for Competency Standards” for AMP.</td>
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<tr>
<td><strong>2</strong> RTCs place a high priority on the exploitation and delivery of online training to support the knowledge and skills requirements of the AMP.</td>
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<tr>
<td><strong>3</strong> Members are requested to assist with the development of training material in different languages.</td>
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<tr>
<td><strong>4</strong> There was a need to promote the availability of ET-ETC support for AMP competency assessment.</td>
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<thead>
<tr>
<th>WMO Fellowship Manual</th>
<th>D/ETR and C/FEL</th>
<th>By end of June 2012</th>
</tr>
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<tbody>
<tr>
<td>In reviewing the draft update to the fellowship manual, the Panel recommended to the ETR Office that Appendix B of the current draft and further updated forms be made readily available in at least English, French, Russian and Spanish for WMO Members. This smaller, user friendly publication should be reviewed at the start of each financial period to take account of the funding set aside for fellowships in that financial period. This smaller publication could state that, due to financial constraints, it would not be possible to provide home leave and UN standard stipends for the current financial period thus providing the link between the wider UN conditions and those in WMO for this period. The Panel decided that the redrafting of the complete fellowship manual should continue with a small working group of Vilma Castro, Biswajit Mukhopadhyay and Karen McCourt (co-opted from the UK Met Office) to assist and further review the current and next draft of both publications.</td>
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<table>
<thead>
<tr>
<th>WMO ETR Symposium</th>
<th>Kent Johnson, François Lalaurette, Winifred Jordaan, Ian Lisk</th>
<th>1 Jan 2013</th>
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<tbody>
<tr>
<td>The Panel formed a planning committee of Kent Johnson (Chair of Planning Committee), François Lalaurette, Winifred Jordaan and Ian Lisk to work with the ETR Office to further refine themes, identify suitable keynote speakers, pursue possible host countries and institutes etc. The Panel further agreed that the proposed outcomes for the Symposium be clearly articulated. Suggestions for Symposium themes will be made through a forum created by Kent Johnson on the Panel MOODLE site. Suggestions and input will be received before the end of April 2012.</td>
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### Other Business

The Panel discussed the proposed WMO Volunteer programme, supported the concept and believed that it had the potential to assist Regional Training Centres and national meteorological training institutes. The Panel was pleased to note that the proposed programme now included a number of education and training roles.

The Panel asked to be briefed, on an intra-sessional basis, on the Country Profile Database (http://www.wmo-sat.info/~wisuser/cpdb/) and potential links to the Education and Training Programme.

The Panel requested that the ETR Office provide information about WMO’s public education programme on an intra-sessional basis to further discussion.

Get Panel members a copy of the public education and outreach

The Panel requested the ETR Office to continue liaison with CIMO on the Cloud Atlas and with the Space Programme on the satellite interpretation manual, and to assist within available resources and priorities.

<table>
<thead>
<tr>
<th>Action Items</th>
<th>D/ETR</th>
<th>By end of April 2012</th>
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<tr>
<td>The Panel received an update of the action items from the previous session via the forum and noted that the majority of the actions had been completed with the remaining ones ongoing. The Panel agreed to write it into the meeting report. The Panel requested the ETR Office to update the Panel on action items in approximately 12 months time and also formally include a report on action items in the meeting agenda for the next session. The Panel suggested that the EC Criteria for Fellowships be included on the agenda of the next Panel session.</td>
<td>D/ETR</td>
<td>1 Jan 2013</td>
</tr>
<tr>
<td>Next Session</td>
<td>D/ETR</td>
<td>June 2013</td>
</tr>
<tr>
<td>The Panel agreed that its next session should take place in the first quarter of 2014. Noting that a Panel session had never been held in Africa the Panel encouraged the ETR Office to investigate options for holding the next session at one of the African Regional Training Centres, taking into account cost effectiveness and security concerns. The Panel was also advised that the Informal Planning Meeting (IPM) had noted an</td>
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interest in holding their meeting in parallel with the next session of the Panel in early 2014.

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<tr>
<th><strong>Task Team to review future role and operation of RTCs</strong></th>
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<tr>
<td>The Panel established a Task Team to carry out a wide-ranging and thorough review of the future of RTCs. Its remit includes an assessment of the advantages and disadvantages of the options (with nothing ruled out) along with considerations of the practicalities of how any changes could be implemented. Also, if possible, the Task Team would make a recommendation about its preferred option. The Task Team will consider issues such as implementing quality assurance, meeting regional needs and providing opportunities for vocational training. In addition, the criteria for creating RTCs will be reviewed and, if a new structure is recommended (e.g. having a two-tier structure), the associated criteria will be proposed. The Task Team will report to and solicit input from the entire Panel periodically. The report of the Task Team will be presented to the next meeting of the Panel. Suggested Task Team members François Lalaurette, Julius Wellens-Mensah, Winifred Jordaan, Benoit Sarr, Bob Riddaway and the ETR Office. The Terms of Reference, membership and chair is to be agreed with the WMO President. The ETR Office is to progress discussions via the online forum prior to EC-64 agreement on the task.</td>
</tr>
<tr>
<td>François Lalaurette, Julius Wellens-Mensah, Winifred Jordaan, Benoit Sarr, Bob Riddaway and the ETR Office.</td>
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<td>By 1 March 2013</td>
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