



**WORLD METEOROLOGICAL ORGANIZATION**

# **RA VI HYDROLOGY FORUM**

**Third meeting**

**Oslo, Norway, 21-23 September 2016**



## **1. Opening**

The third meeting of the RA VI Hydrology Forum was held on 21-23 September in the headquarters of the Norwegian Water and Energy Directorate. It was preceded on 20 September by a Workshop on Hydrological Modelling, Forecasting and Warning.

The Forum was attended by 53 experts representing 32 countries, 2 regional institutions and the WMO Secretariat.

The Forum was opened by Mr Anton Eliassen, Director of the Norwegian meteorological Service and Permanent Representative of Norway with the World Meteorological Organization. In his opening speech he recalled the role of hydropower in the energetic balance of Norway and the statistically significant increase of precipitation due to the effects of climate change. He also underlined the need of coordination between hydrological and meteorological services, especially in the provision of forecast and alerts for dangerous phenomena, and the need to focus on adaptive measures to face climate change effects.

Mr Ivan Čačić, President of RA VI, added his word of welcome to the participants. He praised the role and contribution of the Hydrology Forum to RA VI activities, providing a venue for discussion and exchange among national experts, especially in a moment in which water related issues are prominent in the international agenda, due to the increased attention to extremes and disasters, and the adoption of the Sustainable Development Goals. He recalled several WMO activities which will require inputs from the hydrological community (WIS, WIGOS, GFCS) and the benefits of hydrometeorological cooperation in initiatives such as Multi Hazard Early Warning Systems (MHEWS)

Mr Harry Lins, President of the Commission for Hydrology, welcoming the participants, stressed the willingness of the Commission to link closely with the Regional activities in hydrology, and that this cooperation is in line with the improvement of the efficiency of the Organization that the Congress had requested. He recalled the various avenues for cross-cutting cooperation, in which hydrology has to play its role, such as WIS, WIGOS, DRR. He underlined that RA VI Forum has set the example for similar initiatives in other Regions, and recommended closer exchange of experiences among the Regions. Finally he recalled the forthcoming 15<sup>th</sup> session of the Commission for Hydrology (7-13 December, Rome, Italy) preceded by a forum on Women's Leadership in Hydrology (5-6 December) and invited all the present to attend.

## **2. Presentation on current and planned activities and emerging issues**

Mr Harry Lins, President of the Commission for Hydrology made a presentation about the progress in the implementation of HWR programme, organization wide priorities and future challenges that will be addressed by the commission at its forthcoming session in December in Rome, focussing especially on the WMO Hydrological Observing System (WHOS) and the Global Hydrometry Support Facility (GHSF).

WHOS is being developed as the hydrological component of WIGOS. At its present first phase of implementation it is a map based portal which allows accessing the on-line data or metadata that are made freely available by NHSs. It provides a framework in which other data holder, namely HYCOS project, may be invited to put their data on line. The concept was endorsed by Cg-17. It is conceived as an interim step towards a second phase, that should allow fully WIS/WIGOS compliant data registration, discovery and

access. Water ML 2.0 a standard for representing hydrological observation (part 1 time series, part 2, rating, gauging and sessions) and its regional demonstration (Sava, Arctic, La Plata) as well as the WMO sponsored Global Data Centres' (GRDC, IGRAC, HYDROLARE) role as data nodes (GRDC as GISC) are supporting elements to the full implementation of WHOS.

GHSF is a new initiative providing a coherent framework to the different WMO activities addressing data collection, management and sharing. Its pillars will be the WHYCOS programme for strengthening NHSs capabilities and a Innovation Hub to promote the development and adoption of innovative hydrometry technologies. WHOS (for promoting data sharing) and the Hydro Services Information Platform (to match donors with needs on the basis of a continuous assessment of NHSs status) will complete the facility, together with a Help Desk to assist Members' NHSs.

Referring to the coming 15<sup>th</sup> session of the Commission for Hydrology he also invited to participate in pre-session discussion. ([http://www.whycos.org/wordpress/?page\\_id=758](http://www.whycos.org/wordpress/?page_id=758)) to help in formulating the proposal that the Commission will be called to discuss. He also presented the new proposed structure of the Commission structured on three areas, namely "Coordination and Implementation Support" (addressed by the president, the vice-president, and an AWG Member covering the role of "Project Facilitator"); "Measurement, Monitoring and Infosystems" (addressed by 3 AWG members) and "Hydrological Applications, Products and Service" (addressed by 3 AWG members). AWG Member will focus on few high priority activities, while for other lower priorities identified by the Commission, Member states can take the lead with support from Secretariat.

Mr Tommaso Abrate briefly summarized the outcomes of the meeting of the RA VI that had taken place on Monday 19 October 2016. The Group agreed on the plan to complete its tasks by the next session of the Regional Association (September 2017 in Croatia). The Group also recommended that for the future Working Group ToR should be more realistic and implementable, Members should ensure a stronger support from national experts, interdisciplinary collaboration should be improved and the outcomes of the work should be better communicated to the Region. The Group had also debated the advantages and disadvantages of having climatology and hydrology grouped and concluded that the structure of the subsidiary bodies of the Regional Association should be flexible and adapted to the priorities that the Region will identify at each session and cross disciplinary cooperation sought as and when it brings added value.

Mr Abrate also introduced the Sustainable Development Goals, in particular SDG 6 "Ensure availability and sustainable management of water and sanitation for all" its 6 targets (access to water, sanitation, water quality, sustainable water use, IWRM, and water ecosystems <https://sustainabledevelopment.un.org/sdg6>) and the UN-Water initiative to develop relevant monitoring methodologies, and recalled that NHSs will be called upon to provide adequate data for the evaluation of the indicators.

### **3. Workshop on hydrological modelling, forecasting and warnings**

The Forum was preceded on 20 September 2106 by a Workshop on hydrological modelling, forecasting and warnings. The workshop was organized in three sessions, respectively on Hydrological forecasting, warning and communication with end-users,

Remote Sensing and Hydrological Modelling, Forecasting and Warning and Flash Floods and Urban Floods. All the 18 presentations are available online at the address:

<http://www.wmo.int/pages/prog/hwrrp/RA6/hydroforum2016.php>

The Forum debated some of the outcomes of the workshop, notably ways how NHSSs could contribute and benefit from METEOALARM. It was noted that METEOALARM is using hazard threshold (return period) which is a step back from risk threshold, that should be already available in many countries and impact based alarms are being developed and in general it would need some adaptation to be able to handle hydrological alarms. These issues shall be discussed at the planned EFAS METEOALARM meeting in March 2017, keeping in mind also that METEOALARM addresses the general public and EFAS is restricted to NHSSs, and the latter can play an important role in linking the two initiatives, and in general their role should be enhanced when discussing on MHEWS.

Participants recalled that disaster management is a national responsibility and stressed that national laws and regulations should be taken into account, and therefore it may be necessary to consider the involvement and contribution of Civil Protection. Also the debate indicated that evaluation of forecast may be a topic for work in future and that it might be appropriate to review the CHy Statement on the Scientific Basis for, and Limitations of, River Discharge and Stage Forecasting, to add specific considerations regarding flash flood.

#### **4. Statement from stakeholders**

Representatives of regional stakeholders and partners made presentations on their activities and how they could relate, possibly through the forum, with the work of NHSSs and WMO in the region.

Mr Jon Olav Skøien (JRC) presented the work being undertaken by the Joint Research Centre in support of the implementation of the Water Framework Directive, touching harmonization of observations of the current status, identification of pressures and targets, and design of management measures to reach the targets (Integrated River Basin management, IRBM). He also introduced the new development of the European Flood Awareness System (EFAS) which is now also addressing flash floods and the European Drought Observatory (EDO) and the Copernicus Emergency Mapping Service.

Mr Eric Sprokkereef on behalf of the CHR, presented the work of the Commission, promoting the knowledge about the hydrology of the Rhine basin, solution of cross border hydrological problems, and implementing studies for the sustainable development of the Basin whose results are made available to responsible authorities in the Rhine riparian states and to the EU. Current activities address the development of an alarm model, sediment balance, snow and glacier melting effects, role of Lake Constance as reservoir, and are now also extending to the study of the links with socio-economical aspects.

Mr Dejan Komatina, Secretary of the ISRBC: presented the very wide scope of the Commission's responsibilities, which includes water and flood management plans, environmental protection, forecasting and warning systems, regulation of activities such as tourism and navigation, and development of agreed policies. He reported on the ongoing development of sediment, flood risk and climate adaptation management plans, and geographic and hydrological information systems, and related training activities. A Sava Water Council bringing together academia and business in an advisory body is also

being established. ISRBC has also been among the pilot institutions to use the data standardized format WaterML2.0, to be presented for adoption at the CHy-15 in December 2016.

Ms Jana Poórová presented the activities of the Danube Commission, relating to regulations governing river navigation and traffic, customs and sanitary inspections, and those of the ICPDR aiming to ensure that surface waters and groundwater within the Danube River Basin are managed and used sustainably and equitably, addressing coordination of NMHSs activities and forecasts, common measurement, promotion and standardization of data exchange (rules and protocols) reconciliation of data. ICPRD is also addressing transboundary water management, including groundwater.

Mr Jan Danhelka reported on the Elbe Commission, whose main goals are favouring sustainable water use, ensure environmental protection, and reduce pollution load to the sea by improving the status of the river and its affluent. The Commission oversees the implementation of WFD and FD, and is active in the fields of flood protection and accidental pollution. It has developed a strategy for flood protection, flood risk management and is regularly carrying out assessments of flood and drought events.

Mr Wolfgang Grabs reported on GTN-H, a network of network federating GRDC, GEMStat GPCC, Int'l Soil Moisture Network (University of Vienna with funding from EU space agency), IGRAC and HYDROLARE (in situ + satellite info) to contribute to GCOS Essential Climate Variables. Its goal is to inventory available information and how to access it, facilitate access to hydrological, hydrometeorological and observation data, and generate derived information products of global value, resulting from integration of databases, and addressing specific science questions (e.g. Pristine basins) He underlined the lack of use of observation data and derived products by decision makers.

## **5. Review of activities of the forum**

Mr Vasko Stojov, provided an overview of common security issues, adequacy rules and their implementation, as well as of other practical field and administrative problems affecting operational practices in the Region. Many of them are eventually affecting the capabilities of NHSs to operate appropriately, eventually resulting in the loss of data. The benefits of having regional instrument centres for calibration and maintenance were also discussed.

Ms Elise Trondsen, reported on network design and related case studies, underlining the merging need for developing adequate optimization tools for analyzing and designing network. Closer cooperation with CEN would be beneficial.

Mr Marius Matreața reported on the activities to promote harmonization of transboundary data being implemented between Bulgaria and Romania on the Danube River, aimed at increasing the capacity of cooperation and control, monitoring the quality of environmental factors along the Romanian-Bulgarian Danube sector, creating an integrated database for environment monitoring and setting up a common interface for protection against floods and other calamities.

Mr Ulrich Looser reported on GRDC activities for improving formalized procedure for data exchange. He remarked that the access to quality assured (QA) historical data is often more difficult than to near-real time (NRT) data and underlined that by interacting with GRDC NHSs are often compelled to address data quality and station issues (eg.

Availability and quality of Metadata). He finally reported on the role of GRDC in supplying data to global climate related programs, contributing to the hydrological segment of WIS WIGOS and promoting standardization (WaterML2.0).

Ms Cristina Alionte Eklund reported on the organization of the Workshop on hydrological modelling, forecasting and warnings, as well as on the linkages being established with EFAS and METEOALARM and on the publication of guidance material such as "Transboundary hydrological modelling: relevant projects and activities" and the proposal for one on best practices on use of probabilistic hydrological forecasts. She also indicated validation of forecast and the development of a framework for the assessment of service delivering capabilities of NHSs as possible future lines of actions.

Mr Olivier Overney reported on the refurbishment of the Swiss observing network following the transition from analogic to digital equipment, including the implementation of remote maintenance and monitoring, standardization electrical components with modular structure, and compliance with industrial and safety standards

## **6. Group discussion**

The participants debated on the plans for the activities of the Forum for the period 2017-2018, and beyond, having in mind the mandate of Working Group on Climate and Water of RA VI and the session of the Regional Association scheduled for September 2017. The participants divided in four working groups and identified the following critical areas and related themes:

Adapting to new hydrometric technologies and improving field hydrology: Engagement with and benefits from GHSF Innovation Hub; developing innovative methods in observation; development of guidance on state-of-the-art hydrometric measurement and data transmission techniques; network design and optimization; exchange of experience including identified shortcomings in network operation practice.

Improving the data chain: Assessing and communicating uncertainty in observation data; QMF and exchange of practical experience and best practices; comparison techniques; data sharing (especially in transboundary context, near-real time and historical data); improving partnership with other national agencies dealing with water data; identification and provision of data and building partnership with civil protection authorities for the development of impact based forecasting (starting with mapping the current situation in respect to definition of responsibilities and legal arrangements and sharing relevant experiences).

Sharing best practices in forecasting: description of extreme events according to common criteria; application of radar data, also for now-casting; closer cooperation with FFGS project in the Region; impact base forecasting (roles of various actors, review of needs); drought prediction, seasonal outlooks, forecast performance assessment (methods and inter-comparison).

Developing better services and products: better understanding of user communities and their needs, improved cooperation with other communities (emergency manager, civil protection); relations with METEOALARM, EFAS/COPERNICUS, EUMETNET; experience from implementation of the Common Alerting Protocol (CAP) in hydrology; better communication of probabilistic forecasting and uncertainty in forecast.

Support hydrological education: how to attract new people in the profession; how to ensure institutional continuity.

Modalities of work: keeping the expert level topical meetings (Hydrological Forum), need for a platform for meeting of hydrological advisors/managers of NHSs across the region (former WG on Hydrology), use of electronic communication platforms (web pages, web forums, newsletter, etc.)

## **7. Conclusions**

The Forum took note of the critical areas and topic identified and, as also recommended by the RA VI WG-CH, decided that only few priorities should be included in its plans. Possible support to and complementarity with WG-CH activities and relevant Task Teams (TTs), as well as with the programme of work for the period 2017-2020 to be adopted by CHy-15 in December 2016, should be used a selection criteria in order to maximize the benefits of forum's work.

### ***Priorities:***

#### Hydrological data

1. Network design and optimization (in cooperation with CEN, which is developing a standard), including the organization of a thematic workshop in connection with the next meeting of the forum

#### Flood forecasting

1. Further develop relation with METEOALARM, EFAS, EUMETNET and CAP, especially potential synergies between EFAS and FFGS concerning flash flood awareness products
2. Share experiences (data and techniques requirements, communication with end users) and mapping the present situation in Europe and assess the need for impact based warnings:
3. Collect material and best practices on validation of forecasts, including ensemble forecasts (reference to the outcomes of the RAII WG on Hydrological Services)
4. Develop guidance on the communication of uncertainty in coordination with Euporias project, <http://www.euporias.eu/>)

#### Supporting hydrological education:

1. Improve exchange between NHSs and universities to promote education and professional
2. Map the skills required at institutional level to deliver best services

Ms. Eklund, Regional Hydrological Advisor, was requested, in cooperation with WMO Secretariat, to finalize the programme of work and align with the activities of the WG-CH, and identify a focus theme for the next physical session of the forum, tentatively in two year time. Countries participating in the forum were also invited to get more involved.

The Forum also saw its role mainly as a platform for exchanging solution rather than for establishing priorities, and recognized the need to improve communication by electronics means and further promote the use of Webinars, electronic newsletters, web pages, and virtual discussion forum to debate issues of common interest. It was also pointed out

that often is more educational to share failures and setbacks and retrospective analyses how to avoid them

The Forum would welcome if Ms. Eklund, Regional Hydrological Advisor, could use the outcomes of the group discussion as a basis to prepare a proposal for the activities to be undertaken by the Regional Association (possibly through the successor of the WG-CH) in the next intersessional period to be submitted to the next session of the RA VI Management Group, planned in April or May 2017. The forthcoming session of the Commission for Hydrology (7-13 December 2016, Rome, Italy) may offer an opportunity for informally reviewing a first draft and harmonize it with the Commission work plan

## **8. Closing**

The meeting closed at 15:30 on Friday 23 September 2016



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