

PART II
FOURTEENTH SESSION OF THE COMMISSION FOR HYDROLOGY
(unedited)

TENTATIVE WORK PLAN

TIME	TYPE OF MEETING	AGENDA ITEM*
Tuesday 6 November a.m.	General Plenary (1) (10h00)	1, 2, 3.1
	p.m.	General Plenary (2) Establishment of Nominations Committee and Selection Committee
Wednesday 7 November a.m.	General Plenary (3)	4, 5
	p.m.	Plenary A
Thursday 8 November a.m.	Plenary B	8, 9
	p.m.	General Plenary (4)
Friday 9 November a.m.	Plenary B	10, 11
	p.m.	Scientific Lectures
Saturday 10 November a.m.	General Plenary (4)	13
	Working parties	
	p.m.	Working parties

*The documents corresponding to each agenda item are listed in CHy-14/INF. 2

TIME	TYPE OF MEETING	AGENDA ITEM*
Monday 12 November a.m. p.m.	Plenaries A and B Working parties	Available documents for discussion
	Plenaries A and B	Available documents for discussion
Tuesday 13 November a.m. p.m.	Working parties General Plenary (5)	16
	General Plenary (6) Plenaries A and B	13, 18, Available documents for discussion/ Approval of documents, Available documents for discussion/Approval of documents
Wednesday 14 November a.m. p.m.	General Plenary (7) Plenaries A and B	19, 20, Approval of documents Approval of documents
	General Plenary (8)	21, Approval of documents

* The documents corresponding to each agenda item are listed in CHy-14/INF. 2.

WORKING PARTIES PROPOSED (see tentative work plan)

		Agenda item
1	Future programme of work for the Commission	13
2	Review of WMO-No. 258 - Hydrology	11
3	WHYCOS 2011 Review	8
4	WMO Strategic Plan 2016-2019	15

1. REPORT OF THE AWG MEMBERS (AGENDA ITEM 3.2)

1. The background to the activities proposed in the intersessional period is given in WMO-No. 979, the *Abridged Final Report with Resolutions and Recommendations of the Twelfth Session of the Commission for Hydrology* (Geneva, 20-29 October 2004). The terms of reference for the member are given in Resolution 1 (CHy-XIII), Parts A.5 and B.

2. The following sections address the progress on the items in the terms of reference laid out in that document, commenting on progress and future directions in the light of developments in hydrological science and practice.

2. VICE-PRESIDENT OF CHY (submitted by Julius Wellens-Mensah)

Terms of reference: To assist the president of the Commission, as and when required.

3. The vice-president continued to represent the Commission for Hydrology (CHy) on the EC Panel on Education and Training. His participation in the Panel's meetings and activities ensures that the views of CHy are reflected and incorporated in the Panel's decisions and recommendations. Within the intersessional period 2008–2012, the Panel held two meetings, namely, the 24th session in Boulder, Colorado, USA from 22 to 26 March, 2010 and the 25th session in Pune, India from 26 to 30 March 2012.

4. The 24th session, among other actions, commenced preparations for replacement of the 4th edition of WMO Publication No. 258, *Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology*, Vol. I: Meteorology. The Panel also decided that as part of the review of the Guidelines, the definition of Meteorologists and Meteorological Technicians should be in terms of successful completions of a Basic Instruction Package for Meteorologists (BIP-M) and a Basic Instructions Package for Meteorological Technicians (BIP-MT). The revision of WMO Publication No. 258, Vol. II: Hydrology is not yet due until at least 2013. It is the expectation of the Panel that similar definitions will be considered in the revision of WMO-No. 258, Vol. II.

5. The 25th session, among others, addressed issues relating to development of a publication for educators and trainers in meteorology, climatology and hydrology; development of transferable skills for meteorological, climatological and hydrological staff; support for distance and online learning; staff competencies; and the future role and operations of WMO Regional Training Centres.

6. On competencies in hydrology, the Panel was informed that the 3rd session of the CHy Advisory Group had included a specific item on classification, qualification and competencies for hydrological personnel on the agenda of the upcoming fourteenth session of CHy (CHy-14) in November 2012. The inclusion of this agenda item also responds to a request of Cg-XVI to review the definitions of hydrologists and hydrological technicians and address related classification and competencies issues. The Panel was further informed that the AWG agreed that this was a challenging task, in view of the need to engage with and involve other stakeholders in the hydrological community (e.g. United Nations Educational and Cultural Organization – International Hydrological Programme (UNESCO IHP), UNESCO Institute for Water Education (IHE), the International Association of Hydrological Sciences (IAHS), etc.) in the discussions. The AWG also felt that the issues fall within the CHy Quality Management Framework – Hydrology (QMF–H) thematic area and decided that they should initially be addressed in the current work plan and the future work plan to be finalized at CHy-14.

7. The Panel recommended the recognition of The Meteorology, Climatology, and Geophysics Agency (BMKG) and RCWC in Indonesia as two components of the WMO Regional Training Centre (RTC) to offer education and training in Meteorology and Hydrology and the National Water Academy of India as a third component to the WMO RTC in India for education and training in Hydrology and Water Resources. Both recommendations have since been endorsed by EC-64.

8. The vice-president, on behalf of the president, chaired a workshop to draft the Strategy and Action Plan for the WMO Flood Forecasting Initiative in Geneva. Following the development of the Strategy and Action Plan, Cg-XVI decided to establish an Advisory Group for the WMO Flood Forecasting Initiative with specific terms of reference. The establishment of the Advisory Group is in progress.

Terms of reference: To assist the AWG in fulfilling its duties as outlined in the Implementation Plan for HOMS or, as appropriate, its replacement.

9. The implementation of the Hydrological Operational Multipurpose System (HOMS) is still in progress but has been streamlined through making available an online version of the HOMS Reference Manual (HRM), as well as, uploading, French, Spanish and Russian versions of the HRM thereby improving access to HOMS components. Solicitation for new components for HOMS has had limited success. However with the publication of more HWR manuals and reports within the QMF-H, HOMS serves as a useful vehicle for wider dissemination of these publications. It is important to note that HOMS has been infused into the broader Capacity Building activities of the Hydrology and Water Resources Programme. Other technology transfer mechanisms of Capacity Building are through reports and tools made available through the Help Desks and Websites of other HWR programmes such as the Associated Programme on Flood Management and its related Integrated Flood Management Series reports and Tools.

Terms of reference: To coordinate the editing and production of publications prepared on behalf of CHy.

10. By following the new classification for publications and the revised peer review process approved by CHy-XIII, the following reports and manuals have been published, as appropriate, as part of QMF-H:

- (a) Sixth edition of the Guide to Hydrological Practices;
- (b) Second edition of the Manual on Stream Gauging;
- (c) Manual on Low Flow Estimation and Prediction;
- (d) Manual on Estimation of Probable Maximum Precipitation;
- (e) Manual on Flood Forecasting and Warning.

11. The third edition of the International Glossary being prepared jointly with UNESCO has been finalized and will soon be published.

12. In addition, training materials are being developed for the Manuals on Low Flow Estimation and Prediction; Stream Gauging and Flood Forecasting and Warning and will be published when completed. Other documents undergoing the peer review process are:

- (a) Climate and Meteorological Information Requirements for Water Management;
- (b) Water Quality Manual Monitoring;

(c) Manual on Water resources Assessment.

Terms of reference: To identify and lead actions with regard to the education and training requirements of the Commission's activities under the adopted Strategy on Education and Training for HWR and the QMF-Hydrology.

13. Cg-XVI has endorsed the revised Strategy on Education and Training in Hydrology and Water Resources adopted by CHy-XIII. In the implementation of this strategy, several courses in hydrology have been delivered by distance learning in collaboration with COMET and the National Oceanic and Atmospheric Administration (NOAA), both of USA. CHy is also cooperating with the International Association for Hydro-Engineering and Research (IAHR) to develop and deliver a course on Stream Gauging based the second edition of the Manual on Stream Gauging. A training course on open source data management software for Meteorology, Climate and Hydrology (MCH) is being implemented at country level. Under the strategy, a corps of trainers and online community of trainers are being created to deliver training at country and regional levels to achieve a multiplier effect in delivery of training. A more detailed reporting will be given under Capacity Building activities of the HWRP.

Terms of reference: To monitor and report on the updating of The Hydrological Information Referral Service (INFOHYDRO).

14. The INFOHYDRO forms have been updated by inclusion of some basic definitions. The procedures for submission of inputs have been improved and made more user-friendly by making provision for submissions to be made via the web. Consequently, all entries and summaries on the web are generated using data from an online database. Since CHy-XIII, two calls for entries have been made for new submissions and updating of previous submissions. The response has been modestly encouraging. Thirty-six new entries from nine Member countries in all six WMO Regions and updates from four countries have been received and uploaded. It is considered that the information collected and presented through INFOHYDRO is still relevant and therefore should be retained.

Terms of reference: To promote data rescue and protection and develop project proposal(s) in the light of the requirements report from the previous intersessional period.

15. Through the assistance of Dr Ann Calver, a member of the AWG, a report on guidance for data rescue has been prepared by Mr Matt Fry of the UK and is being considered for publication as a CHy document to assist NMHSs in carrying out data rescue in a systematic manner.

Terms of reference: To support the development and promotion of guidance material on the estimation of the economic benefits of hydrological services.

16. An initial draft of a document on Economic Benefits of Hydrological Services has been produced, but it needs further refining and improvement before being subjected to the peer review process. This may be taken up in the next work plan of CHy.

Terms of reference: To lead review of the *Guidelines for Training of Personnel in Meteorology and Operational Hydrology*, Vol. II – Hydrology.

17. It was found out that the review cycle according to WMO procedures for the document under reference is not due until at least 2013. This activity should be rolled over to the next intersessional period.

Terms of reference: Recover/update the hydrology components of the 9-volume Compendium of Meteorology.

18. It has not been possible to retrieve the document; it is most likely to be out of print.

Terms of reference: Data sharing.

19. The issue of data sharing has been well addressed in a CHy publication, *Exchange of Hydrological Data and Products*, TD-74, 2001 (also numbered WMO/TD-No. 1097). Furthermore, examination of Resolution 25 (Cg-XIII) shows that Annex 2 to the resolution lists Examples of Data, Information and Products which might be provided in support of reducing loss of life and property. Therefore, within the context of exchange of hydrological data, information and products, application of Resolution 25 with the guidance of WMO/TD-No. 1097 adequately addresses the issue of data sharing. However, in the next intersessional period, the requirement of providing hydrological data for the provision of climate services within the Global Framework for Climate Services (GFCS) will need to be analysed and promoted to obtain the buy-in of NHSs.

20. The intersessional period 2008 to 2012 has seen considerable achievements from the viewpoint of the terms of reference and tasks assigned to the vice-president. Of particular mention, is the number of CHy publications produced, as well as, those undergoing the peer review process or those under preparation.

3. REPORT BY AWG MEMBER RESPONSIBLE FOR QUALITY MANAGEMENT FRAMEWORK - HYDROLOGY (QMF-HYDROLOGY) (submitted by Harry Lins)

Term of Reference: To co-lead, monitor, report and provide advice on the Quality Management Framework – Hydrology Theme Area.

21. Monitored the review and finalization of the Technical Report on Water Quality Monitoring. Editorial corrections are currently being made, and the report should be completed and published prior to CHy-14. Additional information will be provided during the session.

22. Prepared a document entitled “Guidelines for Implementing a Quality Management System in Hydrology” that was posted on the CHy e-Board for comment. This document was designed to assist National Hydrological Services (NHSs) in achieving efficiency, quality and effectiveness through the implementation of a quality management system, based on the WMO Quality Management Framework, as appropriate to their situations.

23. Prepared a discussion paper entitled “The Importance of Standards in NHS Operations” for the purpose of providing CHy members with a rationale for using standard procedures in their operations, and to encourage the expanded use of such procedures in accordance with WMO guidelines and recommendations. The paper was posted on the CHy e-Forum.

24. Monitored the progress of the CHy project on the Assessment of the Performance of Flow Measurements and Techniques (<http://www.wmo.int/pages/prog/hwrrp/FlowMeasurement.html>). This project has produced a database of international and national standards and guidelines associated with field discharge measurement instrumentation and techniques, based on contributions from several NHSs. The database is available online at <http://www.whycos.org/chy/flowprojectx/index.php>.

25. Another product of the Flow Measurement and Techniques Assessment project team is a report entitled “Guidelines for the Assessment of Uncertainty of Hydrometric Measurements”. It was prepared by Marian Muste, a member of the project team, and is available online at http://www.wmo.int/pages/prog/hwrrp/Flow/flow_tech/documents/UA_Framework_Muste.pdf.

26. Coordinated with a number of experts in academia and NHSs on the development of a process for establishing standards and protocols for water data exchange. These discussions led

to a recommendation, to be made at CHy-14, that during the next intersessional period a distinct theme area on hydrologic data operations and management be established.

27. Responsibility for a task to prepare a Manual on Design Flood Estimation was transferred to the AWG member responsible for the Climate, Water, and Risk Management Theme Area.

28. Given the numerous activities included within the QMF-Hydrology theme area, the task to prepare guidance material on the effect of weed growth and ice effects on flow measurement and rating curves was not able to be accomplished.

29. In response to the CHy request for a manual (guidance material) on glacier and snowfield monitoring, the QMF-H theme member investigated the organizations that have traditionally played a major role in such activities. The World Glacier Monitoring Service (WGMS) and its predecessor organizations have, for more than a century, been compiling and disseminating standardized data on glacier fluctuations. The WGMS operates under the auspices of the International Council for Science – World Data System (ICSU)(WDS), the International Union of Geodesy and Geophysics - the International Association of Cryospheric Sciences (IUGG) (IACS), the United Nations Environment Programme (UNEP), UNESCO, and WMO, and the connection to WMO is through the Global Climate Observing System (GCOS) and the Global Terrestrial Observing System (GTOS). WGMS, in conjunction with the US National Snow and Ice Data Center (NSIDC) and the Global Land Ice Measurements from Space initiative (GLIMS), operates the Global Terrestrial Network for Glaciers (GTN-G). GTN-G provides the framework for the internationally coordinated monitoring of glaciers and ice caps, and its guidelines and standards for the monitoring of glacier fluctuations are available online at <http://wgms.ch/guidelines.html>.

30. Coordinated with the AWG member responsible for the WMO Integrated Global Observing System (WIGOS) and the WMO Information System (WIS) on the convening of an International Workshop on Hydrometry. The workshop was organized by the National Water Agency of Brazil (ANA) and was held from 8 to 10 May 2012 in Manaus, Brazil. It was attended by approximately 60 experts and addressed topics related to the monitoring of various water cycle variables, including precipitation, discharge, evapotranspiration, soil moisture and groundwater. WMO supported the attendance of three keynote speakers. In addition, the Steering Committee of the project for the assessment of the performance of flow measurement instruments and techniques (described in items 4 and 5 above) met in Manaus from 11–12 May 2012 after its members had given presentations on topics related to uncertainty in measurement at the International workshop.

31. A new peer review form for CHy documents was prepared, endorsed by the AWG, and implemented.

Term of Reference: To liaise, as necessary, with relevant areas of WMO (e.g. the Commission for Instruments and Methods of Observation (CIMO)), the International Standards Organization (ISO) and other United Nations agencies with regard to quality management.

32. Reviewed, and provided comments to the Chair of the WMO Inter-Commission Task Team on Quality Management Framework (ICTT-QMF) on the current version of the Technical Regulations Vol. IV.

33. Participated in a one week WMO Quality Management Framework Overview and Training Workshop, organized by the ICTT-QMF that was designed to provide an overview of the fundamental regulations associated with the ISO 9000 family of Quality Management Standards (QMS), as well as an intensive introduction to the essential elements of planning and conducting an internal QMS audit.

Term of Reference: To develop and implement Capacity Building initiatives based on the activities undertaken within the relevant Theme Area.

34. Oversaw the development and preparation of the CHy Statement on the scientific basis for, and limitations of, river discharge and stage forecasting. The Statement was published on the CHy e-Board.

35. Drafted a general review of the concepts and principles of Quality Management and posted it on the CHy e-Board.

Term of Reference: To report on activities at each AWG meeting and as requested by the president of CHy.

36. Drafted a technical note providing a basic, though formal explanation of the terms stationarity and non-stationarity. The note was prepared at the request of the president of CHy because there has been considerable misunderstanding of these terms as their usage has increased recently. Given that the concepts of stationarity and non-stationarity are critical to the practical field of water resources planning and design, it is essential that the hydrological community have a sound and thorough understanding of what the terms refer to. The note was posted on the CHy e-Forum.

4. HYDROLOGICAL FORECASTING AND PREDICTION *(submitted by Mr Johannes Cullmann)*

Activities with regard to RA I have been undertaken as follows:

37. Preparation of a workshop “hydrological modelling” – Scheduled for December 2012 in Addis Ababa, Ethiopia.

38. Preparation of a five year capacity development project for capacity development for supporting NHSs in delivering services for agriculture with a focus on rice production (start scheduled for 2013, final approval from funding Ministry pending).

39. E-Learning Material has been distributed and communicated; it is freely available on www.iwrm-education.org. The materials have been developed on request and in cooperation with RA I.

Activities with regard to specific topics of the work plan:

40. Training material related to the Manual on Low Flow Estimation and Prediction is under preparation. The material consists of guidelines on how to calculate relevant low flow and drought characteristics and contains a software tool based on freeware. Launch is foreseen for December 2012. A first version will be presented during the session. Capacity development activities are planned for 2013. The development of drought management activities in UNESCO is closely followed, potential synergy will allow for close cooperation.

41. Guidance material on seasonal flow forecasting is a further topic of the present work-plan. In March 2012, a working meeting with local experts took place in the German Federal Institute of Hydrology. Despite the fact that there are resources available for undertaking related activities, it has not yet been possible to identify experts available to analyse and report on the situation of extended forecast and related uncertainties. In order to address seasonal flow forecasting, the Federal Institute of Hydrology has started a three year programme to refine accurate predictions at the operational level. Results from this effort will support the topic in the mid-term.

42. A task team has been established to follow up on the workshop targeted at comparing flood forecasting software packages held in Koblenz, Germany in the fall of 2011. Dr Scharffenberg (US Army Engineers) is heading this task team that comprises 11 members. With regard to further development of material that supports services in designing their forecasting systems, a draft version has been elaborated in 2012. This draft was developed by Dr Scharffenberg, Johannes Cullmann and Andy Phillip. The draft was finalized in August 2012 and was distributed to the other members of the task team and is expected to be finalized by the end of 2012. During the session, this item will be presented and discussed. Further activities with regard to dissemination and capacity development should be envisaged.

43. A strategy and implementation plan for the Flood Forecasting Initiative (FFI) should have been finalized by March 2012. This activity is pending until the FFI steering committee is operational.

Further activities with regard to the data operations and management work plan:

44. A platform is being developed to accommodate water-related information from various data centres. This platform is Internet based and will cover different issues that are important for water management and operational services. The platform will be presented during the session.

5. REPORT BY AWG MEMBER RESPONSIBLE FOR HYDROLOGICAL FORECASTING AND PREDICTION *(submitted by Dr. Zhiyu LIU)*

Activities are presented following the terms of reference.

Term of Reference: To finalize the preparation of the Manual on Flood Forecasting and Warning

45. The preparation of the *Manual on Flood Forecasting and Warning* was led at the beginning of its development, during the intersessional period between the twelfth and thirteenth sessions of the Commission for Hydrology, by Prof. Jian-yun Zhang (China). He chaired a group of eight members of the Open Panel of CHy Experts (OPACHE) on Flood Forecasting and Prediction. At the thirteenth session, the Commission requested to finalize the Manual.

46. The effort has been accomplished through a joint effort of the AWG members leading the theme on Hydrological Forecasting and Prediction, the lead authors of the Manual, peer reviewers and the staff of the WMO Secretariat. The final version of this *Manual on Flood Forecasting and Warning* (WMO-No. 1072, 2011) was completed by James Dent (United Kingdom of Great Britain and Northern Ireland), who also incorporated the comments of the two reviewers, namely Johannes Cullmann (Germany) and Marian Muste (United States of America).

47. On the basis of the final document of the *Manual on Flood Forecasting and Warning*, the training material for this Manual has been prepared with the support from one OPACHE member.

48. In a joint effort, the Bureau of Hydrology of the Ministry of Water Resources P.R. China and the World Meteorological Organization organized a regional Workshop and Training on Flood Forecasting and Warning from 24 to 28 October 2011 in Nanjing, China. The purpose of this event was to review the status of Flood Forecasting and Warning models and forecasting practices in selected countries in Asia, and to provide training sessions for participants in the use of selected flood forecasting models. Participants were also educated in methods of flood forecasting and early warning as described in the WMO Manual on Flood Forecasting and Warning and new techniques of flood forecasting, worldwide. Over 30 trainees from 10 countries attended this workshop and training.

Term of Reference: To provide advice and support to the projects related to the Flash Flood Guidance System (FFGS) and the Iberoamerican Network for the monitoring and forecasting of hydrometeorological (PROHIMET) taking account of other initiatives in the area.

49. There is nothing to report on PROHIMET and the FFGS.

Term of Reference: To provide advice on, and monitor the development and application of, the Global Flood Alert System.

50. As an AWG member, Dr Zhiyu LIU has been involved in the activities pertaining to global or regional flood monitoring and alert system. He has also established a closer linkage with the International Centre for Water Hazard (ICHARM), Hydrologic Research Centre of USA, and European Center for Medium-Range Weather Forecasts (ECMWF). At the kind invitation extended by ECMWF, Dr LIU took part in a technology exchange seminar from 19 to 22 April, 2012 to discuss novel methods and technologies, which can help to improve European flood forecasting and early warning and the global flood alert system.

Term of Reference: To assess the use of Advanced Numerical Weather Prediction (NWP) to improve flood forecasting (e.g. through case studies).

51. The effort was made by collecting some case studies for Chinese catchments. Dr Zhiyu LIU made a presentation on the use of Advanced NWP to improve flood forecasting in China at the Third WMO International Conference on Quantitative Precipitation Estimation (QPE)/ Quantitative Precipitation Forecasting (QPF) and Hydrology (Nanjing China, 18-22 October 2010).

52. Dr LIU also attended the session on Flood Forecasting and Early Warning Systems at the ICFM5 meeting held from 27 to 29 September 2011, Tokyo. At the meeting, he shared with participants the application and practice of using NWP to improve flood forecasting in China.

Term of Reference: To review the current status of and provide guidance material on QPE, QPF and probabilistic Quantitative Precipitation.

53. The effort was practically completed. Dr Zhiyu LIU was trying to make use of OPACHES to collect case studies – e-Board as a kick-off activity. So far he has collected some information on the topic.

Term of Reference: To prepare guidance to undertake an inter-comparison related to the use of operational flood forecasting models.

54. The work was done through a survey on operational flood forecasting model in the WMO Members. With the support of OPACHE, Dr. Zhiyu LIU has collected some information on flood forecasting models from 12 countries and international organizations (Bangladesh, China, India, Japan, Korea, the Czech Republic, UNESCO-IHE, Pakistan, US Army Corps of Engineers, the Norwegian Water Resources and Energy Directorate (NVE), BC Hydro of Canada, the United Kingdom), which was used as a reference material for the Workshop on Inter-comparison of Flood Forecasting Models - Decision Making for their Selection and Application, Koblenz, Germany, 14 to 16 September 2011.

Term of Reference: To liaise, as necessary, with relevant areas of WMO (in particular the Disaster Risk Reduction (DRR), the Commission for Atmospheric Sciences (CAS) and the Commission for Basic Systems (CBS) with regard to the WMO Flood Initiative) and other organizations (e.g. UNESCO IHP, IFI, ICHARM) with regard to hydrological forecasting and prediction and disaster risk reduction activities.

55. It should be noted that the advances in the work plan could not have been done without the contributions and support of the staff of the Secretariat to the efforts of the team. The work of the staff of the Secretariat continues to be critical in our attaining success, and their efforts should not go un-noticed.

6. REPORT BY AWG MEMBER RESPONSIBLE FOR CHY THEME AREA 4 ON WATER, CLIMATE AND RISK MANAGEMENT *(submitted by Ann Calver)*

Term of reference: To lead, monitor, report and provide advice on the activities of this theme area, as indicated in the draft programme of CHy work. [Note that there is some overlap between the details within this term of reference and the more general terms of reference later in this document.]

56. The structure of this short report follows the terms of reference given in the report of the 2008 Commission for Hydrology meeting and the subsequently-developed theme work plan.

57. Complete the (previous session's) identification of climate-sensitive stations and analysis of their data: It was deemed more appropriate to draw CHy members' attention to this data resource and to the fact that there is a range of trend studies available and this was accordingly done by an e-forum posting in 2009.

58. Prepare guidance material on the potential use of the current capabilities in regional climate modelling (RCM) for water resources assessment and management: An article was prepared for the third World Climate Conference (WCC-3) issue of the WMO Bulletin on examples of RCM use in hydrology and water resources assessment; comment was made on the WCC-3 water and climate white papers; Nazzareno Diodato produced a note on possible future downscaling work for hydrological applications.

59. Promote data rescue activities: Having in 2008 completed a report on data rescue requirements, Matt Fry worked on a subsequent report on guidance for data rescue scheduled, at the time of writing, for uploading to the WMO Website in mid-2012. The work involved liaison with colleagues involved in climate data rescue.

60. Contribute to the guidance material on seasonal flow forecasting (liaise with streamflow forecasting and prediction theme) – including quantifying uncertainties: It was agreed at the first AWG meeting of the session that this activity was to be led by theme 3 on 'Hydrological forecasting and prediction'. UK and Australian information in this context was forwarded in 2009 to the leaders of that theme.

61. Prepare guidance material on the climate information requirements of water resources managers for operations, long-term planning and design: James Dent was engaged to write a report on requirements of water managers for climate (and meteorological) information, which was completed in 2011. The report was peer reviewed and is scheduled for web publication as a technical report in 2012. (Additional information will be provided during the session by the AWG member responsible of Publications.)

62. Prepare guidance material on drought forecasting and indices – including quantifying uncertainties. The work relating to this term of reference was scoped in 2010 and subsequently re-aligned during the course of the intersessional period in the light of the development of wider WMO drought initiatives. In this context the theme leader presented hydrological material at an Integrated Drought Management Programme proposal meeting in November 2010 and at a joint WMO/International Strategy for Disaster Reduction meeting on 'Hydrological Drought Indices' in September 2011.

63. Prepare guidance material for factoring transient climates, non-stationary nature of data sets and uncertainty analysis in the estimation of design floods: A scoping note was produced in 2010. It was considered efficient to align work with a new European Cooperation in Science and Technology (COST) initiative on river flood frequency estimation which had a specific work package on estimation under non-stationarity. WMO was welcomed as a member of this initiative and the theme leader attended a COST Action meeting in June 2011 to explore joint aims. Arrangements were subsequently put in place to gather information on non-stationary flood frequency methods from a group of countries beyond Europe to align with similarly ongoing reporting by the European action. Contributions to date have been received from Australia, India and the United States. At the time of writing this report it is expected that these will be loaded onto the WMO Website in mid-2012 both for information and to serve as examples accompanying a request for contributions from a wider group of CHy members.

Term of reference: To liaise, as necessary, with relevant areas of WMO (e.g. the Commission for Climatology (CCI)) and other organizations (UNESCO-IHP, UNEP, IAHR and IAHS) with regard to Climate and Water activities.

64. Liaison has in particular been with WMO Secretariat staff in the Climate and Water Department, with the Commission for Climatology (CCI) and the Commission for Agricultural Meteorology (CAgM), with the newly-developing hydrological programme of Regional Association VI, with CHy hydrologists at Executive Council and Congress meetings, with wider CHy membership via web postings and with local UK initiatives of relevance. See also the activities noted under items 6 and 7 relating in particular to drought and non-stationary river flood frequency initiatives where liaison was with an extensive range of groups.

Term of reference: To develop and implement capacity building initiatives based on the activities undertaken within the theme.

65. See activity 3 above on the development of guidance for hydrological data rescue.

Term of reference: To report on activities at each AWG meeting and as requested by the president of CHy.

66. Liaison has been via web postings, teleconferences and discussions with CHy members and Secretariat staff.

67. Overall the 2008-2012 period has been a fruitful one in terms of work in this theme which has, it is hoped, helped to raise the profile of CHy hydrology particularly at a time of development of wider WMO drought initiatives and the Global Framework for Climate Services.

7. REPORT BY AWG MEMBER RESPONSIBLE WIGOS/WIS *(submitted by Antonio Cardoso Neto)*

Term of Reference: To act as the Commission for Hydrology focal point for the activities associated with WIGOS and WIS.

Activities are presented following the order of the terms of reference.

68. The WIGOS pilot project to be followed up by the Commission for Hydrology is the integration between the Hydrological Cycle Observing System of the Southern Africa Developing Community (SADC-HYCOS) and the Southern Africa Regional component of the Flash Flood Guidance System (SARFFGS), whose general purpose is to develop a tool aiming at the improvement and the effectiveness of the above-mentioned systems through the following items:

- (a) Integration of the flux of real time data from the Southern African Development Community-Hydrological Cycle Observing System (SADC-HYCOS) project;
- (b) Integration of the SAFFGS products that are time sensitive; and
- (c) Integration of the products generated by the Numerical Weather Prediction (NWP) from the Severe Weather Forecasting Demonstration Project (SWFDP).

It is expected that this opportunity will offer a show-case to the WIGOS/WIS as far as the hydrologic aspects are concerned.

69. In December 2009, the AWG member responsible for this project participated in a regional consultation meeting for the project of the Zambezi River Basin Flood Forecasting and Early Warning (ZRBFFEW) whose implementation had started in July of the same year. The meeting that took place in Maputo, Mozambique was the first activity of the project. Part of the meeting was dedicated to the development of the WIGOS/WIS Pilot Project as well as to the identification of potential contributions from other major projects in the region. The Term of Reference for the consultants to be involved in the implementation of the project was prepared by the WMO Secretariat and sent to the Office of Foreign Disaster Assistance of the United States Agency for International Development (USAID).

70. Several constraints have been detected in the implementation of the project, such as: shortage of trained staff in flood forecasting, lack of formal data sharing policy and protocols, poor rainfall forecast accuracy, data transmission problems and malfunctioning devices, vandalism and theft of equipment; outdated instrumentation and obsolete forecasting methods. A report was written by the AWG member at the e-board of the Commission for Hydrology (CHy) at <http://www.whycos.org/wordpress/?p=397>.

Term of Reference: To promote, monitor, report and provide advice on the application of Resolution 25 (Cg-XIII) by Members and in particular in HYCOS projects, as and when necessary.

71. No advances to be reported.

Term of Reference: To design and coordinate a project that will develop hydrological data transfer standards protocols and formats in support of WIGOS and WIS.

72. An updated description of the transfer standards protocol and formats at the e-board of the Commission for Hydrology has been written at <http://www.whycos.org/wordpress/?p=353>.

Term of Reference: To explore and develop opportunities for expanding the use of Hydrological Information Systems (HISs) and associated free-ware, model interface platforms, web services for hydrological applications, etc.

73. Comments posted also at <http://www.whycos.org/wordpress/?p=353>.

Term of Reference: To monitor, report and provide advice on the activities of the international data centres such as the Global Runoff Data Centre (GRDC), the Global Precipitation Climatology Centre (GPCC) and the International Groundwater Resources Assessment Centre (IGRAC) and address the international data requirements, including hydrological components of large-scale initiatives such as the Global Energy and Water Cycle Experiment (GEWEX) and the Global Terrestrial Network - Hydrology (GTN-H), the Global Climate Observation System (GCOS), the Global Terrestrial Observation Systems (GTOS) and the Group on Earth Observations (GEO).

74. No advances to be reported.

Term of Reference: To report on activities at each AWG meeting and as requested by the president of CHy.

75. It has been reported whenever requested.

NOTE: Since there is a connection between WHYCOS and the duties of the AWG member responsible for WIGOS/WIS, this person is doing efforts to implement HYCOS components in the Amazonian and the La Plata basins.

NOTE: While developing the activities it should be ensured that the cross-cutting issues are taken into account.

8. REPORT BY AWG MEMBER RESPONSIBLE FOR WATER RESOURCES ASSESSMENT (submitted by Jeanna Balonishnikova)

Term of Reference: To lead, monitor, report and provide advice on the activities of the relevant Theme Area, as indicated in the Draft Programme of Work (Annex 1 to Resolution 7 (CHy-XIII)).

76. A document entitled "Technical Material on Water Resources Assessment" has been prepared with the aim of providing technical material in a reasonably logical progression as required for carrying out a water resources assessment. The technical material contained in this publication has been collected over the period covering two intersessional periods of the WMO Commission for Hydrology. The list of contributors to this document was extensive. During this period, the material was expanded and a review of the content of the document undertaken. The document should be available for distribution at CHy-14.

77. It was proposed for the future to prepare methodological material on "Assessment of surface water resources and their use" with the following contents:

1. General terms and definitions
2. Assessment of river basins water resources
 - 2.1 Methods for assessing water resources for lowland rivers in natural conditions
 - 2.2 Methods for assessing water resources for lowland rivers under human impact
 - 2.3 Methods for assessing water resources of mountain rivers in natural conditions
 - 2.4 Methods for assessing water resources of mountain rivers under human impact
3. Estimation of the national water resources
 - 3.1 Local water resources of the countries
 - 3.2 Assessment of transboundary surface water transfer
 - 3.3 Available water
4. Water use and water availability
 - 4.1 Major factors determining water use
 - 4.2 Water resources state criteria
 - 4.3 Methods of assessing and forecasting water use and water availability
5. Case study of water resources estimation and their use in the national level

78. A draft report on observations of soil moisture and evaporation from land and soil surfaces: methods of analysis, including draft of recommendations on estimating monthly and seasonal evaporation values with a case study on evaporation assessment for European Russia, has been prepared. This report includes the following chapters:

- (a) Available observation data;
- (b) Methods for observational data analysis;
- (c) New method for assessment of evapotranspiration;

- (d) A Case Study for the European Territory of Russia;
- (e) Bibliography-

This draft report should be placed on the CHy eForum for review and comments.

79. The first draft of a paper (translated from the Russian) on recommendations for optimization of hydrological network with regard to hydrological regime formation and economic activity on watersheds has been prepared. This draft report should be placed on the CHy eForum for review and comments (in preparation up to September).

80. No progress was made in the activity on the preparation of an information note on ecological flow requirements and ecological assessment. However, recently, the European Union has released a Discussion Paper on Environmental Flows in the European Union. CHy members may wish to consider what the Commission could do in terms of guidance material on this topic. There are numerous aspects of derivation of environmental flows that have a direct hydrological linkage and the flow components are identified and described in terms of their magnitude, duration, timing, and frequency. The output is a description of a flow regime needed to achieve and maintain a specified river condition. For example, the flood regime plays a critical role in the structure and functioning of the aquatic ecosystem.

81. A draft report (translated from Russian) on the current assessment methods of water storage in snow cover on watersheds is available for review. Some preliminary work on the preparation of guidance material for estimating snow storage and their distribution with the application of satellite data and models for hydrological forecasts has been undertaken. This report consists of:

1. Introduction
2. General approach
 - 2.1 Gamma radiation method
 - 2.2 Visible/near infrared
 - 2.3 Thermal infrared
 - 2.4 Microwave
3. Snow mapping
 - 3.1 Confusion factors
4. Current applications
 - 4.1 Snow cover area
 - 4.2 Snow depth
 - 4.3 Snow water equivalent
 - 4.4 Other snow properties
5. The most popular and widely used satellite snow data sets
 - 5.1 NIMBUS-7 SMMR Derived Global monthly snow cover and snow depth (SMMR)
 - 5.2 SSM/I Derived Global Snow Cover (SMMI)
 - 5.3 Global Monthly ease-grid Snow Water Equivalent Climatology
 - 5.4 MODIS snow products
 - 5.5 Advanced Microwave Scanning Radiometer (AMSR-E)

References

Term of Reference: To liaise, as necessary, with relevant areas of WMO, United Nations agencies and other relevant groups with regard to water resources assessment activities

82. Opportunities have been taken over the past few years to have interactions with both UNESCO and the United Nations Economic Commission for Europe (UNECE) on water resources assessment related activities. I attended the Third UNECE workshop on water and adaptation to

climate change in transboundary basins: Making adaptation work on 25 and 26 April 2012 at the Palais des Nations in Geneva.

Term of Reference: To develop and implement capacity-building initiatives based on the activities undertaken within the relevant Theme Area;

83. Unfortunately, the series of workshops on evaluating the capabilities of countries with respect to water resources assessment held in cooperation with UNESCO has not proceeded during this intersessional period. However, at the time of writing this report a water resources assessment workshop has been proposed for Regional Association II by the Chair of the RA II Working Group on Hydrology. This workshop will use as a guide to its deliberations the Technical Material on Water Resources Assessment.

Term of Reference: To report on activities at each AWG meeting and as requested by the president of CHy.

84. Reported to president of CHy as required for AWG meetings and at other times during the intersessional period.

9. REPORT BY AWG MEMBER RESPONSIBLE HYDROLOGICAL FORECASTING AND PREDICTION *(submitted by Guido Van Langenhove)*

Term of Reference: To co-lead, monitor, report and provide advice on the activities of the relevant Theme Area, as indicated in the Draft Programme of Work (Annex 1 to Resolution 7 (CHy-XIII)).

85. The *Manual on Flood Forecasting and Warning* was published as a contribution to the MF–Hydrology in 2011 - Manual on flood forecasting and warning, World Meteorological Organization - WMO, 2011 (WMO-No. 1072).

86. Under the World Meteorological Organization's Flood Forecasting Initiative, a regional flash flood guidance system has been established in Southern Africa. WMO, in collaboration with the South African Weather Service in Pretoria, South Africa, organized the first Steering Committee meeting from 24 to 25 October 2011 to monitor progress, provide technical and administrative guidance, and review and update the plan for implementation of the Southern Africa Regional Flash Flood Guidance System project. Mr van Langenhove is a member of the Steering Committee. Participants were briefed on the South African Flash Flood Guidance (SAFFG) System. It has been operational since 1 October 2010 and is similar to the SARFFG but with a higher resolution, focusing only on a few flood-prone regions at a higher resolution and using radar-rainfall information in some of those areas. The roles of stakeholders in the SAFFG System were highlighted. They include modelling the flash flood threat over small basins, monitoring the hazardous weather conditions, preparation of warning information, and response by disaster management. The importance of a good working relationship between forecasters and disaster managers for the effectiveness of this system was highlighted.

87. The Severe Weather Forecasting Demonstration Project is also being implemented in Southern Africa and Mr van Langenhove has provided technical advice and guidance from a hydrological perspective.

88. Mr van Langenhove provided national and regional hydrological expertise and experiences into the Zambezi Watercourse Commission (ZAMCOM), USAID and WMO initiative to develop a strategy for a basin-wide flood forecasting and early warning system for the Zambezi River Basin. Mr van Langenhove has assisted in the preparations for the national consultation and also regional steering meetings for the project.

Term of Reference: To liaise, as necessary, with relevant areas of WMO (in particular Disaster Risk Reduction, the Commission for Atmospheric Sciences and the Commission for Basic Systems with regard to the WMO Flood Initiative) and other organizations (for example UNESCO IHP, IFI, ICHARM) with regard to hydrological forecasting and prediction and disaster risk reduction activities.

89. Mr van Langenhove represented the Commission at the Interagency consultation meeting on the User Interface Platform (UIP), Agriculture, Food Security and Water Sectors of GFCS which was held from 26-28 September 2011 at the Food and Agriculture Organization, in Rome Italy. The meeting was organized by WMO and the Food and Agriculture Organization (FAO), to further partnerships and to develop recommendations for the implementation of the GFCS-UIP.

Term of Reference: To develop and implement capacity-building initiatives based on the activities undertaken within the relevant Theme Area.

90. Aspects of capacity building under this thematic area were handled by other AWG members.

Term of Reference: To report on activities at each AWG meeting and as requested by the president of CHy.

91. Reported to president of CHy as required for AWG meetings and at other times during the intersessional period.

REGIONAL ACTIVITIES RELATED TO THE HWRP

1. The present information document contains a brief report of the regional activities undertaken in the last intersessional period (2009-2012) under the framework of the Hydrology and Water Resources Programme.

RA I

2. The tenth session of the RA I Working Group on Hydrology was held in Entebbe, Uganda from 31 May to 2 June 2010. It was attended by 34 participants from 23 countries including representatives from UN and River Basin Organizations, Economic Groupings and WMO delegates. The report of the meeting can be found at:
<http://www.wmo.int/pages/prog/hwrp/documents/RAI-session-Final.pdf>

3. The fifteenth session of Regional Association I (Africa) was held in Marrakech, Morocco, from 1-8 November 2010. The session established a Management Group to replace the Advisory Working Group, to advise the president, and to make recommendations on issues of relevance to the Association. The Management Group was also tasked with establishing and reviewing the structure and work of the subsidiary bodies of the Association, including recommending implementation, and termination or restructuring of said bodies as necessary. The session appointed Mr Hassen Lofti Frigui (Tunisia) as RA I Hydrological Adviser who will serve as the chair of the Working Group on Hydrology.

4. The Association decided to establish a Working Group on Hydrology, with:

- (a) Three experts on hydrological modelling and flood forecasts;
- (b) Three experts on water resource management;
- (c) Two experts on hydrological data management;
- (d) One of the above experts will be the hydrological adviser who will serve as Chair.

5. During late 2012, Mr Frigui (Tunisia) developed a note on priority and strategic actions for the development of surface water in Africa, identifying priority areas for intervention as well as objectives and proposed actions. The document is being circulated for discussion.

RA II

6. The fourteenth session of Regional Association II (Asia) was held in Tashkent, Uzbekistan, from 5 to 11 December 2008.

7. The Association established the Working Group on Hydrological Forecasts and Assessments (WGH) with the following terms of reference:

- (a) To provide assistance and advice to the president of the Association on all questions pertaining to the regional aspects of the Hydrology and Water Resources Programme;
- (b) To identify the best means of meeting the hydrological needs in the Region;
- (c) To undertake activities relating to the Hydrology and Water Resources Programme;

- (d) To cooperate with the Commission for Hydrology and other WMO bodies on projects related to hydrology and water resources;
- (e) To seek cooperation with other regional bodies and organizations on issues related to the Hydrology and Water Resources Programme.

8. The session of the Working Group on Hydrology (WGH) of the WMO Regional Association II (Asia) was held in Seoul, Republic of Korea, from 23 to 26 November 2010. The session noted with deep regret the untimely demise of Professor Igor Shiklomanov, Director of the State Hydrological Institute of Russia, Hydrological Adviser to the president of RA II, and Chairman of the WGH. Subsequently, Mr Sung KIM (Republic of Korea), formerly co-chair of the WGH, was nominated Regional Hydrological Adviser to the president and Chair of the WGH. The session recalled the eminent contributions of Professor Shiklomanov to hydrology and water resources worldwide and his services over so many years for the regional association and its Working Group on Hydrology, and proposed a number of high-priority theme areas for the next intersessional period of RA II (2012-2016), for which the re-establishment of the WGH is expected.

9. The proposed six theme areas include:

- (a) Strengthening the capability of Members to assess their water resources;
- (b) Improve accuracy and timeliness of forecasting floods of different cause and origin;
- (c) Hydrological aspects of drought, including drought monitoring;
- (d) Hydrological responses to climate variability and change and promotion of the use of climate information by water managers;
- (e) Improved accuracy of hydrometric and sediment observations including space-based technologies;
- (f) Sediment disasters and mass movements.

10. Completing the work plan programme on Water Resources Assessment, Availability and Use of the WGH and with a view of assisting the Commission in deciding the way forward with respect to Water Resources Assessment (WRA), a workshop on "Development of Water Resources Assessment Methodologies and Establishment of an Information System for Water Resources Assessment in WMO RA II had been jointly organized by WMO and the Han River Flood Control Office in Seoul, Republic of Korea in October 2012.

11. The fifteenth session of RA II will take place in Doha, Qatar from 13 to 19 December 2012.

RA III

12. A meeting of the RA III Working Group on Hydrology and Water Resources took place in Santiago de Chile, Chile, from 22 to 25 March 2010. At the meeting reports were presented on the following topics as decided by the previous session of the Association:

- (a) Sub-group on Basic Information for Integrated Water Resources Management (coordinated by Ms Dora Goniadzki (Argentina)) which included the following work:
 - Water Resource Assessment (Ms Claudia Contreras (Colombia));
 - Integrated Flood Management (Ms Silvana Alcoz (Uruguay));

- Hydrological Impacts of Climate Variability and Change (Ms Olga Umpiérrez (Bolivarian Republic of Venezuela));
- Institutions and Legal Framework on Water Resources Management (Mr Luis Noriega (Plurinational State of Bolivia));
- Hydrological Networks (Mr Héctor Vera (Peru));
- Participation of National Meteorological and Hydrological Services (NMHSs) in the Integrated Water Resources Management (IWRM) activities (Mr Aníbal Vaca (Ecuador));

(b) Sub-group on Promotion and Public Information (coordinated by Brahim Nazarala (Chile));

(c) Sub-group on the Hydrological Operational Multipurpose System (HOMS) and training (coordinated by Javier Narbona (Chile)).

13. The fifteenth session of Regional Association III (South America) was held in Bogota, Colombia, at The Bogota Plaza Summit Hotel, from 22 to 29 September 2010.

14. The session established a Management Group of Regional Association III (South America) to replace the former Working Group on Internal Matters of Regional Association III, to advise the president, to act on behalf of the Association and to make recommendations on matters relevant to the Association. The session appointed Ms Dora Goniadzki as Regional Hydrological Adviser to serve as regional Focal Point on hydrological matters in the Region.

15. The Association established a Working Group on Hydrology and Water Resources, comprising:

(a) The chair of the Working Group and the Regional Hydrological Adviser;

(b) The vice-chair of the Working Group;

(c) Sub-groups to be determined by the Management Group according to its terms of reference.

16. A Workshop on the Use of the Flash Flood Guidance System for South America was organized from 1 to 7 October 2011 in Santiago, Chile. This workshop was attended by experts from all Iberoamerican countries of RA III and experts from the USA and Costa Rica.

17. An International Workshop on Hydrometry was organized in collaboration with the National Water Agency of Brazil (ANA) and was held from 8 to 10 May 2012 in Manaus, Brazil (see CHy-14/INF. 4, paragraph 30). It was followed on 11 May by a Regional Workshop on the Implementation of the World Hydrological Cycle Observing System (WHYCOS) in RA III. Participants agreed on the potential benefits of implementing HYCOS components, especially in large basins in the Region, and identified several actions aimed at improving cooperation in areas such as determination of hydrological flow, use of satellite imagery, joint stream gauging on transboundary rivers, etc.

RA IV

18. The fifteenth session of Regional Association IV (North America, Central America and the Caribbean) was held in Nassau, Bahamas, from 24 April to 1 May 2009. The Association noted the report of the chairperson of the Working Group on Hydrology (WGH), Mr C. Barrett (United States of America). It noted the progress made in carrying out activities of particular interest to Members by the coordinators who had been given specific assignments and were supported by

other members of the WGH. In particular, it noted that the WGH focused on these prioritized areas and that the results of the activities were reported by the chairman of the WGH. The following coordinators prepared activity reports on:

- (a) Hydrological Warning Systems – Mr Eduardo Planos (Cuba);
- (b) Integrated Water Resources Management – Mr Sadi Laporte (Costa Rica) and Ms Luz Graciela de Calzadilla (Panama);
- (c) Development of CARIB-HYCOS – Ms Ana Deisy Lopez (El Salvador) (On the continental component).

19. The Association appointed Mr Eduardo Planos Gutierrez (Cuba) as Regional Hydrological Adviser for the new intersessional period and to serve as regional Focal Point on hydrological matters in the Region. The chairperson of the Hurricane Committee and the Regional Hydrological Adviser also serve as ex-officio members of the Management Committee and participate in meetings, when possible.

20. An RA IV meeting of experts in Hydrology was held in Santo Domingo, Dominican Republic from 6 to 8 December 2010. The meeting was attended by 11 experts from the Region. A Workshop on Development of Water Resources Assessment Methodologies and Establishment of an Information System for WRA for RA IV is planned for the first quarter of 2013 in Panama.

RA V

21. The seventh session of the Working Group on Hydrology (WGH) of WMO's Regional Association V (South-West Pacific) (RA V) was held at the premises of the Research Centre for Water Resources (RCWR) in Bandung from 14 to 18 December 2009. The session was organized by RCWR in cooperation with the Meteorological, Climatological and Geophysical Agency of Indonesia (BMKG). Twenty participants from nine countries in the Region (Cook Islands, Fiji, Indonesia, Malaysia, New Zealand, Philippines, Samoa, Solomon Islands, and Vanuatu) attended the meeting.

22. The fifteenth session of Regional Association V (South-West Pacific) was held in Bali, Republic of Indonesia, from 30 April to 6 May 2010. The Association noted with appreciation the offer of Indonesia to host a Regional Training Centre – Hydrology at the Research Centre for Water Resources, and the recommendation of the RA V Working Group on Hydrology on the desirability of having such a centre in the Region. The Association felt that such a facility will assist in meeting the long-outstanding needs of the Region on training in hydrology and water issues. Members expressed the need for designing the curriculum of the courses expressly keeping in view the particular situation and needs of countries in the Region.

23. The Association re-established a Management Group of Regional Association V (South-West Pacific) to assist the president and make recommendations on matters relevant to the Association and, inter alia, to establish and review the structure and work of the subsidiary bodies of the Association, including the implementation of their recommendations, and to disband or reorganize these bodies as needed. The Association established a Working Group on Hydrological Services under the leadership of Dr Arie S. Moerwanto (Indonesia), who is also the Regional Hydrological Adviser to the president of the Association.

24. In May-June 2012, EC-64 approved the training facilities of BMKG and the Research Center for Water Resources (RCWR) in Indonesia as a new WMO Regional Training Centre (RTC).

RA VI

25. The fifteenth session of Regional Association VI (Europe) was held in Brussels, Belgium, from 18 to 24 September 2009. The Association agreed that the existing regional mechanisms guiding climate- and hydrology-related matters in the Region would be consolidated into a new RA VI Working Group on Climate and Hydrology. The Association appointed Mr Markku Puupponen (Finland) as the Regional Hydrological Adviser to the president, co-chairperson of the Working Group on Climate and Hydrology and a member of the RA VI Management Group.

26. The Terms of Reference for the Working Group on Climate and Hydrology are provided in:

ftp://ftp.wmo.int/Documents/PublicWeb/mainweb/meetings/cbodies/governance/ra_reports/english/pdf/1046_en.pdf

27. Through formal and informal meetings with representatives of National Hydrological Services (NHSs) and other stakeholders in the water domain, the RA VI Working Group on Climate and Hydrology (WG-CH) and the WMO Secretariat have noted the need to discuss strategic and operational aspects of hydrological activities between NHSs and their main partners. Due to the pressures that the community is facing (e.g. implementation of European Union (EU) legislation, budget reductions and demands for improved services), this need for collaboration and joint planning is growing more and more important.

28. The RA VI Hydrology Forum is a new concept for regular meetings between the NHSs of the Region and their main partners. The first Hydrology Forum took place in Koblenz, Germany from 8 to 10 May 2012. This event was organized by the WMO Secretariat, the RA VI WG-CH, its Task Team on Hydrometry, and the German Federal Institute for Hydrology that hosted the meeting. Further details are available at: <http://www.wmo.int/pages/prog/hwrrp/RA6/hydroforum.php>

29. The Hydrology Forum 2012 was focused on the design and operation of hydrological monitoring networks. The meeting agreed on a number of activities to carry out before its next meeting, tentatively scheduled in 2014; these include inventory of data and monitoring needs and operational procedures, network optimization and strategic planning, harmonization of methodologies, quality control and access to data, data sharing procedures, as well as enhancing cooperation and advocacy with decision makers.

30. Through its co-chair and other members, the Working Group has continued participating as observer in the activities of the European Commission – Common Implementation Strategy for the Water Framework Directive.

31. The sixteenth session of Regional Association VI will take place in Helsinki (Finland) from 10 to 17 September 2013.
