

WORLD METEOROLOGICAL ORGANIZATION
REGIONAL ASSOCIATION VI
THIRD MEETING
OF THE WORKING GROUP ON CLIMATE AND HYDROLOGY

Helsinki, Finland
12-14 March 2013



MEETING REPORT

Geneva, 05 April 2013

The Table of contents:

Executive Summary

I. Introduction

- I.1. Background
- I.2. Date and Venue
- I.3. Participants
- I.4. Meeting Format and Programme

II. Summary of Discussions

- II.1. Session I – Opening Session
- II.2. Session II - Progress review of the implementation of the tasks
- II.3. Session III - Parallel Expert Groups' Sessions
- II.4. Session IV – Synergies
- II.5. Session V - Closing Session

III. Conclusions and recommendations

IV. Attachments

Executive Summary

The 3rd meeting of the Working Group on Climate and Hydrology was held in Helsinki, Finland, from 12 to 14 March 2013. It was hosted by the Finnish Environment Institute.

It gathered 18 participants, including 11 (out of 12) core members of the Working Group on Climate and Hydrology, 2 local experts representing the Finnish Environment Institute, as well as 3 representatives of the WMO Secretariat.

The Meeting was opened by Prof. Lea Kauppi, Director General of the Finnish Environment Institute and Prof. Petteri Taalas, the Permanent Representative of Finland with WMO and the Director of the Finnish Meteorological Institute. Peer Hechler, WMO Scientific Officer in Data Management Applications also welcomed the participants on behalf of the WMO Secretariat.

The Meeting continued with the informative presentations of the Co-chairs of the Working Group on Climate and Hydrology and with the presentation of the WMO Programme Officer on the regional activities.

The climate and hydrology –experts of the Working Group continued the discussions on specific issues in parallel sessions and then came together in a final plenary session to come to joint conclusions and provide recommendations for the way forward in the next intersession period.

All the Meeting related material, including the presentations, is available on the WMO web page and can be accessed at the following link:
http://www.wmo.int/pages/prog/dra/eur/RA6_WG_CH_Meetings.php.

I.1. Introduction

1.1. Background

The Working Group on Climate and Hydrology (WG/CH) has been established by the XV Session of RA-VI, in Brussels, September 2009, through its Resolution 4 (XV-RA VI).

This is the 3rd meeting of the Working Group and the last one before the XVI Session of RA VI; therefore, its objectives are to review the implementation of its working programme and plan the reporting to the XVI Session of RA VI.

1.2 Date and Venue

On the kind invitation of the Finland, the meeting was hosted by the Finnish Environment Institute from 12 to 14 March 2013. The Information on Local arrangements is attached as INF.1 with Annex I.

1.3. Participants

There were 18 participants at the meeting, including 11 (out of 12) core members of the Working Group on Climate and Hydrology, 2 local experts representing the Finnish Environment Institute, as well as 3 representatives of the WMO Secretariat.

Dr Dmitry Kiktev, the Leader of the Task Team on RCOF and Mr Ali Umran Komuscu, the Leader of the Task Team on Drought Management could not attend the meeting, but have delegated Mr Dr Vladimir Kryjov from the Russian Federation and Mr Sandor Szalai from Hungary to replace them.

Dr Yolanda Luna, the Head of the Department of Development and Application of the State Meteorological Agency also attended the meeting, with the scope to report about MedCOF related activities at the State Meteorological Agency and to facilitate the related discussion.

The list of participants is attached as Annex II to the Report.

1.4. Meeting Format and Programme

The Meeting had the following format:

1st day

1. Session I - Opening Session
2. Session II - The Task Teams' reports

2nd day

3. Session III - Parallel Expert Groups' Sessions

3rd day

4. Session IV - Synergies
5. Session V - Closing Session

The Meeting was opened at 10a.m. on 12th of March and was conducted as a Plenary Session, composed of key note speeches and informative reports on behalf of the Co-chairs of the Working Group and the WMO Secretariat.

The Task Teams' reports were delivered in the afternoon Session.

The second day of the Meeting was conducted in two Expert Group Sessions, composed of the reports on the implementation of the tasks with no or limited cross-cutting actions, as well as with a follow up discussion specific to the expert group.

The Closing Session was in the form of a panel joint group discussion on the follow up of the required actions and on the reporting to the 16th Session of RA VI. It was closed at 1p.m. on 14th of March.

The Programme was unanimously adopted as attached in Doc.1.

II. Summary of Discussions

II.1 Session I- Opening Session

Prof. Lea Kauppi, Director General of SYKE welcomed the participants of the meeting to Helsinki. She said that the adaptation to climate change as well as the climate and hydrology are the key issues not only for Finland, but also for Europe and the rest of the World. The countries should invest in both scientific and technical collaboration. She added that a proper monitoring is important to ensure the data quality. She wished the participants successful meeting deliberations.

Prof. Peteri Tallas, the PR of Finland with WMO welcomed the participants and mentioned that the climate change can be well felt in Finland with the increase of floods, highlighting that the flood forecasting, as an item for interdisciplinary cooperation, is relevant for many countries. He also highlighted the importance of the NMHSs involvement in the European Meteorological Infrastructure, for which the improvement of the provided services and products is one of the priority issues. He added that the title of the RA VI WG-CH meets the requirements for collaboration of the climatology and hydrology disciplines. He wished participants a fruitful meeting and noted that recommendations for concrete actions are expected from this working meeting.

Mr Peer Hechler, WMO Scientific Officer in Data Management Applications, informed the participants of climate-relevant WMO developments since the last meeting of the RA VI WG CH in November 2011, as follows:

- CBS, during its session in September 2012 in Jakarta/Indonesia confirmed the successful finalisation of the demonstration phases of the RA VI RCC-Network as well as of another RA II RCC in Moscow/Russian Federation. WMO EC in May 2013 is expected to finally accept official designation of these two WMO RCCs.
- Cg-Ext in Autumn 2012 decided on the implementation plan for GFCS, established the Intergovernmental Board on Climate Services and discussed related financial mechanisms
- EC-64 decided on the annual generation of World Weather Records and on joint mechanisms to establish the CSIS component of GFCS. EC set up a Working Group on WMO Policy for International Exchange of Climate Data and Products in Support of GFCS, to which Mrs Hovsepyan serves as RA VI representative. Also, EC-64 adopted the WIGOS Framework Implementation Plan.

Mr. Hechler briefed the WG CH of WIGOS including its basic idea of harmonizing WMO observational systems in terms of planning, documentation and operating standards. Climate, hydrological as well as agrometeorological communities are already using data from different observational systems and are in need for certain common standards and operations, which support use of data from different sources. He also provided a WIGOS brochure and encouraged participants to make themselves familiar with WIGOS through www.wmo.int/WIGOS. Finally, he invited the WG to liaise with the RA VI WG on Technology Development and Implementation on WIGOS implementation in RA VI. Mr Hechler drew the attention of the participants to the most

recent Nanjing Workshop on Climate Data Requirements and Applications, which report should be available soon on WMO web site.

Mr. Markku Puupponen and Mrs. Anahit Hovsepyan, the Co-chairs of the Working Group reported on the activities since the last WG meeting, i.e. from November 2011 to March 2013. The participants were informed on the relevant events held in the reporting period, such as:

- The Annual meeting of the European Meteorological Society (EMS) and European Conference on Applied Climatology (ECAC),
- The ECAC' side-event on Climate Watch implementation in RAVI with the case studies from Finland, Germany, Serbia and Turkey.
- PRESANORD – 2 (Cairo, Jan.2012) and 3 (Tunis, Oct.2012), where possibility of establishing the inter-regional MedCOF was discussed with wider audience
- SPECS, one of the recently launched FP 7 Projects (NACLIM, SPECS, EUPORIAS), which objective is research and dissemination activities to deliver a new generation of European climate forecast systems, with improved forecast quality and efficient regionalization tools.
- RA VI Hydrology Forum, Koblenz, Germany, May 2012, etc.

The participants also learned about the planned events, such as: The first inter-regional Mediterranean Climate Outlook Forum (MEDCOF-1), planned for 2nd half of 2013, to be likely hosted by the State Meteorological Agency of Spain.

They have also reported on the progress made in the implementation of the agreed actions, based on the Follow up on actions list. See the [Annex III](#).

The reports are available on the WMO web site and can be accessed through the following link: http://www.wmo.int/pages/prog/dra/eur/RA6_WG_CH_Meetings.php.

Mrs Natalia Berghi, the WMO Programme Officer has delivered a presentation on the Climate and Hydrology related activities in the Region. The participants learned about the relevant regional events and developments, such as:

1. IPA Project: Building Resilience to Disasters in Western Balkans and Turkey
2. Climate Change Adaptation in Drin River, supported by the German Development Agency
3. Global Flash Flood Guidance Systems Initiative and Partnership supported by US National Oceanic and Atmospheric Administration and the Hydrologic Research Center in cooperation with World Meteorological Organization and US Agency for International Development.
 - Black Sea and Middle East Flash Flood Guidance project, and
 - South-eastern European Flash Flood Guidance project.

Also there were presented the main outcomes of the Management Group meeting, held in Geneva from 5 to 6 February 2013. These are:

- Approval of the RA VI Operating Plan for 2012-2015 & publication on the WMO web page: ftp://ftp.wmo.int/Documents/PublicWeb/dra/eur/RA6_StratPlan/Operating_Plan_2012_2015.pdf.
- Feedback from the RA VI Members on the Institutional Arrangements for the NMHSs and the identification of challenges and future priorities, such as issues related to the visibility, human and financial resources, improvement of the climate and disaster risk reduction services, etc.

The Working Group was invited to provide inputs to the Documents for the XV RA VI Session, on the priority issues with the proposed solutions, and also on the future structure of the WG, through the RA VI president. The deadline for this submission was announced as the end of April 2013.

Mr Tommaso Abrate, the Scientific Officer of the Hydrology and Water Resources Branch of the WMO Climate and Water Department briefly presented the outcomes of the fourteenth session of the Commission for Hydrology, which had met in November 2012

CHy identified five thematic areas for its programme of work 2013-2016, namely: Quality Management Framework – Hydrology, Data Operations and Management, Water Resources Assessment, Hydrological Forecasting and Prediction and Water, Climate and Risk Management. The commission had elected Mr Harry Lins (USA) as its President, and Mr Zhiyu Liu (China) as its Vice-president. Two expert from RAVI were nominated to the CHy Advisory Working Group: Mr Yuri Simonov (Russian Federation) co-leading the thematic area Hydrological Forecasting and Prediction and Mr Jan Danhelka (Czech Republic) leading the thematic area Water, Climate and Risk Management. Mr Johannes Cullman (Germany) was also co-opted in the AWG in his capacity as Chair of the Intergovernmental Council of the International Hydrological Programme of UNESCO. CHy reaffirmed the benefits derived from the inputs provided by RHAs to the development of its work plan for the intersessional period. In order to strengthen the ties between the Commission and the regional groups, it proposed that OPACHE resources may be made available to RWGHs and that RWGHs experts register in OPACHes.

The Commission established a Drought Management Programme (in cooperation with CAgM and CCI), reaffirmed its involvement in support of GFCS, especially the User Interface Platform in order to ensure that the needs of the hydrological community are taken into account during the development of GFCS, and supported the continued implementation of Flash Flood Guidance System in south eastern Europe and in the Black Sea regions.

Mr Abrate recalled the major objectives set by the CHy for the forthcoming four-year intersessional period, namely the preparation of manuals on Water Resources Assessment and on Flood Risk Mapping, and the continuation and further development of the project on the assessment of the performances of flow measurement instruments and techniques. The Commission decided commence a process, including testing, that could see the potential adoption of the WaterML 2.0 as a WMO standard for information exchange. It was decided to pursue the development of guidance material on environmental flow and to start work with UNESCO on the definition of hydrologist and hydrology technician, their basic instruction packages, and the relevant competency standards for few core jobs.

II.2 Session II – Progress review of the implementation of the tasks

II.2.1. The Task Team on Regional Climate Centers

Mr. Stefan Rösner, the Leader of the Task Team on Regional Climate Centres reported on the status of the Task Team's actions proposed by the RA VI Operating Plan, and provided an outlook on activities to be considered for the next inter-session period.

He was pleased to inform the Working Group members about the approval of the nomination of the Pilot RCC-Network, by the WMO Commission for Basic Systems at its 15th session in Jakarta, Indonesia. Also, he noted that the next step towards formal designation of the RCC-Network will be the approval of CBS' decision by the 65th session of the WMO Executive Council, planned for 15-23 May 2013.

The participants were also informed that RCC workshops have been organized during the European Conference of Applied Meteorology (ECAM) in Berlin and European Conference on Applied Climatology (ECAC) in Lodz, in 2011 and 2012, respectively.

The website of the WMO RA VI RCC-Network, accessible via www.rccra6.org has been further improved and the RCC nodes were encouraged to include, where possible, a common RCC logo on the web pages with their products.

The participants learned that in summer 2012 for a first time trial Climate Watch Advisories have been issued during the long heat wave in southern and south-eastern Europe. Uptake and feedback of these advisories have been discussed in the WMO Workshop on Climate Watch System, held in 2012 in Lodz.

The followings have been recommended for the next inter-session period:

- *To develop additional regional and/ or sub-regional hydrological products/ services to the RCC-Network,*
- *To consider the possibility of coming up with the consensus statements,*
- *To hold another coordination meeting to discuss several issues, such as the uptake and the usefulness of the present RCC services and the relationship with new RCC nodes.*
- *To review the existing requirements from RA VI Members and the possible extension of the Network, e.g. to include the ECMWF into the LRF (and monitoring?) nodes.*
- *To give a higher priority to the improvement of the communication between providers and users of the RCC products.*
- *To further develop the RCC-Network to better serve its users.*

II.2.2. The Task Team on Regional Climate Outlook Forum

Dr Dmitry Kiktev, the Leader of the Task Team on Regional Climate Outlook Forum was represented by Dr Kryjov, whose talk covered two basic topics:

- (3.1) Improvement of operational long-range forecasts and long-term projections, and
- (3.2) Improvement of delivery of climate information and prediction products for climate adaptation and risk management.

Under the item 3.1 a concept paper on the RCOFs has been presented. Among others it has been suggested that a further separate development of RCCs and RCOFs is supposed to be unpractical because the RCC concept is flexible enough to enfold the RCOF-activity. It has been noted that nowadays along with SEECOF, two new RCOFs are on the list. Particularly, NEACC has held NEACOFs twice a year since spring 2011 and SW Europe + NW Africa RCOF is under construction. Special attention has been drawn to development of downscaling technologies at the NEACC and comparatively high skill of the GPC-Moscow predictions of wintertime SLP that provides a good basis for downscaling. Nowadays, it has become clear that statistical post-processing based on a downscaling technology is in need for interpretation of the model LR predictions. Prediction focused Nodes of the RCCs network (Toulouse and Moscow) should develop basic downscaling technologies from their LR products to be regionalized and implemented at the NMHSs and provide training for representatives of NMHSs.

Under the item 3.2, it has been reported that in summary concerns of the NMHSs are associated with data (normals) consistency, climate monitoring and projections, training.

It was recommended that the future work should be focused on the improvement of regional applications based on downscaling; assessments of economic efficiency of the predictions; industrial sector oriented applications.

II.2.3. The Task Team on Drought Management

Mr Ali Umran Komuscu, the Leader of the Task Team on Drought Management was represented by Mr Sandor Szalai, who summarized the main tasks of the Task Team and presented the results of the activities.

It was noted that the drought is a common issue for all RA VI countries, who recognized the need to enhance the management of this slow creeping natural hazard. Despite the recognition of the relevance of this issue, the Task Team activity was not fruitful in this inter-session period. Therefore, the presentation was directed to the general achievements with special regards to the regional activities of WMO, which held the High-Level Meeting on National Drought Policy, in Geneva from 11 to 15 March 2013.

WMO looks for collaborating partners in the drought management plans, and the role of the WMO Members should be supported as well.

The following recommendations were given:

- *To address the drought related issues in the next inter-session period, noting that this is one of the major challenges for the most RA VI countries.*
- *To focus the human, technical and financial assistance to combat the drought in the most drought affected sub-regions in RA VI.*
- *To ensure a better coordination in leveraging the resources secured for various drought combating activities, led by WMO and other international agencies.*

II.2.4. The Task Team on Water Scarcity and Drought

Mrs Giuseppina Monacelli presented the results of the Review of existing observatories, including the results of the assessment of Water Scarcity and Drought-related index and indicators, databases and mapping tools.

The participants learned that 3 indicators were agreed so far by EU Water Directors and they can extensively be calculated on the basis of pan-European information. These are as follows:

1. The Standardized Precipitation Index (SPI),
2. The fraction of Absorbed Photo-synthetically Active Solar Radiation,
3. The Water Exploitation Index Plus.

Also the participants were informed about the implementation of several EU FP7 projects and their expected results. These are:

- EU Project on Climate at Carpathian region (CarpatClim)
- Climate Adaptation, modelling water scenarios and sectoral impacts Project (ClimWatAdapt)
- Social Economic Scenarios Project (SCENES)

The EU Project on Climate at Carpathian region has started in December 2010 for a period of 36 months to improve the basis of climate data in the Carpathian Region for applied regional climatological studies, including the development of a climate atlas and of indicators for drought monitoring. Further to the data share various applications /in agriculture, hydrology and other sectors are available. So, CarpatClim Project forms a good platform for its use in different sectors. It is the only project in Europe to share the data and outputs free of charge.

ClimWatAdapt and SCENES projects, for which maps were developed, on future water use under the climate change scenarios. The maps mirror the different possibilities on how the European water resources may unfold in the future. It can be seen that the profile of water uses will change in the future depending on the scenario (<http://www.climwatadapt.eu/scenarios>).

Finally, it has been noted that a Central European Drought Monitoring Centre is being established with the support of WMO.

II.2.5. The Task Team on Data Rescue

Dr. José A. Guijarro, the Leader of the RA VI Task Team on Data Rescue presented the Data Rescue' web site of the RA VI Task Team on Data Rescue and of the WMO Commission on Climatology' Expert Team on Data Rescue. It can be accessed at: <http://www.climatol.eu/DARE/> and has a collection of links to DARE projects and data repositories, plus a set of tables summarizing the characteristics of the available homogenization computer packages, whose performance is compared in benchmarking results provided in an adjoined web page. The other expected results, i.e., promoting DARE projects and getting homogenized series, are achieved individually by the members of the Team through their participation or leadership in the projects such as: Atmospheric Circulation Reconstruction over the Earth (ACRE), WMO sponsored Mediterranean climate Data Rescue initiative (MEDARE), and others.

The followings have been recommended:

The extension of partnership is required to enrich the information related to data rescue projects, data repositories and related tools. Italy and University of Austria have offered to provide the access to their online available resources.

II.2.6. The Task Team on Agricultural Meteorology

Dr Josef Eitzinger, the Leader of the Task Team noted that the overall aim of the Task Team was to review the agrometeorological products and services with the view to improve the implementation and the impact.

The TORs of the Task Team included:

- 1: The economic impacts of agrometeorological information in Europe
- 2: Improve the active collaboration between the farming community in Europe and agrometeorological services
- 3: Best practices for agrometeorological products: Evaluate region specific requirements for agrometeorological data and products; Explore efficiency of (seasonal and ensemble) long range weather forecast (LRF) for agrometeorological purposes
- 4: New challenges or tasks for agrometeorological services and products related to ongoing climate change impacts and the high-quality agricultural production chain.

The detailed results, conclusions and recommendations were presented and are available on the ROE webpage: http://www.wmo.int/pages/prog/dra/eur/RA6_WG_CH.php.

The followings have been recommended:

- The ToRs 1, 3 and 4 are to be further addressed in the next inter-session period,
- The weather services should foster in cooperation with Universities and research Institutions studies on the economic impacts of regional agrometeorological services and products.
- A toolbox for economic impact studies should be developed, especially designed for applications for assessing the benefit of the environmental services.
- Both bottom up and up down approaches are to be applied for improving the collaboration between the farming community in Europe and agro-meteorological services,
- To offer better consulting services to farmers,

- To implement a system of reward to those who best apply state-of-the-art technology, e.g. base the grant of subsidies on this.
- To revise the study plans in order to improve the education of the next generation of farmers,
- Agrometeorological products should be tailored for different stakeholder groups such as farmers. High resolution terroir maps need to be developed, which are relevant for the farmers field scale.
- To implement the legislation on the use of meteorological data, such as the EC Directive 128,
- To provide easier access to raw and processed agrometeorological data, incl. soil data,
- To define and recommend observation network for monitoring and/or collection of critical observed agrometeorological data, which are not measured till now in many agricultural areas (soil water content, soil temperature, crop biomass and yield, irrigation etc.)
- An important task for the next decades is to develop high resolution data bases of soil conditions, agronomic conditions and local climates.
- To strengthen the use of the LRF, it is recommended to make use of the information related to the management of the full food production chain, i.e. including storage and cooling conditions, also an information campaign and expert training especially for Agricultural Ministries, Insurance Agencies, and extension tailored services are recommended.
- Agrometeorological indices or empirical methods operationally applied under climate change conditions should be recalibrated regularly (i.e. 10 years) in order to avoid emerging biases.
- For agrometeorological services and products, the geo-traceability offers the opportunity to provide the site specific climatic information for relevant products and to develop the warning systems for the whole transport and storage chain of a product (i.e. energy demand for cooling, risks related to climate extremes etc.).

II.2.7. Task Team on Hydrometry

Dr Dominique Bérod, the Leader of the Task Team on Hydrometry defined the main achieved deliverables, such as: the evaluation of the survey on hydrological networks and the organization of the first Forum on hydrology, held in Koblenz from May 8th to 10th, 2012.

The Forum allowed to:

- Identify the stakeholders' needs for the hydrological services,
- Give an overview on current strengths and weaknesses of National Hydrological Services,
- Define actions required to improve the services. These improvements are dedicated to monitoring networks and instruments, data management and transmission, and improvement of service deliveries.

It has been noted that the Swiss Federal Office for Environment has commissioned various research institutes to investigate how the water balance in Switzerland, the frequency of floods and low water as well as the water temperature might change by the end of this century. The studies were carried out on the basis of national climate scenarios developed at the same time. The

research project “Climate Change and Hydrology in Switzerland” has provided important hydrological foundations for strategic considerations and decisions. The Synthesis Report details the main results of the project and is available at: <http://www.bafu.admin.ch/publikationen/publikation/01670/index.html?lang=en>.

The United Nations General Assembly declared 2013 as the United Nations International Year of Water Cooperation. This year is also marked by the 150th anniversary of Hydrometric observations in Switzerland. The celebration of the anniversary will be connected to the Swiss Hydrology Day, celebrated on 5th of April. In this regard, the Institute of Geography of the University of Bern will celebrate from 4 to 6 April 2013. The Program of events is available at: http://www.kasa.unibe.ch/tdh13/pdf/Programm_TdH2013_web.pdf (in German only).

Also, the digitalization of long hydrological series is planned with the goal to digitalize water level series, as well as rating curve and meta-information, using a semi-automatic approach. Due to this, the archive will be secured and long series will be delivered for further analyses related to climate or flood. One of the main steps will be to purchase adequate software.

II.2.8. Task Team on Potential Extreme Floods

Dr Bogdan Ozga-Zielinski, the Leader of the Task Team on Potential Extreme Floods has noted that most of the proposed deliverables have been successfully achieved and submitted to the WMO Climate and Water Department through Mr Markku Puupponen, the Hydrological Adviser to the president of RA VI. See the list below:

1. Technical Report as Guidelines for Flood Frequency Analysis – Long Measurement Series of River Discharge (WMO HOMS Component I81.3.01.)
2. Technical Report on River-flooding Potential in terms of the Safety of Water Management Structures and Flooding Risk - Introduction to Methodology
3. Technical Report on Gradex-KC and Gradex-ZN Methods for Computing the Maximum Discharges with Given Probability of Exceedence where Discharge Measurement Data are Incomplete.
4. The Methods of River Discharge Characteristics Estimation – Best Practice Handbook (Polish version), is currently under external review.
5. The Review of Applied-Statistical Methods for Flood-Frequency Analysis in Europe., 2012, Editors: Castellarin A., Kohnova S., Gaal L., Fleig A., Salinas J.L., Toumazis A., Kjeldsen T.R., Macdonald N., FLOODFREQ COST Action ES0901, <http://nora.nerc.ac.uk/19286/>, (as the contribution of the TT on PEF).
6. Recommendation on best practices for flood monitoring, early warning and protection systems on local, national and international level (will not be finished in this inter-sessional period). For the time being TT on PEF promote two publications on the above topic, namely:
 - *Guidance on Flash Flood Management – Recent Experiences from Central and Eastern Europe*, issued by WMO/GWP Associated Programme on Flood Management (APFM) and IMGW-PIB in 2007 (http://www.apfm.info/regional_projects/ceetac.htm), and
 - *In Time for the Flood – A methodological guide to local flood warning systems*, issued by IMGW-PIB, GWP Central and Eastern Europe and APFM in 2005.
7. Liaise with European Network of Freshwater Research Organisations EURAQUA, <http://www.euraqua.org/>, (as on-going cooperation).

The followings have been recommended, for the next inter-session period:

- *The roles and responsibilities of each TT member should be better shared.*
- *The intervention of the WMO Secretariat is required to facilitate the exchange of the technical expertise between the Regional Associations (RAs) and the RAs Working Groups.*

- *To enhance the collaboration with the main players in water community all over the Europe, and particularly between the RA VI WG on Climate and Hydrology, the European Commission bodies and the European Water Organizations.*
- *The Task Team on Hydrometeorological Early Warning System to provide recommendations on the best practices for flood monitoring and early warning systems on local, national and international levels.*

II.2.9 The Task Team on Flood Forecasting and Warnings

Ilmar Karro, the Task Team Leader noted that the team issued three progress reports during the intersession period: in March 2011, October 2011 and August 2012, available on the RAVI web page of the WMO web site.

Also he highlighted few relevant deliverables, which are to be of great help to the RAVI Members dealing with the probabilities, uncertainties and verification issues. These are:

1. The report on the Forecast Demonstration Project D-PHASE entitled "MAP D-PHASE: Demonstrating forecast capabilities for flood events in the Alpine region". D-PHASE stands for Demonstration of Probabilistic Hydrological and Atmospheric Simulation of flood Events in the Alpine region and is a Forecast Demonstration Project (FDP) of the World Weather Research Programme of WMO. It aims at demonstrating some of the many achievements of the Mesoscale Alpine Programme (MAP), in particular the ability of forecasting heavy precipitation and related flooding events in the Alpine region. The Project addresses the entire forecasting chain ranging from limited-area ensemble forecasting, high-resolution atmospheric modelling (km-scale), hydrological modelling, and nowcasting to decision making by the end users, by setting up an end-to-end forecasting system . Updated information on D-PHASE can be obtained from: www.meteoschweiz.admin.ch/web/en/research/current_projects/forecast/dphase.html

2. The European Flood Alert System (EFAS), launched in 2003 at the DG Joint Research Centre of the European Commission. EFAS now is operational and, with its use of probabilities, it is a good example of combining meteorological and hydrological data, giving advice in a probabilistic manner for a pan-European area. More info on EFAS is available at: <http://floods.jrc.ec.europa.eu/>.

Closely associated with EFAS are two major data collection systems. One is the European Terrestrial Network for River discharge (ETN-R) which has been launched by the European Commission to collect real-time water levels and discharges across Europe's transnational river basins. ETN-R is being executed by the Global Runoff Data Centre (GRDC), which operates under the auspices of the World Meteorological Organization. The second project is the EU-FLOOD-GIS, a comprehensive data integration system to support the flood forecasting activity on floods in Europe. It collects meteorological and hydrological data in real-time data, including ETN-R, across Europe and also holds historic time series needed for calibration and validation of the system. Furthermore, information on cross sections, reservoirs, flood extent information, collected for specific case studies, are held in this data base. Because of the restricted data policy in Europe, EU-FLOOD-GIS data cannot be distributed. Only the associated catalogue will be made available in the future, after all data providers have agreed to this.

3. The report of the COST 731 -Propagation of uncertainty in advanced hydrometeorological systems is being finalized and should provide useful inputs on the use of uncertainties to the National Meteorological and Hydrological Services.

4. The 3rd Task Team' report on the Finnish Automatic Forecast Verification in Watershed Simulation and Forecasting System, which is available on the RA VI web page.

The Task Team had recommended the followings:

- *Noting that the flood forecasting and warning is an important issue, it has been recommended to re-establish the Task Team on flood forecasting and warning in the next inter-session period with clearly defined tasks and deliverables for an easy follow up.*
- *Among the future tasks, it is recommended to establish the working relationship with the EFAS Consortium for the benefit of RA VI Members.*
- *Taking into account that the Task Team had no contact with other WMO bodies, such as the WMO Commission on Hydrology, with the exception of the TT/HMEWS, it has been recommended that the re-established Task Team tightens the links with the relevant bodies within and outside WMO.*

II.2.10 Task Team on Hydrometeorological Early Warning System

Mrs. Caroline Wittwer, the leader of the Task Team on Hydrometeorological Early Warning System presented the results of the inventory of the existing Early Warning Systems in the Region. On the basis of the ten answers collected by the end of 2012 (Austria – five regions -, Finland, France, Greece, Latvia, Netherlands, Norway, Slovak Republic, Sweden, Switzerland), covering a wide range of technical development of warning systems (from basic to state of the art), attention was pointed out on their status, differences and similarities, as well as on the issues under work to improve their relevance for the end-users and to enlarge the number of natural hazards covered by the systems.

The Task Team had recommended the followings:

- *Noting that early warning systems is a major part of the development of efficient prevention policies, work and exchanges of experiences should be continued on this issue, particularly in coordination with the Risk Management Plans elaborated in the framework of the EU Flood Directive for December 2015,*
- *Due to the diversity of the national systems, it seems difficult to create quickly a Pan-european hydro-alarm system, similar to MeteoAlarm,*
- *Presenting the TT results on a web-interface, as initially foreseen in sub-task 2, would need continuous efforts for maintenance,*
- *Educational sessions should be part of further activity on this field.*

II.2.11 Task Team on Climate and Water

Mr Esko Kuusisto told about the results of a survey on climate change challenges to National Hydrological Services. Responses were received from 19 RA VI members. The respondents mainly pointed out the need of well-trained personnel and adequate finances. The importance of interdisciplinary and inter-institutional cooperation was also highlighted. More visibility is needed – perhaps there should be more activities in approaching media. "We ought to be a real stakeholder, not only a data and information provider!".

II.3. Session III - Parallel Expert Groups' sessions

The Expert Group on Climate has developed a list of proposed tasks/activities for future work programme of RA VI WG on Climate and Hydrology related to climate, taking account of the activities listed in the RA VI Operating Plan for 2012-2015 and of the required contribution to the Global Framework of Climate Services' implementation.

The proposed Work Plan is attached as Annex IV.

Experts on Hydrology have elaborated an outline for the future work programme of the Working Group on Climate and Hydrology. The Outline is attached as Annex V

II.4. Session IV – Synergies

Both experts on climate and hydrology have briefed each others on the parallel expert groups session, exchanged among themselves the Work Plans proposed for the next intersession period and agreed on the identified cross-cutting issues.

II. 5. Session V – Wrap up and Closure of the meeting

Dr Yolanda Luna, the Head of the Department of Development and Application of the State Meteorological Agency was invited to report about the interregional initiative of the Regional Associations I and VI to extend the Regional Climate Outlook Forum to the Mediterranean sub-region. Dr Luna highlighted the necessity of the establishment of an inter-regional Climate Outlook Forum for the Mediterranean Basin (MedCOF) and expressed the interest of the Spanish Meteorological Agency (AEMET) to coordinate this initiative. For this purpose, the Permanent Representative of Spain with WMO has addressed a letter to both RA I and RA VI presidents proposing to initiate the related consultations with the NMHSs of RA I and RA VI, which would be potentially interested to participate in MedCOF. The first step would be the conduction of a scoping meeting on the possibility to establish the MedCOF. The meeting objective is to improve the collaboration across the Mediterranean basin for operational provision of climate information at seasonal scales. The State Meteorological Agency of Spain is considering hosting the scoping meeting planned to be held in the first half of 2013, in Madrid.

The Task Team Leaders were requested to submit informative inputs to the WG Activity Report for the XV Session of RA VI, planned for September 2013, in Helsinki, Finland. A template has been developed to ensure that all the inputs are structured in a similar way. The template is attached as [Annex VI](#).

The Group agreed on a list of priority tasks to be carried out in the next inter-session period, (see Annexes IV and V).

Based on the priority issues, recommended to be addressed in the next intersession period, the Group has developed the future structure of the WG, as follows:

The Working Group on Climate and Hydrology, to be co-chaired by an expert on climate and an expert on hydrology will coordinate the following Task Teams:

1. The Task Team on Regional Climate Centers and Regional Climate Outlook Forum
2. The Task Team on Climate Watch System
3. The Task Team on Agricultural Meteorology
4. The Task Team on Water Scarcity and Drought (joint Climate and Hydrology)
5. The Task Team on Hydrological modeling, forecasting and warning
6. The Task Team on Data operations & Management (joint Climate and Hydrology), and
- a) Rapporteur on DARE
7. The Task Team on Water services and adaptation to climate change.

III. Conclusions and recommendations

The following conclusions have been made:

1. Joint efforts and synergy of the Expert Groups of Climate and Hydrology produce greater results and deliverables.
2. The Task Team Leaders will submit, by the end of March, the Activity Reports, using the developed template (see Annex VI).

3. The co-chairs will submit the Final Activity Reports, to the WMO Secretariat, by the end of April, with the proposed future working structure of the Group on Climate and Hydrology and its Terms of References.
4. The co-chairs of the WG will provide inputs to the Documents of the XV RAVI Session, by the end of April 2013, taking account of the Task Teams reports,
5. The Group recognized with satisfaction the outstanding work of all core-members of the Working Group.

Recommendations:

The Group recommends the followings:

1. An integrated interdisciplinary collaborative approach of activities should be promoted.
2. The Pool of experts with specific specialist knowledge should be used while seeking for the expert support in the implementation of certain specific tasks.
3. The Working Group on Climate and Hydrology, to be co-chaired by an expert on climate and an expert on hydrology related issues, should be re-established with the following Task Teams:
 - The Task Team on Regional Climate Centers and Regional Climate Outlook Forum
 - The Task Team on Climate Watch System
 - The Task Team on Agricultural Meteorology
 - The Task Team on Water Scarcity and Drought (joint Climate and Hydrology)
 - The Task Team on Hydrological modeling, forecasting and warning
 - The Task Team on Data operations & Management (joint Climate and Hydrology), with
 - a Rapporteur on DARE
 - The Task Team on Water services and adaptation to climate change.
4. The Group took note of the willingness of Anahit Hovsepyan, Dominique Berod, Josef Eitzinger, Giuseppina Monacelli, Jose Antonio Guijarro, Stefan Roesner and Sandor Szalai to provide continue expertise for the implementation of the regional issues in the next intersession period and recommends to the RA VI president to send Letters of Appreciation to the Permanent Representatives of Armenia, Austria, Germany, Italy, Hungary, Spain and Switzerland with WMO, for the support provided by the above listed experts during this intersession period and ask for their concurrence to re-nominate the same experts to provide expertise in the next intersession period.
5. Taking into account the proposed working structure, the Group recommends re-nomination of the following experts to provide expert support in the next inter-session period, as follows:
 - a. Josef Eitzinger, as leader of the Task Team on Agricultural Meteorology
 - b. Stefan Rosner, as leader of the Task Team on Regional Climate Centres and Regional Climate Outlook Forum.
 - c. Giuseppina Monacelli & Sandor Szalai, as co-leaders of the Task Team on Water Scarcity and Drought
6. Welcoming the willingness of Dominique Berod to take over the co-chairmanship for Hydrology for the next intersession period, the Group recommends the RA VI president to seek for the concurrence of the PR of Switzerland with WMO to nominate Mr Berod to serve as the co-chair on Hydrology of the WG on Climate and Hydrology, in the next inter-session period.

7. Further, noting the need to establish a Task Team on Climate Watch System, the Group recommends the RA VI president to invite Finland, as a country coordinating a pilot project on climate watch to take the leadership on the implementation of the climate watch related tasks.
8. To invite Mrs Cristina Alionte Eklund from Sweden to provide expert support to the Task Team on Hydrological modeling, forecasting and warning and Mr Harry Dixon from UK to provide expert support to the Task Team on Climate and Hydrology Data Operations and Management.

IV. Attachments

The Report has the following attachments:

- Doc. 1 - The Meeting Programme
- INF.1 -The Information on Local arrangements
- Annex I - Map with the location of the meeting venue
- Annex II - The List of Participants
- Annex III - The Follow up on the actions
- Annex IV – The Work Plan of the Expert Group on Climate
- Annex V - The Outline of the Expert Group on Hydrology
- Annex VI – The template of the TT Final Reports