WORLD METEOROLOGICAL ORGANIZATION

RA VI HYDROLOGY FORUM

Fourth meeting

Bratislava, Slovakia, 2 - 4 April 2019

1. Opening

On 2, 3 and 4 April 2019, the Slovak Hydrometeorological Institute (SMHÚ) hosted the fourth meeting of the RA VI Hydrology Forum that was held in the conference hall of the Tatra Hotel, Bratislava, Slovakia.

The Forum brought together 65 participants (40 men and 25 women), representing 32 WMO RA VI Member countries and 7 regional and international scientific and technical institutions.

Mr M. Benko, the Permanent Representative of Slovakia with WMO, welcomed the participants. He recalled that most of natural disasters, and the costliest, are weather and water-related and praised the value of international cooperation in hydrology recalling examples such as the European and the Global Flood Awareness Systems (EFAS and GFAS) and WMO's Associated Programme on Flood Management (APFM) and Integrated Drought Management Programme (IDMP). He recalled that in 2019, the SMHÚ celebrates 75 years of activities and achieved ISO 9000 certification.

Mr V. Novák, the Director General of the Directorate for Water Protection of the Ministry of Environment of the Slovak Republic, in his opening speech, underlined the need for a better knowledge of the water cycle, not only for a better forecasting to protect societies from water-related extreme events, such as floods and droughts, but also for assessing the impacts of climate change on the resources. Furthermore, he underlined the value of international cooperation in sharing experience and designing common solutions. Mr Novák briefly presented the bilateral cooperation arrangements established by Slovakia with all neighbouring countries on transboundary waters. He highlighted that in each agreement common activities in hydrology are foreseen, including common methodological specification, data collection and sharing.

Mr S. Pecora, on behalf of the President of the WMO Commission on Hydrology (CHy), recalled that water issues are at the forefront of many challenges facing humanity, from climate change to the need for sustainable and integrated management of resources. There is a need for data, information and services to enable the societies to make a better-informed decision and the WMO CHy acts to meet this demand: coordination and cooperation, fostering of observation and development of services. He recalled the outcomes of the HydroConference held in May 2018 and the planned reform of WMO governance.

The Forum also paid a tribute to the memory of Mr Olivier Overney, the Hydrological Adviser to the Permanent Representative of Switzerland with WMO.

2. Workshop

All the presentations given during the workshop and the Forum are available on the WMO Forum dedicated web page that can be accessed at http://www.wmo.int/pages/prog/hwrp/ra6.php. A brief synthesis of all the presentations is provided in the following paragraphs.

2.1 Workshop part 1 – Setting up the scene

Ms F. Tauro presented various activities undertaken by the International Association of Hydrological Sciences (IAHS), in particular, MOXXI (Measurement and Observation for

the XXI Century) and CANDHy (Citizens and hydrology). In the framework of MOXXI, new technologies such as drones or imagery applications are promoted. She underlined the need for a closer interaction between academia, that is developing new technologies, and the operational needs of the National Hydrological Services and of other users, and the role that Hydroforum can play.

Ms L. Blaškovičová introduced the work being carried out by the CEN TC 318 (Hydrometry), also in collaboration with the mirror committee ISO TC 113. Currently, the work is focussing on developing a standard on network design, to be published in 2021. Country representatives were invited to join the CEN TC 318 to provide their experiences into the standard-setting activities.

Mr H. Dixon presented the WMO Global Hydrometry Support Facility (GHSF HydroHub) aiming at helping the countries – mainly through NMHSs – in their data collection, management and dissemination, in a way that leverages innovative technologies and approaches. It is made by five components: the Innovation Hub, WHYCOS to ensure efficiency of observing networks and foster the use of data, WMO Hydrological Observing System (WHOS) for data accessibility and sharing, an information platform on current information on governmental and non-governmental water monitoring organizations, and their capabilities, and a Community of Practice to exchange experiences and provide mutual support.

2.2 Workshop part 2 – Country case studies

Mr M. Barben reported on the redesign of the Swiss national monitoring network. The selection of measuring location was based on the various monitoring goals (water balance, disaster prevention, quality protection, etc.), and considering the locations of existing stations, overlaps and gaps and economic aspects. Stations equipment was also modernized and standardized.

Ms J. Korhonen presented the challenges related to the outsourcing of monitoring of water level and quality to private operators. The Finnish Environmental Institute remains responsible for the overall coordination of the monitoring programme and issues the quality guidance to be abided by the contractors. This approach leads to better quality of data monitored with more effective use of the resources, although it brings the risk of losing the skill linked to the fieldwork. The regular renewal of contracts, with potentially new contractors, also raises questions related to the discontinuity of people and practices.

Ms J. Eybl presented the feature of eHyd, the online portal for accessing the hydrological data of Austria, providing both historical series and real-time gauging of surface and groundwater and other relevant data. To prove large public interest in the status and trends of water resources, it appears that eHyd is the most visited GIS application of the Austrian Ministry of Environment.

Ms E. Trondsen presented the outcomes of intercomparison activities between traditional and innovative measurement techniques, using both direct (regattas, parallel measurements, etc.) and indirect (dual calculation, comparison with rated discharges, etc.). The intercomparison also allowed to identify malfunctioning instruments, that might not have been detected otherwise.

Ms J. Harðardóttir talked about the cross-disciplinary approach and integration of activities that followed the creation of a joint hydrometeorological service in Iceland, bringing together weather and climatology, hydrology and cryology, oceanography and earth sciences. In particular multidisciplinary units dealing with observation, processing and warning were created, allowing e.g. increased efficiency of field work.

2.3 Workshop part 3 – "World café"

Four world cafés were established to discuss broad topics of relevance for the Region. Due to time limitation, the participants could only attend two of the world cafés.

HydroHub (facilitator Mr H. Dixon): The group debated the Region's potential inputs to and expected outcomes from the HydroHub. Several proposals were formulated, among which carrying out a survey of hydrometric needs, increased use of multimedia for presenting innovative technologies, and the need to update WMO Technical Regulation to the challenges posed by the introduction of new technologies. The participants also encouraged the development of the Community of Practice for sharing experience, e.g. in intercomparison, and developing a "who's who" for technical reference.

Network design (Facilitator Ms E. Trondsen): The participant recognized that major drivers for redesign are the need for extending and innovating networks and, providing real-time data especially for flood forecasting. Reducing the financial costs for installation, operation and maintenance, ensuring an essential minimum coverage and supporting international cooperation were among the main design criteria.

Open data (facilitator Ms Cristina Alionte-Eklund): The participants acknowledged the strong push towards opening public data holdings while also recognizing a broad variety of approaches among the RA VI Members, also due to National Hydrological Services concerns of losing any revenue generated from data sales. It was recognized that open data increase the reputation of the National Hydrological Services for their public services. The implementation of WHOS may assist the National Hydrological Services in RA VI in making their data holding more easily discoverable and accessible.

Traditional versus modern measurements techniques (facilitator Mr V. Stojov): Current meters and ADCP are the most common gauging instruments, although the respective share of measurements varies considerably from country to country. Drones and other devices still represent a minor fraction. Although new technologies offer advantages such as greatest efficiency and better accuracy, still many NHSs lack sufficiently qualified and trained staff who is not exposed to hydrometry even during the basic formation at the university level. Higher data quality would be obtained by fostering intercomparison exercises and sharing of expertise, especially from countries already implementing new technologies.

3. Water challenges and WMO activities

Mr H. Dixon presented the outcomes of the CHy-Ext (February 2019) convened at the request of EC-70 to define a path forward for major WMO developments in hydrology and propose the necessary organizational arrangements for the hydrological community to deliver on relevant strategic objectives defined in the WMO Strategic Plan in the framework of the proposed reform of WMO constituent bodies. CHy-Ext recognized that the reform is an opportunity to increase the visibility and involvement of the hydrological community in WMO and to elevate WMO contribution to the global water agenda and its

support to hydrologists worldwide, however it detected also the need to maintain an end-to-end approach to hydrology specific activities and avoid disenfranchising community by ensuring a proper representation of the hydrological community in the different components of the new structure. CHy-Ext recommended to WMO Congress a definition of “operational hydrology” and a series of long term ambitions for operational hydrology to be considered in the Strategic Plan. It also suggested that, at each Congress session a “Hydrological Assembly” meets to provide advice on strategic decisions related to operational hydrological issues, and joint Working Group of Congress and Executive Council to support integrated delivery of water-related activities between the sessions of the Congress.

Mr Y. Simonov presented the progress of the WMO Flood Forecasting Initiative and End-to-End Early Warning Systems for flood forecasting (E-2-E EWS). He detailed the advances in the implementation of various initiatives such as the regional Flash Flood Guidance Systems (FFGS), the Coastal Inundation Forecasting Demonstration Project and the Severe Weather Forecast Demonstration Projects, and the development of assessment guidelines on the efficiency of flood forecasting services.

Mr S. Pecora reported the progress in the development of the WMO Hydrological Obse4rving System (WHOS), the CHy contribution to WIGOS. In August 2015, a map interface was implemented with links to NHSs making their real-time and historical data available online. The implementation of a fully WIS/WIGOS compliant services-oriented framework linking hydrologic data providers and users through a hydrologic information system enabling data registration, data discovery, and data access, based on WaterML 2.0 standard was subsequently approved by CHy-15 in 2016. WHOS is aiming to guarantee interoperability and information flow and initial implementation in RA VI covers the Sava, Danube, Rhine and Aral basins, as well as the Arctic region.

Mr H. Dixon also presented the current situation of the HydroSOS (Status and Outlook System), aimed to provide information on the current hydrological status, appraisal of where it diverges from “normal” and an assessment of the evolution and its likelihood. To do so it will use local data and analyses complemented by information from downscaling of global models. The process, for establishing a routine data stream and for developing a hydrological status and outlook assessments, is being tested in pilot areas such as the Lake Victoria and South Asia (Ganges-Brahmaputra-Meghna basins).

Messrs M. Dacić and Y. Simonov presented the Multi-Hazard Early Warning Advisory System for South-East Europe (SEE-MHEWS-A) aiming to improve the availability of hydrological and meteorological data and information for improving flood forecasting and regional data sharing, including the use of NWP outputs in hydrological forecasting.

4. Dialogue with stakeholders

Mr E. Sprokkereef presented the European and the Global Flood Awareness Systems (EFAS and GFAS) whose goal is to support preparedness for floods event through the provision of complementary, added value medium-range, probabilistic and basin-wide forecasts to NHSs and Civil protection authorities. The recent release of an updated interface allows the use of mobile devices and user reporting missed events. Seasonal outlook up to 8 weeks ahead is also included.

Mr M. Sarač presented the Sava River Flood Forecasting and Warning System. The system aimed at forecasting events and minimizing their adverse impacts. It represents a real-world application of WMO initiatives such as WaterML 2.0, WHOS etc..

Mr K. Ivanov described stakeholder engagement process: combining technical aspects with social aspects of communication can lead to more positive relations and better project outcomes as key issues at all levels are identified and agreed and knowledge, experience and concerns of stakeholders are built into plans and measures, minimizing conflicts and making measures more acceptable.

Mr P. Mikánek described the cooperation mechanism established among the riparian countries of the Danube basin, based on the implementation of targeted projects such as regime of suspended and bedload, inventory of hydraulic structures or water regime analysis and water balance.

Mr E. Sprokkereef presented the activities of the Commission for the hydrology of the Rhine, aiming at contributing to a better knowledge of the hydrology of the basin and sole cross-border problems. Several monographic studies have been completed, ranging from flood frequency analysis to the assessment of land use change on flow regimes. Also, a Rhine Alarm Model has been operationalized. Currently, studies on the influence of snow and glaciers melt on discharge and Socio-Economic-Scenarios and their impact on the discharge regime are underway.

5. UN global initiatives

Mr U. Looser presented the current status of the data holding of the Global Runoff Data Centre (GRDC) summing up to more than 9500 stations in 161 countries for a total of over 420 000 station-years. He stressed that GRDC does not have its own monitoring infrastructure and thus is not substituting the functions of National Hydrological Services, which remain also the owners of the data provided to the GRDC. He reported a continuous growth of the data.

Mr J. Daňhelka updated the participants on WMO activities in the framework of the implementation of the Sendai Framework, notably through the development of a Disaster Risk Reduction (DRR) Roadmap. The Roadmap envisions that WMO and its Members' NMHSs are recognized as an authoritative and effective support mechanism within the national, regional and global DRR arenas with regard to the weather-, water- and climate-related hazards.

Mr T. Abrate reported on the participation of WMO in the activities of UN-Water for the development of indicators for SDG 6 "Water and Sanitation" and the implementation of the strategy for their monitoring, including the development of relevant methodologies.

6. Linking the Forum activities with the Work Plan for RA VI and the activities of CHy

Participants considered that the Hydroforum could help in focussing the regional support to a number of activities undertaken by the Commission for Hydrology or the RA VI Task Team on Hydrology, and notably the assessment of forecasting capability, the validation of forecasts, implementation of WHOS though the appointment of national focal points, as well as the development of the Quality Management Framework- Hydrology (QMF-H)

by supporting various aspects of Project X and by a wider involvement of NHSs in CEN/TC318 Hydrometry.

Recognizing the need also for many countries in RA VI for a capability support facility such as the one that is envisaged in the framework of GHSF HydroHub, the Hydroforum recommended the following activities to be considered by the RA VI Task Team on Hydrology for its work plan:

- Develop, on the basis of experiences such as Yammer, a platform for sharing knowledge and experience, especially on new technologies,
- Promote the conduct of intercomparison tests (e.g. regattas) also at the sub-regional level, and encourage wide participation by Members' NHSs,
- Consider starting the development of technical guidance (matrix) on a choice of technologies (intended use, location, environmental constraints, etc.),
- Continue and further develop the activities on the collection of material and best practices on validation of forecasts, including ensemble forecasts,
- Implement regional training event, e.g. on stream gauging (WMO-IAHS-IAHR course), new technologies, etc.,
- Consider organizing one or two webinars during the intersessional period on topics to be identified by the RA VI Task Team on Hydrology,
- An overview document on the status of observing networks in RA VI might be useful,
- A survey or the completion of the WMO CPDB hydrological part should also be carried out, gathering the opinion and advice of Members' NMHS,
- The priority should be given to the implementation of the Resolution 1, 9 and 14 approved by RA VI-17 (February 2018). The RA VI Task Team on Hydrology will lead the implementation process. A follow-up will be done at the next RA VI Hydrology Forum.
    - On RA VI-17 Resolution 1 on flood forecasting, the assessment will be piloted in the SEE as part of the Multi-Hazard EWS-A project under the lead of Yuri Simonov, the RA VI Rapporteur on Flood Forecasting.
    - On RA VI-17 Resolution 9 on WHOS, the following basins were identified test beds in the 2nd phase,: Sava, Danube, Rhine, Aral, Arctic. The Member countries will be invited to nominate the WHOS National Focal Points once the WHOS concept is approved by the Congress.

7. Summary of the Workshop Day 1

[see 2.3 above]

8. Closure of the Forum

The participants recognized the Forum's value as a unique platform for discussion among hydrology practitioners in the Region.

They expressed the desire that in the next session the workshop part should be on a more focused theme, while in the general part more time is allocated to group discussion on a wide range of issues and problems affecting NHSs. The audience to the Forum could be enlarged to the private sector representatives.

The RA VI Hydrological Adviser to the PR of Moldova with WMO expressed interest to host the next session of the Forum.

The Forum being conducted every two years, its next session is planned for 2021.

The Hydroforum closed at 12.00 on Thursday 4th of April.