



**WORLD METEOROLOGICAL ORGANIZATION**  
Weather • Climate • Water

**REGIONAL ASSOCIATION VI – EUROPE**  
**WORKING GROUP ON HYDROLOGY**  
**Eleventh Session, Toulouse, France**  
**25 – 27 March 2009**

**FINAL REPORT**  
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## **1. OPENING OF THE MEETING**

1.1 The eleventh session of the Working Group on Hydrology of the Regional Association VI (Europe) was held from 25 to 27 March 2009 in the Centre International des Conférences in the Météopole MétéoFrance in Toulouse, France.

1.2 The meeting was attended by 44 participants, representing 23 Member states and six international organizations. A list of participants is attached in Annex 1 to this report.

1.3 In his opening speech, Mr Daniel Roux, deputy director of MétéoFrance and head of the MétéoFrance Centre in Toulouse, expressed appreciation to the chairperson of the group for having supported the organization of the meeting in Toulouse. He underlined the major contribution of the RA VI-WGH to the implementation of the Expected Result 3 of WMO strategic planning (Enhanced capabilities for Members to provide more accurate hydrological forecasts and assessments) at regional level and the expectation from this session regarding future implementation of water related activities in the Region. He also highlighted the central role of hydrology and water related issue in many aspects of the societal life (ranging from economical development to the protection of life and properties) and the need to expand the knowledge in these domains in order to better serve the society.

1.4 In his address, Mr Jan Kubát, chairperson of the RA VI-WGH, expressed thanks to Météo France and to SCHAPI for hosting the meeting and providing excellent facility. He noted that organizing the meeting in the same site of operational offices of the hydrological and meteorological community reflects WMO policy to bring closer experts from the two disciplines in order to strengthen their cooperation and facilitate the implementation of their respective tasks. He informed the participants about the meeting objectives which includes assessment to the work carried out in the current intersessional period and to formulate proposal to the attention of the Regional Association regarding future activities. Finally, he briefed the participants on major events that were shaping the activities of National Hydrological Services (NHSs) in the region, notably the occurrence of severe floods severely affecting several countries, the publication of the IPCC Fourth Assessment Report providing further insight into the impacts of climate change on water resources, and finally the recent financial crisis, with potential detrimental effect on state budget and the functioning of NHSs.

1.5 Mr M. Tawfik, on behalf on the Secretary-General of WMO, added his words of welcome to the participants. He expressed WMO's appreciation to the Government of France as well as to Meteo France and the Permanent Representative of France with WMO for hosting the meeting and making available all the facilities to support the participants. He also thanked SCHAPI for their support to the meeting. He informed the participants about the major changes occurred in WMO since last session of the WGH, notably the adoption of a Strategic Planning based on Expected Results, and the restructuring of the Secretariat including the establishment of the Climate and Water Department. He urged the WGH to formulate indication on how it could contribute to the implementation of the Hydrology and Water Resources Programme, in particularly on the development of the Quality Management Framework – Hydrology, the WMO Strategy on Education and Training in Hydrology and Water Resources, the replenishment of HOMS databases and finally the way for improving cooperation with European Commission and its various bodies. He encouraged the group to discuss and formulate proposal on the future working arrangement at regional level. He concluded by assuring the participants of WMO's support for their activities and wished them successful deliberations.

## **2. ORGANIZATION OF THE WORK OF THE SESSION AND APPROVAL OF THE AGENDA**

2.1 The meeting agreed with the organization of the work of the session and adopted the agenda with minor changes. The Agenda is attached in Annex 2.

## **3. REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON HYDROLOGY**

3.1 The Chairman of WGH, Mr Jan Kubát reported that during the current intersessional period there was only one opportunity for the core Group members to meet, however during other occasions (WMO meetings, EC sessions, etc.) members organized side meetings and informal consultation.

3.2 Mr Kubát reported about his attendance to the sessions of Executive Council in his capacity as Regional Hydrological Advisor. Participants noted that he had constantly promoted closer cooperation between hydrological and meteorological services, especially when it is located in separate institutions, or in the context of international river basins. They were also pleased to note the growing collaboration between the Commission for Hydrology (CHy) and the RAs-WGH, as witnessed by the participation of all Chairpersons of RAs-WGH and Hydrological Advisors to the Presidents of different Regional Associations at the session of the CHy Advisory Working Group (AWG) preceding the CHy-XIII and their contribution to the formulation of the draft CHy working plan, where they presented their regional priorities and requirement.

3.2 He briefed participants about his participation in the regional Task Team for the formulation of RA VI Strategic Plan and his efforts to ensure a proper balance between meteorological and hydrological aspects. The participants were also informed about the ad hoc meeting of the WGH core members which was convened in Prague in 2007 to prepare contribution to the formulation of RA VI Strategic Plan concerning hydrology and water related matters. Participants noted that although the Expected Results are an excellent approach for planning activities, they are less suitable for arranging the institutional structure of the Organization, its major programmes and constituent bodies, as it could result in dividing homogeneous and consistent discipline into several sections.

3.3 The participants noted with satisfaction the growing cooperation with European Commission bodies, especially the consideration of the requirement of NHSs in RA VI, in the implementation of the Water Framework Directive (WFD) and the importance of coordinating of NHSs input to this process provided by this Group. Finally, participants realized the need for strengthening cooperation with UNESCO IHP in activities of interest for the Region.

## **4. CONSIDERATION OF THE RELEVANT DECISIONS OF Cg-XV, XIV-RA VI, CHy-XIII, EC-LIV, EC LV AND EC-LVI**

4.1 Reporting on the activities and decision of the various WMO constituent bodies, Mr Tommaso Abrate informed the participants about the major outcome of XIV-RA VI session in 2005. Members were encouraged to continue strengthen cooperation with the European Commission in fields of common interest such as in the implementation of the WFD, preparation of the groundwater and flood directives, the European Union Action Plan on Flood Risk Management and the European Flood Alert System (EFAS); to develop closer partnership with the EU and other regional organizations on early warning systems; and to promote cooperation with NMHSs in other Regions.

4.2 The fifteenth World Meteorological Congress (Cg-XV) recognized that Regional Working Group on Hydrology formed one of the strong mechanisms to liaise with regional

hydrological communities and, concerned with the declining level of support they were receiving, stressed the need to strengthen their activities, also noting that many of the Millennium Development Goals (MDG) are closely related to water therefore water sector (NHSs) represent major input to WMO contribution to MDG.

4.3 EC-LVIII in 2006 expressed support to the proposal to have WMO Regional Training Centres (RTCs) in a range of disciplines in lieu of more narrow-scoped WMO Regional Meteorological Training Centres. Member countries from the region were invited to identify suitable institution that could become RTC for hydrology.

4.4 The Thirteenth session of the Commission for Hydrology (November 2008) adopted the following four thematic areas as a priority for its work in the next intersessional period:

1. Quality Management Framework – Hydrology (QMF–Hydrology)
2. Water Resources Assessment
3. Hydrological Forecasting and Prediction
4. Water, Climate and Risk Management

4.5 The CHy also adopted the Quality Management Framework – Hydrology, as an integral part of the overall WMO QMF, with the goal of providing an overall strategy, advice and guidance tools for NHSs to attain efficiency, quality and effectiveness in their functioning. The QMF-Hydrology would include documentation on approaches to QMS and guidance on its adoption and implementation, on management of NHSs, on technical approaches for the provision of hydrological data, products and services as well as training modules and materials. CHy would develop the required guidance materials, making use of the best technical practices and approaches developed by Members and other organizations. Participants noted that, in September 2008, WMO and the International Organization for Standardization (ISO) had entered a working agreement to strengthen the development of international standards and to avoid duplication of work on standards related to matters of common interest. The CHy urged its Members to become engaged with ISO national counterpart agencies for the development of standards of importance to NHSs.

4.6 The participants noted that two pilot projects were presently being implemented in the framework of the Flash Flood Guidance System (FFGS) in Central American and South Africa, in cooperation with USAID and the Hydrologic Research Centre (HRC) in San Diego. Noting the relevance of flash flood phenomena in the region, the participants expressed interest in the topic and requested WMO to consider development of a FFGS pilot project in the Region.

4.7 The participants noted with appreciation that WMO had participated in the 5th World Water Forum (Istanbul, Turkey, from 16 to 23 March 2009) and co-organized two technical sessions on "Managing Water-related Risks in a Changing Climate" in collaboration with the Government of the Republic of Korea, and "Data for All" in collaboration with IAHS. They were pleased to know about WMO activities in the forum including organization of several side events and by setting two stands, one in the Water Expo and the other at the UN Pavilion, WMO was well presented and gained good publicity. The Forum offered good opportunity to WMO to promote its visibility in water related activities and to publicise the World Climate Conference-3 (WCC-3).

4.8 The WCC-3 will be organized by WMO from 31 August to 4 September 2009 with the aim to establish an international framework to guide the development of climate services which will link science-based climate predictions and information with climate-risk management and adaptation to climate variability and change throughout the world. The WGH members were invited to encourage participation of their country representatives in the Conference at the highest level.

4.9 The CHy revised the WMO Strategy on Education and Training in Hydrology and Water Resources, and decided that it should guide the activities of the Organization in this area for the period 2009-2012 through short-duration, low-cost and high-impact activities such as training of trainers and roving seminars. A questionnaire is being prepared and would be soon distributed to update the assessment of regional priorities in education and training and provide guidance for the implementation of the Strategy. Members from the region were invited to identify courses or training events their countries could offer (through NHSs or other education institutions) to meet the requirement identified through the questionnaire.

4.10 The participants were informed that in several occasions constituent bodies had underlined the importance of the information contained in HOMS and INFOHYDRO data bases and expressed concern that Members contribution of new information or component had become very rare. Therefore Members were urged to consider increasing their contributions to these important data bases.

## **5. CONSIDERATION OF THE ACTIVITIES OF THE RAPORTEURS OF THE WORKING GROUP**

### ***Report of the Chairman of the Subgroup on Flood Forecasting and Warning***

5.1 Mr Ilmar Karro, chairman of the sub-group presented his report on the activities of the subgroup on Flood Forecasting and Warning. The sub-group had been actively participating in several meetings and workshops, including the workshop on "Enhanced flood forecasting in Europe" in Bratislava in December 2005, the joint WMO/CHR workshop in Berne in March 2006 which dealt with uncertainty in numerical weather predictions, hydrological ensemble forecasts and communication of uncertainties. The sub-group also cooperated with the EXCIFF in the formulation of the guide on "Good Practice for delivering Flood-related Information to the general public" and monitored other activities such as EFAS and HEPEX.

5.2 The subgroup prepared a questionnaire on flood forecasting which was distributed to all RA VI Members with 56% response received. From the analysis of the received replies, results show a dominating role of NHSs in providing flood forecasting (including at the international scale), a quite widespread use of meteorological ensemble, a need for improving forecasting capacities for urban flood and flash floods, a prevalence of deterministic products with respect to probabilistic and a certain weakness in dealing and especially communicating uncertainties related to forecasts. Verification of forecast is quite common although the methodology adopted is relatively basic. The strengths reported are: expertise, models, co-operation, while training and improving forecast accuracy and lead time are the most commonly expressed needs. The areas identified for further activities are (i) the use of probabilistic forecasting and the inclusion of uncertainty in products to users, (ii) the operationalization of EFAS, (iii) flash flood forecasting and (iv) dissemination of forecasts with short lead times. It was also recommended to make an inventory of Open Source software for the forecasting system.

5.3 The participants discussed the issue of making available on the internet hydrological warning, based on positive experiences (eg. France and Poland). They appreciated the EC HYDROALARM initiative, which provides to the general public the warning and information made available by EU member states. It was also noted that forecasting of floods caused by ice jams is of interest for considerable number of Members in the Region.

### ***Report of the expert on Public Relations and Visibility of Hydrological Services***

5.4 Ms Marinela Simota reported about her activities on the topic, which was mainly to identify best activities, tools and approaches used by NHSs, develop a Web site especially for public relation and visibility of NHSs and identify the best means to communicate to large public the daily hydrological bulletins, forecasts and warnings. A proposal for the structure of a

web site for the RA VI water related activities was designed and presented to the meeting; members were requested to provide comment in view of its future development. A questionnaire would also be designed and circulated to NHSs concerning their Public Relations and Visibility practices.

5.5 She noted that in this domain it is important to enhance the visibility of the NHSs and to recognize their role by national authorities, as well as their involvement in the formulation of new international policy tools concerning water. She also stressed the need for further action to make scientific information more visible and understandable to the public at large and to the decision-makers. She reported that although, the topic is of great concern for NHSs national level, regional cooperation in this matter attracted very little attention.

#### ***Report of the Rapporteur on Networking for Contributions to Regional Initiatives Related to Water***

5.6 Mr Markku Puupponen recalled that the main objective of this activity was to promote relevant hydrological contribution for the implementation of the Water Framework Directive (WFD) and to provide support to National Hydrological Services to plan and adapt their long-term activities accordingly. Furthermore, innovative working practices within the WGH were developed by facilitating a network concept for the activity. Twenty-three countries joined the network. The main channel of communication has been via e-mail and internet. Two web sites have been created for the network on WMO servers: one for posting documents relevant to the activities and one hosting a discussion forum. Within the implementation of the WFD, the network has focused on seven topics of special interest: Coordination (Strategic Coordination Group), Working Group on Floods, Working Group on Reporting, Water Scarcity and Droughts Expert Group, Working Group on Groundwater, Hydro-morphology aspects and Climate Change.

5.7 The most important positive development is an increased role and better visibility of hydrology and NHS in the implementation process of WFD due to the reinforced participation of hydrology experts in the process. The Hydrology Network has also been successful as an information channel, and this has contributed to the improved "mobility" of the hydrological community. Few obstacles can be identified mainly due to the absence of specific financial support which has limited the attendance at WFD policy making meetings.

#### ***Report of the Rapporteur on Climate and Water***

5.8 Mr H. Koivusalo, on behalf of Mr T. Kokkonen, reported that the climate and water tasks was to carry out an investigation on methods and tools for summarising and disseminating to decision makers and end users climate scenarios as well as climate change impacts on lakes. The investigation was conducted in form of an internet survey among a group of experts from RA VI. The main visualisation tools included in a decision support system (CLIME-DSS) developed in the EU-funded CLIME project (Climate and Lake Impacts in Europe) were presented to the experts, and they were asked to assess how informative the presentation of climate and lake model results was and what could be done to improve the presentation. The key results of the survey were summarised and presented to the participants.

5.9 Participants pointed out the need to identify suitable ways for the presentation of the future climatic conditions and potential impacts on water resources to different interest groups. It is important to present the context of the information and uncertainties involved in the prediction, when information is disseminated. The difficulties in the identification and separation of concurrent influences of climate change and human impacts on hydrology were addressed. Water resources management issues under changing climate are important and

challenges related to future adaptation measures call for a continuation of the work on climate and water in WGH.

### ***Report of the Rapporteur on Water Monitoring and Assessment***

5.10 Prof. Valery Vuglinskiy reported about his activities on the topic mainly connected with the Integration of WMO observing systems (Expected Result IV of the RA-VI Strategic Plan) for the period April 2007 – December 2008. He characterized two areas of activity connected with the establishment of standards for the Terrestrial Essential Climate Variables (ECV's) and development of International Data Centre on Hydrology of Lakes and Reservoirs (HYDROLARE). Both types of activity were carried out with the participation of the WMO CHy and RA-VI WGH members.

5.11 The work on the establishment of ECV's standards has been done in line with the activities of the Terrestrial Observing Panel for Climate (TOPC) which is part of the Global Terrestrial Observing System and the Global Climate Observing System. One of its aims is the development of terrestrial observation networks, including hydrological network. The Biennial Report Supplement was issued with reviews of the terrestrial ECVs. Four of them, namely river discharge, water use, ground water and lake level, refer to the field of hydrology. A standard review of each ECV has been performed involving terms and definitions, the observed parameters, measurement methods, both in-situ and satellite ones, existing standards and recommendations on improvement of monitoring of individual ECVs. The representatives of RA-VI countries took actively part in the preparation of the reports on ECV T1: River discharge and on ECV T4: Water level in lakes and reservoirs, water storage.

5.12 The rapporteur informed that the International Data Centre on Hydrology of Lakes and Reservoirs (HYDROLARE) began to operate at the State Hydrological Institute (Russian Federation) from 1 January 2009 in accordance with the protocol signed with WMO. During 2008, the encoding system for data base was set and the database software was selected to meet WMO requirements. Metadata and historical observational data for Russia and other former Soviet Union countries was assembled and entered into the data base. A first test operation of HYDROLARE was carried out. At the end of 2008, the questionnaire for data collection from foreign countries was distributed via WMO. More than 45 countries agreed to cooperate with HYDROLARE. The HYDROLARE web site is now under operation: [www.hydrolare.ru](http://www.hydrolare.ru). The Rapporteur stressed the necessity to further continue activities on Water monitoring and Assessment theme in close connection with the RA-VI Strategic Plan.

### ***Report of the Rapporteur on Drought Assessment and Forecasting***

5.13 Ms Monacelli reported on the work, she carried out during the intersessional period in contributing to the drafting of EU documents and reports, and ensuring a linkage between the core members of the WGH and the EU working groups acting on the subject of water scarcity and drought in the framework of the Common Implementation Strategy of the Water Framework Directive in order to ensure that the hydrological aspects are duly taken into account during the preparation of these documents. The main documents to which this contribution was provided were the 1<sup>st</sup> and 2<sup>nd</sup> Interim Reports (2006 and 2007), the report on "Prolonged drought - towards a common understanding of the phenomenon and of its impacts" (2007) and the "Drought Management Plan Report - including agricultural, drought indicators and Climate Change Aspects" (2008). The contributions to the above mentioned reports and documents were all developed with participative processes inside the working group.

5.14 The expert also reported on the adoption by the European Commission of a Communication to the European Parliament and to the Council on "Addressing the challenge of water scarcity and droughts in the European Union", presenting a set of policy options to

address and mitigate the challenge posed by water scarcity and drought within the European Union, with the intention to remain fully committed to the international conventions, in particular UN Convention to Combat Desertification and UN Framework Convention on Climate Change. The various policy options were debated in the discussion forum set up for the RA VI WGH. In future the focus of the activity should be on to the individuation of the onset and ending of the events, and on low flows in rivers for the ecological respect of aquatic life in regulated water courses.

5.15 Further, she highlighted that, being the development and approval process of EU water policy related document relatively fast, and being not always NHSs adequately represented in the relevant EU working groups, there is a strong need for maintaining strong and effective links among the NHS of the region, through adequate networking, in order to ensure that NHSs contributions and requirements are adequately taken into account in the development of such policy documents.

### ***Report of the Rapporteur on Potential Extreme Flood***

5.16 In presenting his report, Mr B. Ozga-Zielinski (Poland) informed the participants that he had worked closely with a group of experts (V. Cabrihna (Portugal), F.O. Kocyigit (Turkey), B. Kulasova (Czech Republic), R.P. Mic (Romania), L. Nikiforova (Kazakhstan), H. Ozguler (Turkey) and D. Trninic (Croatia)) who supported him in achieving his task.

5.17 The report was prepared on the basis of a literature review on the research carried out on hydrological design data for extreme floods occurrences, notably the Gradex-KC and Gradex-ZN methods for computing the maximum discharges with given probability of exceeding where discharge measurement data are incomplete. Gradex-KC method enables the estimation of annual maximum floods with T-year return period on the basis of short (0 to 15 years) series of annual maximum river discharge and long ( 40 years or more) annual maximum precipitation series. The Gradex-ZN method is based on theoretical assumptions adopted in the Gradex-KC method and introduces changes in parameters estimation taking into account requirements for ungauged basin.

5.18 A handbook on the best practices of Methods for River Discharge Characteristics Estimation was being prepared. The handbook would present a set of currently used methods recommended as best practice in hydrological calculations for water management structures planning, design and exploitation. The methods presented differ in complexity of mathematical description and difficulty in their usage, from empirical formulas to very complex mathematical models. The English version of the report on River-flooding potential for safety of water management structures and flooding risk, based on international experience concerning PMP/PMF and proposing a new approach called Maximum Credible Precipitation (MCP) and Maximum Credible Flood (MCF) , is now under preparation.

5.19 It was recommended to prepare recommendations on best practices and standards in design data for flood events, and on flood monitoring, early warning and protection systems on local, national and international level.

### ***Report on international standards for hydrological observation and processing in RA-VI***

5.20 Ms Zs. Buzás reported on her activities related to “initiate joint effort with the International Organization for Standardization (ISO) and European Committee for Standardization (CEN) on international standards for hydrological observation and processing” of the RA VI Action Plan 2008-2011. The main objective of her task is to contribute to the comparability of monitoring results, particularly in relation with the implementation of the WFD. A survey was carried out in early 2008 on standards in use in European NHSs for surface and

groundwater quantity observation and data processing. The results of the analysis of replies received from 14 countries, showed that NHSs use mainly national standards while international standards (ISO) are much less commonly adopted, specially for discharge measurements, while no country has adopted international standard for data processing.

5.21 Ms Buzás also noted that few NHSs experts are currently involved in the European Committee for Standardization (CEN) activities and when draft standards are circulated for comments to national standardization authorities, often these authorities lack adequate expertise in hydrology.

## **6. DISCUSSION ON THE IMPLEMENTATION OF THE HYDROLOGY AND WATER RESOURCES PROGRAMME IN RELATION TO THE NEEDS OF THE REGION**

6.1 The group was informed about the Strategic Plan process which is shaping the implementation of WMO programmes and activities at global and regional level. It noted that CHy XIII had recommended that the views of the hydrological community be taken into account and incorporated in the development of Strategic Plans for the Regional Associations, and had encouraged WMO hydrological community to take every opportunity to provide prioritized proposals and suggestions to the formulation of the Strategic Plan for the period 2012-2015.

6.2 The group reviewed the objectives set in the hydrological part of the RA VI Strategic Plan 2008-2011 and noted that they were still relevant and demanded only minor modification to reflect the outcomes and finding of the work of the group. In particular it was proposed to include the following elements under the existing Expected Results as follows:

- Expected result 3 - Enhanced capabilities for Members to provide more accurate hydrological forecasts and assessments
  - Calculation of water balance (for reporting to EEA and EUROSTATS)
  - Cooperation with the European Drought Observatory (EDO)
  - Review of meteorological forecasting systems for flash flood events with very short lead time
- Expected result 7 - Enhanced capabilities for Members to provide and use weather, climate, water and environmental applications and services
  - Replace the development of the web site with the definition of a communication strategy for hydrological activities
- Expected Result 9: Enhanced capabilities of NMHSs in developing countries, particularly LDCs, to fulfil their mandates on weather, climate and water
  - To be removed in consideration of the departure of the group member responsible for the task

6.3 Ms Natalia Berghi from the WMO Regional Office for Europe further informed the meeting about the outcomes of the EC Working Group on Strategic Planning (16-18 March 2009). The Group had recommended that the Strategic Plan should be adopted for a period of ten years while the operating plan would be designed for the period 2012-2015. It also had recommended slightly amending WMO expected results as follows:

- ER1 with focus on research
- ER2 with focus on weather, climate, water and environment
- ER3 with focus on WIS and WIGOS
- ER4 with focus on DPM
- ER5 with focus World Climate Services Systems
- ER6 with focus on partnership
- ER7 with focus on capacity building
- ER8 with focus on the efficient functioning of the Organization

Regional Associations and Technical Commissions had also been invited to define specific key outcomes together with indicators, baselines and targets and cooperate with the Secretariat to develop deliverables, activities and proposals.

6.4 She also informed the meeting that the RA VI Management Group at its meeting in Dubrovnik (Croatia) on 22 March 2009 had recommended the following structure of regional working group:

- Working Group on development and implementation (mainly dealing with WIGOS and WIS)
- Working Group on Climate and Water
- Working Group on Service Delivery and Partnership
- Management Group, with responsibilities concerning Capacity Building and Strategic Planning

She invited the meeting to consider the above recommendation, while developing the RA VI-WGH Terms of Reference for the next intersessional period.

6.5 The meeting discussed at length the advantages and disadvantages of the proposed new structure. Participants stressed that hydrological activities represent a high priority for the Region's Members and should be adequately reflected in the future structure and plans. The concern was also expressed that the new structure might lead to a dispersion of the hydrological expertise in the region, weakening the profile of WMO in water related matters.

6.6 The meeting appreciated the valuable cooperation between meteorologist and hydrologists within the framework of the ongoing activities of the subgroup on flood forecasting and warning. Participants also stressed the need for further improving cooperation between hydrological and climatological communities at the regional level. Further it highlighted the need for continued institutional cooperation with EU in WFD implementation related matters.

6.7 The group strongly stressed the need, felt by all the NHSs in the region, of having a forum for networking, discussing and coordinating their activities as an integral part of RA VI activities, with special reference for the inputs to the implementation of EU water related directives (especially considering that NHSs are not always adequately represented in EU subsidiary bodies setting the directive implementation policies). The WGH has represented so far such a forum and its disbandment may weaken this function, therefore significantly reducing the impacts of the NHSs in the activities for which such a networking and cooperation are strongly required.

6.8 In consideration of all the above, participants suggested to the XV-RA VI to re-establish the Working Group on Hydrology with strengthened coordination, integration and cooperation with the meteorological and climatological communities. It should also take into consideration the synergies with CHy activities.

6.9 The participants also noted the requirement expressed by the European Environmental Agency for contribution from the hydrological community in developing and improving the standards on water accounting and balance. The participants also expressed the need to find a way for making accessible to NHSs and the hydrological community (regionally and globally) the many outcomes of the EU funded projects in domain relevant to the hydrology and water resources.

## **7. DISCUSSION OF FUTURE ACTIVITIES OF THE REGIONAL ASSOCIATION VI IN THE FIELD OF HYDROLOGY AND WATER RESOURCES**

7.1 The meeting was informed that the Fifteenth Session of WMO Regional Association VI is planned for 16 to 25 September 2009 in Brussels (Belgium). It therefore agreed that the draft report of the eleventh session of RA VI WGH should be finalized by the 15 April 2009

for submission to the president of RA VI for his approval for circulation to all the working group members.

7.2 The meeting, in view of the discussions on the implementation of the Hydrology and Water Resources programme in relation to the needs of the Region (see 6 above) proposed the following topics for the future work in hydrology and water related matters as listed below:

- a) **Flood Forecasting:** this activity shall be implemented in co-operation with CHy AWG expert on Hydrological Forecasting and Prediction. Emphasis should be put on the use of probabilistic products and the use of uncertainties as well as the promotion of cooperation between meteorologists, hydrologists and end users both in operational as well as in research and development. Especially flash flooding forecasting should be further studied. It is also important to strengthen the cooperation with regional initiatives and projects as EFAS.
- b) **Potential Extreme Floods** Contribution to flood risk management through:
  - a. the preparation of recommendations on best practices and standards in estimation of design data for extreme flood events and
  - b. preparation of recommendation for flood monitoring, early warning and protection systems at local, national and international level,
- c) **Water monitoring and assessment:** particular emphasis should be given to evaluate current methods used for water balance and assessment of the surface and ground water in the region, including observation networks objectives and design. and cooperate in introducing of up-to-date methods into hydrological practice (cooperation with CHy AWG expert on Water Resources Assessment) , also in consideration of the reporting requirements established by the European Environmental Agency and EUROSTAT, and more in general to take care of the hydrological aspects of EU environmental data policies and cooperate with EEA in the collection, exchange and use of hydrological data and information
- d) **Hydrological measurement - instruments and techniques:** this task shall be implemented in close cooperation with CHy activities under QMF thematic area and the relevant experts (notably the project on Assessment of the performances of Flow measurement Equipment and the cooperation with ISO and CEN on development of international standards for hydrological observation and processing) and with the RA VI Working Group on development and implementation, if so established by the regional association at the next meeting. The activity will focus on two areas:
  - Hydrological observing equipment (measuring, collecting and transmitting data);
  - Flow measurement equipment (ADCPs, ...)The aim will be to provide information about new technology implemented in the work of the NHSs, and to prepare guidance, manuals, standards, calibration based on best practice, also information about practice, problems and solution.
- e) **Impacts of Climate Change on Water:** with focus on assessment of possible impacts of climate variability and change in hydrological practices and adaptation to climate change in water resources management (use of reservoirs in the adaptation, mitigation of changing flood and drought risk)
- f) **Drought monitoring and assessment:** with special emphasis on the analysis and evaluation of methods for determination of minimum ecological flow (cooperation with CHy AWG expert on Water Resources Assessment) and the coordination of NHSs inputs to drought related activities in the region such as the DMCSEE and the European Drought Observatory (EDO)
- g) **Visibility of hydrological activities:** the work should focus on the development of a communication strategy to promote the visibility and recognition of NHss and of hydrological activities in a broader sense (this activity could be undertaken by the working group on Service delivery and Partnership, if so established by the Regional Association at the next session)

- h) **Joint meteorological and hydrological warning systems:** this task will focus on a feasibility study conducted to define and propose solutions for including hydrological warning into the current meteorological warning systems at national, European and larger level (this activity could be undertaken by the working group on Service delivery and Partnership, if so established by the regional association at the next meeting).

7.3 The meeting agreed that the Group should further strengthen its networking and develop its communication strategy. Thus the concept of the former activity on networking for Water Framework Directive would be extended to cover all Group members and all of its activities. The use of the web pages of the activity will be extended in the similar manner.

## **8. ANY OTHER MATTERS**

8.1 The meeting recognized and appreciated the work Mr Jan Kubát during the last two intersessional periods as a chairman of the Group and Hydrological Advisor to the President of RAVI. His contribution to the work of the Group and coordinating the inputs from various experts resulted to successful implementation of the planned activities and achieving the objectives of the Group.

8.2 The Group appreciated the offer from Mr Markku Puupponen (Finland) and Mr Bogdan Ozga Zielinski (Poland) to serve as chairperson and vice-chairperson respectively during the next intersessional period.

8.3 The group also noted with appreciation the offer from various experts to contribute to the implementation of the above proposed activities as follows:

- (a) Flood Forecasting and warning. Ilmar Karro (Sweden)
- (b) Potential Extreme Floods: Bogdan Ozga Zielinski (Poland)
- (c) Water Monitoring And Assessment: [Spain][Germany]
- (d) Hydrological measurement: \_\_\_\_\_
- (e) Impacts of Climate Change on Water: Esko Kuusisto (Finland)
- (f) Drought monitoring and assessment: Ms Giuseppina Monacelli (Italy) [Bulgaria]
- (g) Visibility of hydrological Activities: \_\_\_\_\_
- (h) Joint meteorological and hydrological warning systems: Ms Caroline Wittwer (France)

8.4 The Group requested the RA VI session to consider the above offers subject to agreement of the respective Permanent Representatives.

### **8.5 *Technical and scientific presentations***

#### **8.5.1 Météo France**

Mr J-M Carrière, Forecasting Director of MétéoFrance briefly presented MétéoFrance activities related to hydrology. MétéoFrance in particular is providing precipitation forecasts, information on snow cover and information on the interaction between soil and atmosphere. Through a network of meteorological radars (X and S band) it covers about 80% of the national territory and it is planned to extend the coverage in the Alpine region with C-band radars. In the framework of an agreement between MétéoFrance and the Ministry of Sustainable Development MétéoFrance is also providing methodological support for flood forecasting and acts as flood forecasting centre for the East Mediterranean region. Other MétéoFrance activities in support of hydrological activities are the development of ensemble river discharge forecasting system (combining hydrological model and ensemble precipitation forecasts), the regionalization of return period of maximum precipitations and a hydrodynamic 2D finite-element models of the Gironde estuary. All these products had been developed jointly with

SCHAPI and other research institutions. MétéoFrance web site presents jointly the potentially dangerous meteorological and hydrological situation on a colour-coded map.

#### 8.5.2 SCHAPI

Ms C. Wittwer of SCHAPI presented the reorganization of state authorities (at both central and regional level) which has accompanied the overall shift of focus from flood warning to flood forecasting and lead to the creation of SCHAPI (Service Central d'Hydrométéorologie et d'Appui à la Prévision des Inondations). SCHAPI has available a network of observing stations, covering 20.000 km of rivers and about 90% of the population living in floodable areas. It coordinates flood forecasting and hydrometric activities at national level, produces flood vigilance maps, provides information to national authorities and communication media, and technical supports to the local flood forecasting centres (SPC). Since 2007 jointly with MétéoFrance it has been developed a procedure for rainfall – flood vigilance

#### 8.5.3 GRDC

Mr Looser presented the activities of the Global Runoff Data Centre, which mainly focus on data acquisition and cooperation in international programmes and projects. Information was given on the specialised databases maintained amongst other for UNESCO European FRIEND and for EFAS through the European Terrestrial Network for River Discharge (ETN-R). Special products and activities (e.g. Fresh water fluxes to the world oceans, Metadata profile for hydrologic datasets) were presented. The need for data sharing was addressed and it was noted that there seems to be a heightened awareness amongst concerned parties and an increased willingness to cooperate. Finally the GRDC partner data centres GPCC, IGRAC, GEMS/Water and HYDROLARE were mentioned.

#### 8.5.4 JRC – EFAS - HEPEX

Ms J. Thielen reported on the progress of the European Flood Alert System (EFAS) under development at the DG Joint Research Centre of the European Commission since 2003. Pre-operationally, EFAS is currently providing to 24 National Hydrological Services early flood warning information based on EPS and multiple weather forecasts. M. Simota reported that EFAS results contributed this year to early flood warning in Romania. Discussions on the funding of an operational EFAS from 2011 onwards, are currently ongoing with different DG's of the European Commission. Until funding has been agreed, the Joint Research Centre will continue to provide a pre-operational service.

Ms J. Thielen, in her function as co-chair of HEPEX, gave a brief overview on the aims of HEPEX (Hydrologic Ensemble Prediction Experiment). The project was launched in 2004 and is an initiative where hydrological and meteorological communities come together to develop pioneering probabilistic hydrologic forecast techniques that use state-of-the-art weather and climate ensemble forecasts. HEPEX would welcome interaction with the WMO working group of hydrology. Attention was drawn to the next HEPEX workshop, to be held in Toulouse, from 15 to 18 June 2009.

#### 8.5.7 Technical visits Meteo France and SCHAPI

A technical visit to Meteo France and SCHAPI offices was arranged by the organizer; The visit offered good opportunity to the participants to exchange views and experience on issues related to flood forecasting. They were pleased with the visit and appreciated the available facilities in the two institutions. It was suggested further cooperation between NHSs and these two institutions to make use of the available technologies.

## **9. ADOPTION OF THE REPORT AND CLOSURE OF THE MEETING**

9.1 The Working Group adopted the report of its session and requested the WMO Secretariat to make any editorial changes deemed necessary and, with the approval of the President of RA VI, to circulate it to all participants and Members of RA VI.

9.2 In her closing remarks, Ms Anne-Marie Levraut Head of the Natural and Hydraulic Risks Service of the Risk Prevention Directorate, Ministry of Ecology, Energy, Sustainable Development, and Land Planning, expressed satisfaction with the fruitful cooperation between WMO and the various French state institutions, notably SCHAPI and Météo France, which operate under the aegis of the Ministry; she noted that WGH meeting had offered the opportunity to establish closer ties with the European hydrological community. She called for more closer cooperation in the future, also in consideration of the fact that most of the proposed themes for future activities of the Group were in line with the mandate of the Ministry.

9.3 At the closing session, the chairman thanked the participants for their valuable contributions to the discussions and the deliberations of the meeting and to SCHAPI and Meteo France for hosting the meeting and making available all the facilities. He appreciated the technical support he received from the various experts in the WGH to achieve his task.

9.4 Mr M. Tawfik joined his words of thanks to the organizers, for the facilities and support to WMO delegates which resulted to a successful meeting. He also thanked the chairman for the excellent work accomplished during the intersessional period and to all participants for their useful and valuable contribution to the work of the session. Finally, he briefly outlined the follow-up actions, which will precede the XV-RA VI and assured the participants of WMO support to their work.

9.5 The session closed at 16:00 on Friday 27 March 2009

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**WORKING GROUP ON HYDROLOGY  
REGIONAL ASSOCIATION VI  
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**RA VI WGH/DOC. 1  
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**ELEVENTH SESSION  
(TOULOUSE, FRANCE, 25 -27 MARCH 2009)**

**Original: ENGLISH**

## **AGENDA**

- 1 OPENING OF THE MEETING
- 2 APPROVAL OF THE AGENDA AND ORGANIZATION OF THE WORK
- 3 REPORT OF THE CHAIRMAN OF THE WORKING GROUP
- 4 CONSIDERATION OF THE RELEVANT DECISIONS OF CHy-XIII Cg-XV, XIVRA VI, AND EC-LVII, EC-LVIII, EC-LIX, EC-LX
- 5 CONSIDERATION OF THE ACTIVITIES OF THE RAPPORTEURS OF THE WORKING GROUP
  - 5.1 Report of the Chairman of the Subgroup on Flood Forecasting and Warning
  - 5.2 Report of the Rapporteur on Public Relations and Visibility of Hydrological Services
  - 5.3 Report of the Rapporteur on Networking for Contributions to Regional Initiatives Related to Water
  - 5.4 Report of the Rapporteur on Climate and Water
  - 5.5 Report of the Rapporteur on Water Monitoring and Assessment
  - 5.6 Report of the Rapporteur on Drought Assessment and Forecasting
  - 5.7 Report of the Rapporteur on Potential Extreme Flood
  - 5.8 Report on international standards for hydrological observation and processing in RA-VI region
  - 5.9 Report on international standards for hydrological observation and processing in RA-VI
- 6 DISCUSSION ON THE IMPLEMENTATION OF THE HYDROLOGY AND WATER RESOURCES PROGRAMME IN RELATION TO THE NEEDS OF THE REGION
- 7 DISCUSSION ON FUTURE ACTIVITIES OF THE REGIONAL ASSOCIATION VI IN THE FIELD OF HYDROLOGY AND WATER RESOURCES
- 8 ANY OTHER MATTERS
- 9 ADOPTION OF THE REPORT AND CLOSURE OF THE MEETING