

**WORLD METEOROLOGICAL ORGANIZATION**



**WORKING GROUP ON HYDROLOGY**

**REGIONAL ASSOCIATION VI  
(EUROPE)**

**Berlin, Germany, 15-20 February 2002**

**REPORT**



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

1.1 The ninth session of the Working Group on Hydrology (WGH) of the WMO Regional Association VI (Europe) was held at the Haus Am Köllnische Park in Berlin from 15 to 20 February 2002. The list of participants is provided in Annex 1 to this report.

1.2 The session was opened by the Chairman of the Working Group, Professor F. Nobilis (Austria). He extended his welcome to all the participants and thanked the German IHP/OHP Committee, in particular Professor K. Hofius (Germany) and the staff of the German IHP/OHP Secretariat, for hosting the meeting and for assisting with its organization. He also appreciated that many participants attended the meeting, in spite of the financial restrictions that many NHSs are experiencing in these years.

1.3 Mr T. Abrate, on behalf on the Secretary-General of WMO, also added his words of welcome to the participants. He expressed WMO's appreciation to the Government of Germany and in particular to the German IHP/OHP Committee for hosting the meeting. He outlined that the purposes of the meeting were to review the work carried out by the rapporteurs and by the Subgroup on Flood Forecasting and Warning, and to decide on plans for future activities. In connection with this he identified a number of priority areas to be considered during the session. He also recalled that the WGH offered a unique forum for representatives of NHSs of all the European countries to gather and discuss matters of common interest.

1.4 Professor Hofius, Hydrological Advisor to the Permanent Representative of Germany, welcomed the participants, also on behalf of the Commission for Hydrology. He called the attention of the Group to the meeting of the representatives of the International Hydrology Programme (IHP) National Committees for the Electoral Groups I (Western Europe and North America) and II (Eastern Europe) that would be held in the same venue on 18 and 19 February. He thanked Mr R. Feddes, Chairman of the Intergovernmental Council for the IHP for having proposed holding the IHP meeting in parallel with the WMO RAVI WGH meeting, thus providing the possibility for the participants in each to meet together.

## **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 as given in Annex 2. It was also informed that a joint session with the IHP meeting was planned for Monday 18 February in the afternoon to discuss ways of strengthening links and promoting co-operation between the two programmes.

## **3. CONSIDERATION OF THE RELEVANT DECISIONS OF Cg-XIII, XII-RA VI, CHy-XI AND EXECUTIVE COUNCIL (EC)**

3.1 The meeting was informed of decisions of Cg-XIII, Executive Council and CHy-XI which were relevant to the regional aspects of the Hydrology and Water Resources Programme.

3.2 Note was taken of the adoption, by the Congress, of new terms of reference for the Commission for Hydrology, broadening the scope of its activities, and of the inclusion of two new components within the HWRP, respectively on sustainable development and on capacity building. It was noted that Regional Hydrological Advisors are now invited to participate in the whole period of all sessions of the Executive Council except the session following Congress.

3.3 The group was informed that the Congress had not supported the proposal to amend the name of the WMO to include hydrology, but appreciated that consideration was being given to the possibility of adding a subtitle to highlight the Organization's role and responsibility also in the fields of hydrology and climatology.

3.4 The meeting noted the adoption of Resolution 25 (Cg-XIII) on the international exchange of hydrological data and related information. The Group noted that this resolution, in conjunction with Resolution 40 (Cg-XII) on meteorological data, had a positive effect on the NHSs activities in most cases, allowing easier access to the data and information required for their activities. Some concern was expressed on the risk of re-export and sale of data and information by a third party. The Group also expressed the wish that the same principles of free and unrestricted exchange applicable at international level be implemented also at national level, especially between NHSs and NMSs. It also recommended that water quality data exchange be included in the scope of Resolution 25.

3.5 The Group was informed that EC-LIII adopted a resolution for the establishment of the International Groundwater Resources Assessment Centre (IGRAC). It recommended that groundwater related issues be given more attention in the HWRP activities, and co-operation be sought with national geological services in this respect. It noted with pleasure that the Government of The Netherlands was carrying out a feasibility study on the establishment of the IGRAC.

3.6 The Group noted the proposal of CHy to create national committees for HWRP and recognized that in specific national contexts such committees that gather together all the producers of hydrological information, could be beneficial. Indeed, it noted with concern the scattering of responsibilities on water-related issues between a number of services and agencies existing at national level, in particular regarding water quality and groundwater. This affects in particular the integration of data from different sources, as often different methodologies for collection and primary processing are adopted. Therefore the need to know "who does what", to promote data exchange and to develop common standards for data quality was underlined.

3.7 The Working Group strongly recommended that WMO be more actively involved in the European Commission's activities, aimed at setting standards for hydrological data collection and processing, and in promoting the adoption of accepted international standards.

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

4.1 Reporting on its activities as chairman of the Working Group, Professor Nobilis, in particular highlighted the work done in the framework of the Joint Liaison Group, by establishing a number of co-operative contacts and links with a large number of organisations active in the field of hydrology at continental level. These included river basins commissions and the European Union institutions amongst others. A list of the organizations contacted is given as Annex 3. He pointed out that areas in which co-operation was possible were: water balance of Europe, GIS for ecological assessments, validation of hydrological models, flood forecasting and protection, integration with EUROWATERNET, sediment transport and the implementation of the Water Framework Directive of the European Commission.

4.2 In addition he mentioned that the reports of the rapporteurs proposed a number of other tasks to be considered for the future working plan.

4.3 He also reported on his participation in the Executive Council sessions and on the discussions had in a preparatory meeting on a flood related project proposal Integrated Meteorological Prediction and Hydrological Forecasts for Improved Short-Term Operational Flood Warning and Management (MEPHYSTO) hosted in Vienna in June 2001.

## **5. REPORT OF THE CHAIRPERSON OF THE COORDINATION SUBGROUP ON FLOOD FORECASTING AND WARNING**

5.1 The Group noted that the chairperson, Ms H. Bartels (Germany) had been unable to complete her mandate for personal reasons, and that she had been replaced by Mr J. Kubát (Czech Republic), vice chairman of the Subgroup, who reported on the outcomes of its activities.

5.2 A questionnaire addressing institutional, meteorological and hydrological aspects, as well as data exchange practices, had been sent to a selected number of countries to assess the status and the methodologies of flood forecasting and warning activities. Due to the lack of sufficient response, only the meteorological and hydrological part of the questionnaire could be evaluated.

5.3 The Subgroup also developed proposals and recommendations for the improvement of flood forecasting and warning. Areal / gridded precipitation data, quantitative precipitation forecasts (QPF), integration of rain data from various sources (surface networks, radar, satellite), calibration of rainfall-runoff models, hydrological forecasting models and communication systems were identified as critical areas which required major improvements in the future. It was also recognized that there is a need to bridge the gap existing between the meteorological and hydrological communities in the way each group approaches the problem of flood forecasting.

5.4 The meeting was of the opinion that the whole process, starting from rain data and ending with the issuing of a hydrological warning should be addressed in an integrated way. Special attention should be paid to the recipients of the warning (responsible authorities, general public) and the identification of the institution / person responsible for issuing such warning.

5.5 There was a strong recommendation that the activities in this area be continued in the next inter-sessional period under the guidance of the Working Group on Hydrology. This should focus on a selected set of problems to be addressed in detail. The need for a greater involvement of meteorological experts in the specific areas of their competence was also expressed. The Group also expressed the wish that, as part of this activity, seminars or workshops be organized in the coming years.

## **6. CONSIDERATION OF THE WORK OF THE RAPORTEURS**

6.1 The meeting reviewed the work that had been carried out to date by the various rapporteurs on the basis of their draft technical reports which they presented. The work of each rapporteur is summarized below.

### **Integration of Environmental Monitoring Networks**

6.2 Dr A. Snorrason (Iceland) presented the report, which had been jointly prepared with Dr M. Puupponen (Finland). The appearance of new information needs linked to the increasing competition on water use and to the requirement for systematic assessment of the status of the environment is necessitating closer integration of different monitoring networks. The main advantages of such an approach are increased cost-effectiveness, improved quality and coverage of the monitoring, and generation of new knowledge. The rapporteurs underlined that integration is applicable from the general policy and strategy decisions down to the scale of integrated multiparameter stations. Data from GIS and remote sensing should also be included.

6.3 The rapporteurs stressed the nature of public good of the environmental information. Free access to data is a basic prerequisite for further integration of monitoring network. Integrated networks and integrated information systems were also seen as practical tools to overcome the difficulties arising from the many and varied actors in the field of water monitoring, where institutional mergers do not appear to be a viable solution.

### **Integration and coupling of hydrological models with water quality models**

6.4 The report by Dr B. Arheimer (Sweden) presented an overview of the different types of existing water quality models: steady state models, in turn subdivided into inmission and emission models, and dynamic models, further classified into physically based and conceptual. She underlined the existence of a trade-off between model complexity and its predictive power: sophisticated models often cannot be applied due to lack of sufficient data input, while more simple models, demanding less input data and computational effort, may not produce reliable predictions. The report also presented an exhaustive survey of 37 water quality models used operationally in RA VI countries. For each model a short abstract of purposes and functioning was provided, the co-ordinates of the developer and, when available, bibliographic references and Web site addresses. The meeting recognized that a similar survey on groundwater model would be of interest. In the report reference was also made to ongoing model comparison programmes and to decision support systems. Additional information on ecological models in general is available from the Registry of Ecological Models (ECOBAS, <http://eco.wiz.uni-kassel.de/ecobas.html>).

6.5 As regards the development of new models, it was stressed that the environmental goals to be achieved should be clearly defined before starting the modelling process. Better integration of various disciplines (hydrology, chemistry, biology) was needed. Finally it was recalled that models, beyond their primary use for assessment and development of scenarios, can also have a value as a pedagogic or support tool in presenting to the public the results of a decision making process.

### **GIS applications in hydrology**

6.6 The report by Dr J. Fürst (Austria) presented the results of a survey on the current state of GIS application in operational hydrology. GISs are commonly and routinely used in most of the countries of the region, including those with economies in transition. NHSs appear to make more use of GISs than NMSs. The main areas of application are mapping and data management, spatial analysis and dissemination of information to end users, including the general public. Basic spatial datasets and digital elevation models are also commonly available.

6.7 While the differences in the geographic reference system adopted are not a critical issue, the report underlined the lack of consistent and standardized base maps providing the elementary spatial information to associate thematic information, thereby hampering the possibility of aggregating maps by mosaicking. It was also reported that only 40% of the hydrological maps considered in the study adopted the standard reference period of WMO 1961-90. The expert underlined the need for developing European consistent maps of the principal water balance elements, and to work towards the establishment of standards for data observation, processing and regionalization.

### **Regional aspects of HOMS**

6.8 In his report Dr J. Hladný (Czech Republic) reported on the implementation of the HOMS programme in Region VI. He recalled that the majority of the European HOMS National Reference Centres (HNRC) had collaborated with the WMO Office for HOMS in the updating of the system which had initiated in 1998. It was recalled that about 30% of the total

of the components had been submitted by Members of the RAVI. The representatives of the HNRC of the RAVI had also played an active role in the preparation of the "Plan for HOMS in the 21st Century". They had also contributed to the development of the strategy for the "Implementation and Co-ordination of HOMS in RA VI for the 21<sup>st</sup> Century"

6.9 It was further recalled that, following the updating of the system, the total number of components had decreased from 452 to about 180, compensated by a corresponding increase in the usefulness of the individual components. The translation of the HRM into French, Russian and Spanish was underway, thanks to the co-operation of some HNRCs. In June 2001, a CD-ROM containing the updated version of the HRM and other material on HOMS had been distributed to all HNRCs.

6.10 The meeting recognized that HOMS is a dynamic system that should adapt to the evolution of science and technology and the changing needs of users. The meeting appreciated that the process for the approval of new components had been simplified, and recommended that the feedback between users and producers of components be improved. Finally the Group identified water demand, flood and drought assessment and ecohydrological issues, as areas requiring further development.

### **Climate and water**

6.11 In his report, Dr O. Varis (Finland) investigated the status of climate models and scenarios, the use of their results in hydrological models, and finally the impact on water management. He criticized the absence of systematic analysis of the uncertainty which characterizes the results of many climatological models. A series of other shortcomings calling for cautious use of the outputs of climatological models into hydrological models was also underlined, such as the difference in scale and resolution, poor understanding of threshold-type phenomena and of ice dynamics and thermodynamics, uncertainties concerning the effects of water vapour and clouds, and limited stability of the results. In particular, the climatological models are limited in the provision of the extreme values of hydrological phenomena.

6.12 In modelling applications for water management assessment, a more pragmatic approach was proposed, in which the management needs determine the information needs. In particular, modelling for evaluating future scenarios for water resources management should also include non-climatic variables, such as population and water demand changes.

6.13 Finally the expert underlined that many climatological models suffered the bias of having being developed by scientists in the northern temperate regions and therefore they were barely applicable to other climatic zones.

### **Extreme floods**

6.14 The report by Mr H. Engels (Germany) attempted to derive information on the impact of anthropogenic activities on the risk of extreme floods. The description of, and attention to, anthropogenic causes of floods appeared only very recently in the scientific literature. The main causes mentioned were: poor communication between authorities, organizational failure, mistakes in regional planning and land management, negligence in river maintenance. River training, rectification and soil sealing were rarely mentioned.

6.15 Strengthening the awareness of flood risks among the population potentially affected, improving flood warning systems and shift the approach of authorities towards a holistic approach of the risk at the catchment scale were among the action proposed to reduce damages from extreme floods. It was further noted that, in areas affected by events of similar magnitude in a short time interval, the observed reduction over the time in losses in life and property was mainly the results of changed behaviours of riparian dwellers. However, if not properly supported by appropriate norms, these "lessons learnt" are quickly forgotten.

## **Operational hydrology reference basins (OHRB)**

6.16 The report by Professor M. Spreafico (Switzerland) briefly summarized the characteristics required for a operational hydrology reference basin, in terms of duration of historical series, representation of various hydrological regimes, presence of anthropic disturbance, accuracy in data collection and processing, and their compliance with established standards. Unfortunately, insufficient data and information were provided to carry out the work according to the established work plan. The meeting commented that, nevertheless, there is still a need for such long-term monitored basins and that cooperation could be sought with the UNESCO European Research Basins initiative.

## **Sediment transport**

6.17 Ms Zs. Buzás (Hungary) presented in her report the present status of the sediment monitoring activities in the countries of the Regional Association. The information, collected by means of a questionnaire, showed that suspended sediment monitoring is performed at a satisfactory level (in terms of frequency of sampling and density of the network) in only some countries and bed sediment monitoring is only very seldom performed. The situation appears similar concerning databases, with an almost total lack of information on bed sediment / bed load. The technologies adopted for routine monitoring are well established and of a traditional nature. Modern devices are mainly used only on an experimental basis. Water quality data are too rarely collected at the sediment-sampling site.

6.18 The situation is further aggravated by the multitude of agencies active in this field, with very limited exchange of data among them, and by the non-compliance with international standards in the field. It was finally noted that sediment sampling receives very little financial support. The meeting noted, however, that this type of data is extremely important for the implementation of the European Commission Water Framework Directive, as sediment transport has a vital role in estuaries and coastal zones.

## **World Wide Web**

6.19 A short presentation was given on the development of the Web Site “Hyperlinks on Hydrology” and on its content (<http://www.nwl.ac.uk/ih>) providing links to NHSs, research institutions and universities, intergovernmental and non-governmental bodies, international programmes as well as manufacturers of hydrological equipment.

6.20 The Group proposed that the site could become the official web site of the RA VI Working Group on Hydrology, and could also be used as a tool for its management. It also noted that a strong Internet presence should be part of the NHS's policy. This should contribute to enhance their visibility.

## **General remarks**

6.21 Considering the difficulties faced by most of the rapporteurs in getting sufficient replies to the questionnaires they had sent, the Group recognized that other more effective ways for collecting information should be adopted, in particular a technical and scientific literature review, making personal contacts, using information from the Internet and organize informal meetings with invited experts.

## **7. GUIDE TO HYDROLOGICAL PRACTICES, TECHNICAL REGULATIONS AND INFOHYDRO**

7.1 The Group noted that, the Advisory Working Group of CHy, at its last session in September 2001 in Geneva, had included the revision and updating of the Guide among its priority activities. It also had asked the responsible member of the AWG, Professor Hofius,

with the co-operation of the Secretary of IAHS, Mr P. Hubert, to prepare an outline of the new edition. Mr Hubert presented the outline to the meeting, proposing to re-organize the material presently available in the Guide in a more consistent and comprehensive manner, according to the structure recommended by the CHy-XI, i.e. a first part containing basic and well established methodologies, and a second part containing new and state-of-the-art methodologies.

7.2 The meeting noted that it was necessary to ensure better consistency between the various chapters of the Guide and between the Guide and the Technical Regulations. A thorough review of the content was also felt necessary. It also recommended that the review and updating procedure be reviewed and simplified, in order to allow a faster updating of the Guide's content. It was noted that the presentation of the paper version as a single volume was not convenient for frequent updating. It was suggested to evaluate the benefits of loose-leaf presentation, as in the case of many WMO manuals.

7.3 Mr Hubert also presented the electronic version of the UNESCO-WMO International Glossary of Hydrology, developed by the French IHP/OHP National Committee. It noted that the present version already contains eleven languages and some more should be added soon.

7.4 Referring to the discussion reported in paragraph 3.6 above, the Group echoed the opinion expressed by CHy XI and reported by Prof. Hofius, that INFOHYDRO could provide useful information on the status of hydrological activities at national level and therefore should continue to operate, although in a modified and reduced format. The Group recommended to improve the quality of information available on groundwater networks. Professor Hofius brought to the attention of the meeting the proposal made by the RA V WGH that RA VI could act as pilot region for testing the reviewed structure of INFOHYDRO. The proposal was partly reflected in the proposal for the future work plan of the Group (see activities under "Public Relation and Visibility of NHSs").

## **8. WHYCOS PROGRAMME AND REGIONAL HYCOS COMPONENTS IN REGION VI**

8.1 Mr Abrate briefly presented the status of the implementation of the WHYCOS programme, especially focussing on the components of interest to the Region. He recalled that the main objectives of WHYCOS were to strengthen the NHSs and improve their capacity to deliver information to end users, to reinforce international co-operation and exchange of data, and finally to contribute global data to research and scientific programmes. Concerning MED-HYCOS, he pointed out that the main results had been obtained in the development of integrated tools for data management and data display using web-compatible technologies. Another important result had been the creation of stronger co-operation links between the Services that had participated in the project. Finally it was mentioned that a proposal for a second phase of the project had been prepared and was to be submitted to programme partners for funding to the European Commission.

8.2 Mr J. Nilsson (Sweden) and Mr H. Rödiger (Germany) introduced Baltic-HYCOS. It is conceived as a basin-wide system for acquiring, managing and disseminating data in near real time and according to agreed standards. By October 2002, a proposal, already agreed upon by all the participating countries, will be submitted to the European Commission under the sixth Framework Programme.

8.3 Professor V. Vuglinsky (Russian Federation) presented the Arctic-HYCOS proposal. He stated that the inflow to the Arctic Ocean represents 10% of the global inflow. Nevertheless, large areas of the Arctic catchment are totally un-gauged. The project had received the support of the first session of the ACSYS (Arctic Climate System Study)-Scientific Steering Group in October 2001. The first phase of its implementation would cover four representative test basins (Lena, McKenzie, Pecora and Pasvick).

8.4 Mr G. Bálint (Hungary) informed on the status of the preparation process of Danube-HYCOS, lead by Hungary. The project aims to reinforce hydrological forecasting activities, through the implementation of a Regional Integrated Flow Monitoring and Forecasting System. The final version of the project document will be available by end 2002.

## **9. COOPERATION WITH OTHER WMO BODIES AND INTERNATIONAL ORGANIZATIONS IN PROJECTS RELATED TO HYDROLOGY (INCLUDING JOINT SESSIONS WITH UNESCO IHP NATIONAL COMMITTEES MEETING)**

9.1 Mr Kubát briefly informed the meeting on the activities of the International Commission for the Protection of the River Elbe (IKSE-MKOL). The Commission's tasks include decrease of pollution load, flood protection and support to the implementation of the Water Framework Directive. He underlined in particular that as a follow up to the work of the commission the riparian governments had taken effective measures to substantially reduce the pollution load in the river.

9.2 Ms Buzás briefly introduced the activities of the International Commission for the Protection of the Danube River. In 2000 a permanent expert group on river basin management was established to support the Commission activities related to the implementation of the Water Framework Directive in the Danube River Basin. In 2001 UNESCO/IHP regional co-operation of the Danube Countries acquired observer status with the Commission and was asked to update of the water balance studies for the Hydrological Monograph of the Danube River Basin.

9.3 Professor Spreafico presented the activities of the Commission for the Hydrology of the Rhine. He recalled that the Commission has basically scientific objectives and operates within the framework of the UNESCO IHP. The Commission's activities are organized in five main projects: on flood forecasting, climate change and the water cycle, GIS, sediment transport and transport models for pollutants.

9.4 Mr Engels briefly introduced the activities of the Commission for the Protection of the River Rhine. Originally focused on water quality issues, its mandate has since been enlarged to develop an action plan on flood defence with the objective of reducing damage risk and flood stage, and improve risk awareness and flood forecasting. Among the actions being carried out, he referred to the inventory of flood defences, a survey of flood forecasting systems and suggestions for their improvement.

9.5 Mr M. Menéndez (Spain) spoke on behalf of the Topic Centre on Waters. The Topic Centre is formed by a consortium of 30 European institutions (mainly research and university institutes) and comprises 13 countries. Its main areas of activities are integrated water assessment for policy-making purposes, development of indicators on water, and support to the implementation of the European Union water policy also at country level. It is also supporting the European Environmental Agency in the development of a water-related data base.

9.6 Professor Vuglinsky spoke of the proposal for the establishment of an International Centre on the Hydrology of Lakes and Reservoirs to be operated under WMO umbrella. The objectives of the centre would be the maintenance of a global data bank, the development of standards for data collection, the regular review of the state and the analysis of trends of the regime of large lakes. He also presented the activities of the data bank on lake hydrology, managed by the State Hydrological Institute of the Russian Federation. An example of the State Water Cadaster yearbook (surface and subsurface water quality and quantity) for 2000 was presented. It could be used as an example or the development of the concept of the European Yearbook.

9.7 Ms Buzás presented the ECE Convention of Transboundary Rivers and International Lakes and underlined the relevance of this convention with respect to the implementation of the EC Water Framework Directive. She further mentioned that working groups had been established within the Convention framework, among which one exists on monitoring and assessment. This working group had prepared standards and guidelines which were presently tested in pilot projects.

9.8 In the afternoon of 18 February, the participants in the meetings of the RA VI Working Group on Hydrology and of the National IHP Committees for Electoral Group I and II met together. The meeting was co-chaired by Professor Nobilis and Professor Hofius, the latter in his capacity as chairman of the IHP meeting. Although this type of joint meeting may have a value in discussing the implementation of the two programmes in order to avoid duplication of initiatives, many participants saw more merit in having joint technical meetings, specially aimed at developing joint initiatives and project proposals. Flooding was identified as an area for such co-operation, covering hydrological, social and educational aspects.

9.9 Mr A. Tilche (European Commission) presented to the joint meeting the sixth Framework Programme. He reported that, within the framework of the programme, six priority areas are identified, two of which are sustainable development and global change. In these, actions are planned addressing the global hydrological cycle, groundwater and soil, impacts of climate change on water management, development of scenarios for water demand and availability.

## **10. ROLE OF THE WORKING GROUP IN THE REGIONAL EUROPEAN CONTEXT AND FUTURE WORK PROGRAMME**

10.1 The meeting noted with concern that often the NHSs are not sufficiently involved in the EU water policy making process, and that EU legislation directly or indirectly affected policy making, not only in the Members concerned and in the accession countries but in general in the region at large. The RA VI Working Group in Hydrology could become an instrument for NHSs to voice their views, but, if it has to be recognized as a valuable counterpart for all the matters of interest to NHSs (e.g. standardization, water legislation, etc.) there is a strong need for improving its capacity to respond more promptly to external requests. More frequent informal meetings, possibly of a restricted group dealing with a specific subject, could contribute towards such an improvement.

10.2 The meeting was informed that the Thirteenth Session of WMO Regional Association VI was planned to be held from 2 to 10 May 2002 in Geneva. It therefore agreed that its draft reports should be finalized by the end of March 2002 at the latest and submitted to the WMO Secretariat, with a copy to the chairman of the Working Group.

10.3 Having considered the reports of the experts and the discussions during the session, the meeting identified two broad areas for future activities. They were: scientific topics and institutional aspects. The first area encompasses activities related to water and climate, water quality assessment, extreme floods, drought assessment, forecasting and warning, and flood forecasting and warning. The second area includes institutional aspects of hydrological monitoring and assessment, and public relations and visibility of NHSs. The proposed terms of reference for the future activities are included as Annex 4 to this report. A number of countries expressed their interest in participating and contributing to the various activities identified by the group, as indicated in the terms of reference. The Group proposed that the activities relating to flood forecasting and warning and institutional aspects of hydrological monitoring and assessment be undertaken by subgroups rather than by individual experts.

10.4 The meeting agreed to recommend to the Regional Association that the Working Group on Hydrology be re-established by XIII-RA VI for the next inter-sessional period. The meeting was informed that the current chairman, Professor Nobilis was not available for a further mandate. It thanked him for the remarkable work he has done in leading the Group and for the considerable efforts he has made in fulfilling his duty as chairman. The meeting noted the willingness of Mr Kubat to act as chairman, if so nominated and appointed.

## **11. ANY OTHER BUSINESS**

11.1 There was no other business discussed.

## **12. ADOPTION OF THE REPORT AND CLOSING SESSION**

12.1 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.

12.2 At the closing session, the chairman thanked the host country for the excellent organization of the meeting and the participants for their contributions to the discussions and the deliberations of the Group. He invited them to maintain their spirit of cooperation as shown during the meeting. He also addressed his thanks to the WMO Secretariat for the support it provided. A number of members also expressed their gratitude to the outgoing chairman for the way he conducted the meeting and the work of the Group during his mandates. The representative of WMO added his words of thanks to the host country, the chairman and to the participants for their active participation in the meeting.

12.3 The session closed at 13h00 on Wednesday 20 February 2002.

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## AGENDA

1. OPENING OF THE MEETING
2. ORGANIZATION OF THE WORK OF THE SESSION AND APPROVAL OF THE AGENDA
3. CONSIDERATION OF THE RELEVANT DECISIONS OF Cg-XIII, XII-RA VI, CHy-XI AND EC
4. REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON HYDROLOGY
5. REPORT OF THE CHAIRMAN OF THE COORDINATION SUBGROUP ON FLOOD FORECASTING AND WARNING
6. CONSIDERATION OF THE WORK OF THE RAPPORTEURS
  - 6.1 Hydrological Network
  - 6.2 Integration and coupling of hydrological models with water quality models
  - 6.3 GIS applications in hydrology
  - 6.4 Regional aspects of HOMS
  - 6.5 Climate and water
  - 6.6 Extreme floods
  - 6.7 Operational hydrology research basins (OHRB)
  - 6.8 Sediments transport
  - 6.9 World Wide Web
7. GUIDE TO HYDROLOGICAL PRACTICES, TECHNICAL REGULATIONS AND INFOHYDRO
8. WHYCOS PROGRAMME AND REGIONAL HYCOS COMPONENTS IN REGION VI
9. COOPERATION WITH OTHER WMO BODIES AND INTERNATIONAL ORGANIZATIONS IN PROJECTS RELATED TO HYDROLOGY (INCLUDING JOINT SESSIONS WITH UNESCO IHP NATIONAL COMMITTEES MEETING)
10. ROLE OF THE WORKING GROUP IN THE REGIONAL EUROPEAN CONTEXT AND FUTURE WORK PROGRAMME
11. ANY OTHER BUSINESS
12. ADOPTION OF THE REPORT AND CLOSING SESSION



### WGH Joint Liaison Group

With respect to the task of the Working Group concerning the establishment of a joint liaison group with representatives of different powerful organizations working in the field of hydrology and to get as an input ideas of possible common fields of work, the chairman contacted:

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## PROPOSED TERMS OF REFERENCE

Considering the overall objective of the Hydrology and Water Resources Programme, namely to apply hydrology to meet the needs for sustainable developments and use of water and related resources, to the mitigation of water related disasters and to effective environmental management, the WGH identified the following topics as areas on which to focus the future activities of the Group:

- 1) Public relations and visibility of national hydrological services,
- 2) Institutional aspects of monitoring and assessment,
- 3) Climate and water,
- 4) Water quality assessment,
- 5) Potential extreme floods,
- 6) Drought assessment and forecasting,
- 7) Flood forecasting and warning (in cooperation with representatives of meteorological services).

It is expected that the activities under 2) and 7) above be carried out by sub-groups within the framework of the Working Group on Hydrology.

### Public Relations and Visibility of Hydrological Services

- (a) to develop and expand the existing Web site "Hyperlinks in Hydrology" as an operational tool for the activities of the Working Group e.g. exchange of information, maintenance of an address book, publication of reports, provision of links for the hydrological community; including information on the current activities of the NHSs;
- (b) to produce a concept of a European Yearbook of Water Resources for selected basins and observation sites;
- (c) to develop concepts concerning the presentation of daily hydrological situation and forecasts for a country or large river basins to the large public and using communication media;
- (d) to collect and analyse information on existing tools and approaches used, and activities undertaken by NHSs to raise their visibility.

*Several participants expressed interest in supporting the expert in carrying out specific tasks as follows:*

- *Developing and expanding "Hyperlinks in Hydrology:" Mr G. Bálint (Hungary)*
- *Yearbook: Prof. V. Vuglinsky (Russian Federation)*
- *Media presentation: Prof. F. Nobilis (Austria)*
- *Visibility of NHSs. Ms Zs. Buzas (Hungary)*

*Italy and Israel also expressed their willingness to support*

### Climate and Water

Considering major risks, threats, vulnerabilities and other major uncertainties to nature and human society caused by climate variability and change and their impacts on water resources, the expert will prepare a report concerning the experience of RA VI countries in relation to climate and water, mainly:

- (a) how hydrological services should develop their operational practices in order to best cope with these challenges;
- (b) how hydrological services should interact with the other national and international activities on climate and water.

These activities should be carried out in close liaison with the work of experts on potential extreme floods and on droughts assessment, forecasting and warning.

*The representatives from Finland (Varis), Iceland (Snorrason) and United Kingdom expressed interest in supporting the expert's work.*

### **Water-Quality Assessment**

The expert will evaluate current methods used for assessment of surface and ground water quality in European countries, in particular in relation with present and anticipated duties of the NHSs in this area, and prepare a review of, and proposals on:

- (a) criteria for the classification of the state of rivers and groundwater bodies (according to different water quality parameters);
- (b) demands on the frequency of monitoring for assessment of surface and groundwater quality parameters.

*The representatives of Czech republic, France, Sweden, and Yugoslavia expressed interest in supporting this activity.*

### **Potential Extreme Floods**

Considering of importance of hydrological design data for safety of people and their impact on security of hydraulic structures (dam, bridges,.....) the expert shall:

- (a) undertake a brief literature review of former research carried out on this topic;
- (b) undertake an international survey on best available practices and on national standards in estimation of hydrological design data for extreme floods occurrences;
- (c) carry out investigation on methods of PMP/PMF derivation and other methods of extreme flood estimation;
- (d) contact key individuals/groups to canvass opinion and comment on future research priorities;
- (e) prepare a catalogue on extreme floods occurred since year 2000.

*Representatives from Spain and Romania expressed interest in supporting this activity.*

### **Drought Assessment, Forecasting and Warning**

In consideration of the increase of water-stress during period of drought in the countries of the Region and with a view to ensure proper management of water resources during such conditions, the expert will:

- (a) review and evaluate meteorological and hydrological medium- and long-term forecasting systems in RA VI countries;
- (b) assess the use of satellite data and the use of indices to describe the severity of droughts;
- (c) propose ways for promoting the exchange of data and products as well as of forecasts and warnings during low flow situations in RA VI countries;
- (d) propose ways for ensuring effective co-operation with other international and regional bodies involved in drought mitigation;
- (e) recommend systems for drought contingency planning.

*Representatives from Italy (Monacelli), the Netherlands, Turkey and Yugoslavia expressed their interest in supporting the expert in carrying out this task.*

### **Sub-Group on Institutional Aspects of Monitoring and Assessment (surface water, groundwater, quality and quantity)**

The Sub-group will continue and expand the activities undertaken by the rapporteurs on Integrated Hydrological Networks. The activities will focus on the institutional and organizational aspects of hydrological monitoring and assessment. The forum is the RA VI network of National Hydrological Services. In particular the Sub-group will:

- (a) investigate the institutional and organizational aspects of hydrological monitoring and assessment;
- (b) maintain and strengthen the links with national contacts with a view to increase the role and the visibility of Hydrological Services in relation with international Conventions and the European Commission activities related to hydrology;
- (c) support RA VI member countries in the application of river basin management plans and of the EU Water Framework Directive.

The sub-group will, inter alia, carry out the following:

- mapping of the monitoring actors and programs in RA VI;
- establish contacts with the main actors (NHSs, European Commission, European Environment Agency, etc)
- assess the needs for hydrological information, in connection with the application of river basin management plans and of the EU Water Framework Directive;
- contribute to the formulation and implementation of standards on measurements and data processing;
- formulate proposals for integrated monitoring network design and assessment;
- attend or organize workshops involving the key actors for co-operation;
- actively participate in the planning of the Conference on hydrological monitoring (planned in 2005 in the Netherlands)

*Have expressed interest in participating in this subgroup: Finland (Puupponen) France (Givone) Hungary (Buzas) Iceland (Snorrason) Italy (Monacelli and Guiducci) and Spain.*

### **Sub Group on Flood Forecasting And Warning**

To improve the capability of NHSs in flood forecasting and warning of different types of floods, the subgroup composed from hydrologists and meteorologists should study and promote:

- use of radar data, satellite data and other data, including outputs of numerical models, for integrated meteorological information;
- integrated approach to quantitative precipitation forecast;
- calibration and testing of hydrological models using outputs from meteorological model, preferably in gridded form;
- the development of common probabilistic and ensemble forecast;
- methodologies and criteria for evaluation of quantitative precipitation forecast and hydrological forecast;
- effective ways of disseminating meteorological and hydrological information and warnings

*The representatives of Czech Republic, Italy, Romania, Russia, Slovakia, Spain, Sweden and United Kingdom expressed the willingness that expert from their country join the sub-group and participate in its activities.*